Implementation of Federal Prize Authority: Fiscal Year 2015 Progress Report

Appendix 1: Agency Prizes and Challenges Conducted Under the America COMPETES Reauthorization Act of 2010

A Report from the
Office of Science and Technology Policy

In Response to the Requirements of the
America COMPETES Reauthorization Act of 2010

August 2016

About the Office of Science and Technology Policy

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Department, Agency, Office, and Division Abbreviations

ASA	Office of the HHS Assistant Secretary for Administration (part of HHS)
CDC	Centers for Disease Control and Prevention (part of HHS)
CNCS	Corporation for National and Community Service
CPSC	Consumer Product Safety Commission
CTTSO	Combating Terrorism Technical Support Office (part of DOD)
DARPA	Defense Advanced Research Projects Agency (part of DOD)
DHS	Department of Homeland Security
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DOJ	Department of Justice
DTRA	Defense Threats Reduction Agency (part of DOD)
EDA	Economic Development Administration (part of DOC)
Education	Department of Education
EPA	Environmental Protection Agency
EERE	Office of Energy Efficiency and Renewable Energy (part of DOE)
FDA	Food and Drug Administration (part of HHS)
FMC	Federal Maritime Commission
FTC	Federal Trade Commission
GSA	General Services Administration
HHS	Department of Health and Human Services
HRSA	Health Resources and Services Administration (part of HHS)

HUD	Department of Housing and Urban Development
IARPA	Intelligence Advanced Research Projects Activity
NASA	National Aeronautics and Space Administration
NIC	National Institute of Corrections
NIEHS	National Institute of Environmental Health Sciences (part of NIH in HHS)
NIH	National Institutes of Health (part of HHS)
NIST	National Institute of Standards and Technology (part of DOC)
NIJ	National Institute of Justice (part of DOJ)
NNCO	National Nanotechnology Coordination Office
NNI	National Nanotechnology Initiative (coordinated out of NNCO)
NOAA	National Oceanic and Atmospheric Administration (part of DOC)
NSA	National Security Agency
NSF	National Science Foundation
OMB	Office of Management and Budget (part of the Executive Office of the President)
ONC	Office of the National Coordinator for Health Information Technology (part of HHS)
OSTP	Office of Science and Technology Policy (part of the Executive Office of the President)
SAMHSA	Substance Abuse and Mental Health Services Administration (part of HHS)
SBA	Small Business Administration
TSA	Transportation Security Administration (part of DHS)
USAID	United States Agency for International Development
USBR	United States Bureau of Reclamation (part of DOI)
USDA	Department of Agriculture
USFWS	United States Fish and Wildlife Service (part of DOI)
USGS	United States Geological Survey (part of DOI)
USSOCOM	United States Special Operations Command
VA	Department of Veterans Affairs

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Appendix 1: Agency Prizes and Challenges Conducted Under the America COMPETES Reauthorization Act of 2010

This Appendix provides a complete summary of all prizes and challenges conducted in FY 2015 under the prize authority provided to agencies in COMPETES and does not include any of the multiple prize competitions conducted under other authorities.

A. Corporation for National and Community Service

a. Excellence in AmeriCorps Programming and Service Awards[1]

Summary: In honor of retired U.S. Senator Tom Harkin, an inspiring champion for national service, the Corporation for National and Community Service presented the "Excellence in AmeriCorps Programming and Service Awards." The goal for these awards is to recognize outstanding and innovative programs and high quality and meaningful AmeriCorps service experiences (for current members and alumni). Just as Senator Harkin sought to expand "what worked" throughout his career, the organizers intended these awards to encourage the development and expansion of best practices in national service programming, improved project development, and increase the value of the AmeriCorps member experience to help tackle the country's most pressing human and environmental needs through service. With emphases on engaging individuals with disabilities in service, best program innovation and enhancements, and compelling AmeriCorps member experience, the awards reflect the depth of impact of the national service field on the communities served and the individuals serving.

Solution Type: Nominations

Primary Goals: Find and highlight innovative ideas; Inform and educate the public; Build capacity

Results: Of the 100 eligible entries, 5 were selected for recognition and awards, including individuals and organizations from 5 states. These awards allowed us to share excellent program strategies and models with the national service field and the general public so that individuals, nonprofits, government agencies, schools, and more are now more aware of the excellent and diverse range of national service programs across the country.

Problem Statement: Currently there are few good means for programs to share information about best practices with one another. These awards allow the Corporation for National and Community Service to share excellent program strategies and models with the national service field and the general public so that individuals, nonprofits, government agencies, schools, and

[1] https://www.challenge.gov/challenge/excellence-in-americorps-programming-and-service-awards/

more will be aware of the excellent and diverse range of national service programs across the country. This was a single challenge, which the organizers may repeat in the future.

Proposed Goals: The primary objectives of the prize competition were to identify program(s) or individual(s) that best demonstrates improvements and/or high quality national service programming.

Why a Prize: The transparency that comes with a challenge allowed the Corporation for National and Community Service to recognize winners, to share their ideas, and to inspire other programs.

Participants: The agency hoped to mobilize programs and grantees to compete. Eligible nominees were current service participants and alumni, and current programs funded through AmeriCorps grants (or subgrants) from the Corporation for National and Community Service. Those programs include: AmeriCorps State, AmeriCorps National, Tribal programs funded by AmeriCorps, AmeriCorps VISTA, and AmeriCorps NCCC. The competition received 103 entries, 100 of which were deemed eligible. The submissions came from national service staff from all regions of the country (34 states and territories). There were 52 nominations for service programs and 51 nominations for individuals.

The 5 awards recognized both individuals and programs. The potential pool of entrants involves all of the AmeriCorps grantees - which vary in size from a single site with a handful of members to a nationwide program such as Habitat for Humanity and Teach for America with thousands. There are over 3,000 programs, in every state, United States territory, and several Indian nations.

Timeline: Submissions were received between May 28, 2015 and June 22, 2015. The submissions were judged from June 23, 2015 to September 1, 2015, and winners were announced September 15, 2015.

Solicitation & Outreach: The competition was promoted via email, conference calls, and through interactions with the AmeriCorps grantees, state commissions (state affiliates), and state offices (government field offices). The organizers targeted programs in certain focus areas, such as disability focused programs. The awards were announced and promoted at the National AmeriCorps Symposium in Washington, D.C. – as well as through a press release - with targeted press outreach to each of the winners' hometown news outlets. The organizers were very happy with the attention the awards received and the relationship developed with Senator Harkin.

Incentives: There were no cash prizes. The primary incentive was meant to be recognition to the winners' peers (other programs) and others involved or interested in National Service. Recipients were also provided travel expenses to the national symposium if they were not already attending. An outside contractor made the travel arrangements.

Evaluation and Judging: A panel of program officers selected the finalists, and presented to AmeriCorps Directors and the Executive Leadership for final selection. This method seemed to be successful.

There were 4 categories for which an individual or program could be nominated: (1) Best new program addressing a critical priority; (2) Most significant enhancement to an existing program; (3) Member with disability(ies) who significantly contributed to increasing the participation of other individuals with disabilities in national service (as AmeriCorps members, volunteers, or partners); and (4) Most compelling member experience in either building an ethic of civic responsibility or having positive change in his/her life.

A CNCS team of staff from AmeriCorps State, National, VISTA, and NCCC reviewed submissions. Three review teams rated approximately 35 nominations from all 4 categories. The nominations were reviewed by type (e.g., all the innovative program design nominations were reviewed together), rated, and ranked within their respective categories by each review team. All reviewers then met to finalize the ratings and rankings. The team's recommendation was submitted to the CNCS Chief Executive Officer for consideration and final decision. The ratings were defined in this way:

Outstanding: 5

- The nomination fully and clearly provides all criteria requested about the nominee.
- The nomination clearly and effectively demonstrates how the nominee impacts the community.
- The nomination provides evidence to support the impact of the nominee's service.

Good: 4

- The nomination fully and clearly provides most of the information requested about the nominee.
- The nomination somewhat demonstrates how the nominee impacts the community.
- The nomination may provide evidence to support the impact of the nominee's service.

Adequate: 3

- The nomination provides most of the information requested.
- It may not be easy to identify the scope of the nominee’s service or specific results of the service.
- The nomination does not provide information on the impact in the community of the nominee’s service.

Weak: 2

- The nomination information requested is not fully explained or well-developed.
- It is difficult to follow the narrative provided by the nominator.
- Based on the nomination submitted, the nominee meets a small amount of the criteria.

Inadequate: 1

- The nomination does not follow the guidelines provided.
- The nomination does not meet the criteria provided.

- The nomination is poorly written and does not explain the nominee's AmeriCorps service.

Partnerships: The main partnership for the awards was the relationship between the Corporation for National and Community Service and Senator Harkin and his team, which helped promote the work of the programs.

Resources: Resources included a few hours for each reviewer to read and evaluate the submissions. No contractors were involved in the selection of winners, just to provide travel logistics to the recipients as needed.

Results: Just as Senator Harkin sought to expand "what worked" throughout his career, these awards encouraged the development and expansion of best practices in national service programming, improved project development, and increased the value of the AmeriCorps member experience to help tackle the country's most pressing human and environmental needs through service. With emphases on engaging individuals with disabilities in service, best program innovation and enhancements, and compelling AmeriCorps member experience, the awards reflected the depth of impact of the national service field on the communities served and the individuals serving.

These awards allowed the Corporation for National and Community Service to share excellent program strategies and models with the national service field and the general public so that individuals, nonprofits, government agencies, schools, and more are now more aware of the excellent and diverse range of national service programs across the country.

Of the 100 eligible entries, 5 were selected to win awards and gain recognition at the Washington, DC symposium. The 2015 Tom Harkin Excellence in AmeriCorps Award winners are:[2]

- "Berea College PartnerCorps (Berea, Kentucky) - Best New AmeriCorps Program Design - PartnerCorps is a school-wide mentoring program that began in 2013, placing 40 AmeriCorps members in Knox and Leslie County High Schools. Since its inception, PartnerCorps members have provided more than 30,000 hours of service, mentoring students, and providing behavior and attendance assistance. Both schools have seen significantly improved in academic achievement and school attendance since PartnerCorps was introduced to the community. In 2014, Leslie County High School recorded the highest ACT average among juniors in the school's history and jumped from 224th to 16th place out of 230 Kentucky schools.
- American YouthWorks (Austin, Texas) - Most significant enhancement to an existing AmeriCorps program - After being mobilized for their first disaster following Hurricanes

[2] Information about the winners can be found at http://www.nationalservice.gov/newsroom/press-releases/2015/first-annual-harkin-awards-honor-americorps-members-programs

Katrina and Rita in 2005, American YouthWorks quickly discovered they had a formula that worked to provide critical services in times of disaster. Under their former program design however, American YouthWorks AmeriCorps members were only able to deploy during federally-declared disasters, limiting the program's ability to respond in a timely way and provide critical services for an impending disaster. In 2012, American YouthWorks launched their Texas Conservation Corps and corresponding Emergency Response Team, which include teams of AmeriCorps members that are trained and ready for rapid deployment in response to disasters across Texas. These AmeriCorps members are experts in volunteer and donation management logistics, homeowner assistance registration, operating call centers, staffing shelters, aiding in case management, debris removal, and supporting search and rescue operations. Without these critical program changes, American YouthWorks would not have had the swift and impactful response to this year's Texas floods.

- Alex Feest, University of Wisconsin Oshkosh Vet Corps (Oshkosh, Wisconsin) - AmeriCorps member with a disability who significantly contributed to disability inclusion efforts for national service programs - U.S. Marine Corps veteran Alex Feest began his AmeriCorps experience with Riverview Gardens and often doubted his ability to relate to the people RVG serves – community members who struggle with barriers to stable employment due to physical and mental health, abuse, personal choices, and life circumstances. Alex's success working one-on-one with individuals in the Riverview Gardens job training program, inspired the organization to develop a partnership with Outagamie County Veterans Treatment Court, which is an opportunity for veterans experiencing trauma from military service compounded by mental health, alcohol, and other drug addictions, to receive treatment as an alternative to jail. Because of Alex's efforts, veterans from all branches of service have joined Riverview Gardens as community volunteers, and veterans in need have connected with the program and joined the job training program.
- Bridget Palombo, Local Initiatives Support Corporation (Philadelphia, Pennsylvania) - -Most compelling AmeriCorps experience in building an ethic of civic responsibility - As a LISC AmeriCorps member serving with the Asociación Puertorriqueños en Marcha, a nonprofit social service organization in North Philadelphia, Bridget Palombo sought to address the lack of affordable, fresh produce for the families she served. Her research led to the development of the Food Buying Club, which provides residents the ability to purchase produce directly from the Philadelphia Wholesale Product market at a lower cost. In August 2014, the Food Buying Club held its first group buy; eight families shared four cases of produce. Ten months later, 77 families shared 86 cases of produce. Since its inception, the program has provided more than 25,000 pounds of produce and saved participating residents nearly $50,000. Bridget now works with other community organizations to discuss, teach, and implement her model.
- Dubuque National Service Partnership (Dubuque, Iowa) - Honorable Mention - The Dubuque National Service Partnership (DNSP) is a unique cooperative that leverages the collective

impact of Higher Education, local nonprofits, and city and state governments through national service to focus volunteers on building economic opportunity in the Dubuque community. For example, Loras College contributes to the DNSP by utilizing five Iowa Campus Compact AmeriCorps VISTA members and 40 Iowa College AmeriCorps Program (ICAP) members each year to develop programs like Dubuddies which supports Iowans with intellectual disabilities."

B. Consumer Product Safety Commission

a. Carbon Monoxide Safety Poster Contest[3]

Summary: The Carbon Monoxide Safety Poster Contest is intended to educate middle school students in 6th, 7th and 8th grades about the dangers of carbon monoxide (CO) poisoning. Students are being challenged to create a poster that warns others about CO, also called the "invisible killer."

This challenge offers $500 each to 10 finalists, three from each grade chosen by a panel of CPSC judges and one finalist chosen by public vote on CPSC's website. One of the nine finalists chosen by the CPSC judges will be chosen as the grand prize winner and receive an additional $1,000 (for a total of $1500).

Educating 11 to 14-year-old students about carbon monoxide safety is anticipated to have long-term, lifesaving benefits. Students who participate in the poster contest will gain knowledge about how to prevent carbon monoxide poisonings in the future. It is CPSC's hope that they will use that knowledge to encourage their parents, relatives, and friends to protect themselves against CO by getting CO alarms, furnace checkups, operating portable generators safely and recognizing the symptoms of CO poisoning.

This challenge was reported on in the FY 2014 COMPETES report, but had not yet been completed.

Solution Type: Creative (design & multimedia)

Primary Goals: Engage new people and communities

Results: In 2015, CPSC received 700 poster entries from middle school students, more than double the goal of 300 posters and more than the 440 entries from the 2011 contest. There were 10 winners, including three in grades 6, 7 and 8 and also a public vote winner.[4]

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[3] www.cpsc.gov/COContest; this competition was reported on in the FY14 COMPETES Report, starting on page 57.

[4] The winning posters are on CPSC's website at this location: http://www.cpsc.gov/en/Safety-Education/CO-Contest-2014/

Part of the increase in submissions can be attributed to the addition of a public vote on the submissions and hosting the contest on the CPSC website for the first time. This contest illustrates CPSC's success in outreach and engagement of middle school students across the United States and at U.S. military bases throughout the world. CPSC's work to publicize the contest received two million viewer impressions and unique visitors worth more than $62,000 in ad value.

Problem Statement: See FY14 report, page 57.

Proposed Goals: See FY14 report, page 58.

Why a Prize: See FY14 report, page 58.

Participants: Any child who is a citizen or permanent resident of the United States and is in grade 6, 7, or 8 was eligible to participate in this contest, except for children of CPSC employees. To win a prize, a contestant must comply with the requirements and rules of the contest, including submitting a Contest Submission and Parental Consent Form. CPSC received about 700 poster submissions from middle school students, which was a record number of entries. The poster contest submissions came from middle school students in nearly every state across the United States and from U.S. military bases overseas. There were approximately 230 entries each from grades 6, 7 and 8. Poster entries from middle school students attached to overseas military bases represented about 10% of the entries. The previous poster contest (in 2011) received about 440 entries.

Timeline: Poster entries to the CPSC were accepted between July 14, 2014 and February 27, 2015. Judging took place from March through April 2015, and winners were announced May 13, 2015.

Solicitation & Outreach: CPSC staff promoted the poster contest through a press release, tweets and a YouTube video. Staff directly contacted dozens of school districts nationwide and DODEA schools on U.S. military bases overseas in order to target science and art teachers to encourage student participation in the contest. Fire safety officials nationwide helped to promote the contest on their websites and in their newsletters. CPSC requested that the contest information and web link be posted on contest websites and school websites. Directly contacting school districts–particularly DOD schools overseas and large school districts–to encourage students to take part in the contest significantly helped increase participation in this year's contest.

Incentives: See FY14 report, page 58.

Evaluation and Judging: CPSC staff with an expertise in carbon monoxide poisoning prevention judged the poster contest. Posters were evaluated on the basis of CO safety message clarity, visual appearance, and design originality. Most entries were submitted electronically on CPSC's website, and housed in the CPSC's content management system. After the contest closed, judges received an Excel spreadsheet with the child's first name, grade, state and a link to the poster.

Partnerships: CPSC was the sole sponsor of the CO safety poster contest.

Resources: CPSC's CO contest was designed and operated primarily by the agency's Office of Communications (3 staff months) beginning in FY 2014. There has been significant participation by staff in CPSC's Office of the General Counsel (1 staff month), Office of Hazard Identification & Reduction (2 staff months), Human Factors (1 staff month), Health Sciences (1 staff month) and Economic Analysis (0.5 staff months).

CPSC outsourced graphic design of the contest flyer and Web graphics ($1,620), printing of the contest flyer ($1,000) and incurred mailing costs ($700) to send out certificates and checks to the 10 winners ($6,000) and Honorable Mention certificates to all other participants.

Results: CPSC's carbon monoxide poster contest advanced the goal of CO safety awareness among middle school students. CPSC received 700 poster entries from middle school students, more than double the objective of 300 posters. There were 10 winners, including three in grades 6, 7 and 8 and also a public vote winner.[5]

This contest illustrates CPSC's success in outreach and engagement of middle school students across the United States and at U.S. military bases throughout the world. Seven hundred students took on the challenge of creating a poster to demonstrate the dangers of carbon monoxide and, in the process, taught themselves, their classmates and their parents and teachers valuable lessons about dangerous carbon monoxide that will save lives and prevent injuries. CPSC's work to publicize the contest received earned media of two million viewer impressions/unique visitors worth more than $62,000 in ad value. The contest launch was picked up on dozens of local television newscasts and news sites. CPSC's YouTube video promoting the contest received 1,245 views.[6]

This year for the first time, CPSC conducted the contest on its website, www.cpsc.gov. This required a special build out in CPSC's content management system by its Web developers. CPSC also opened up the contest to a public vote to generate excitement. This worked well and contributed to the record number of poster entries.

C. Department of Agriculture

a. Tall Wood Building Competition[7]

Summary: Using wood obtained through sustainable forestry practices in green building applications promotes a healthy environment and a strong economy. The timber industry is an important job creator and supports hundreds of local communities, many of them rural. A recent life cycle analysis found that harvesting, transporting, manufacturing, and using wood in lumber and panel products in building yields fewer air emissions--including greenhouse gases--than the

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[5] The winning posters are on CPSC's website at this location: http://www.cpsc.gov/en/Safety-Education/CO-Contest-2014/

[6] The YouTube video can be found at this address: https://www.youtube.com/watch?v=w_-nydDdcQQ

[7] www.softwoodlumberboard.com

resource extraction, manufacture, and use of other common building materials. There are barriers to being the first to adopt new building materials and systems, most notably the costs of analyzing novel design and engineering alternatives and verifying that these solutions comply with applicable code(s).

USDA, in a cooperative partnership with the Softwood Lumber Board (SLB) and the Binational Softwood Lumber Council (BSLC), launched a prize competition funding initiative to support the demonstration of tall wood buildings in the United States. The prize competition was conducted to showcase the architectural and commercial viability of advanced wood products in tall building construction to support employment opportunities in rural communities, maintain the health and resiliency of U.S. forests, and advance sustainability in the built environment.

The objective of the competition was to identify one or more with existing viable projects and capable design and construction teams willing to convert their existing project from a traditionally constructed tall building to a design and construction approach using advanced wood building materials, new composite, or hybrid wood construction methods.
The total prize purse offered for this competition was $3 million.

Solution Type: Technology demonstration and hardware

Primary Goals: Find and highlight innovative ideas; Solve a specific problem; Advance scientific research; Inform and educate the public; Engage new people and communities; Build capacity; Stimulate a market

Results: Eight eligible submissions were received representing diverse U.S. geographies and top design and development firms from across the nation. Given the significant requirements for basic eligibility in the competition, such as a requirement to control ownership of the development site and to have engaged local jurisdictions having authority with proposals for a conditional letter of support, the competition sponsors believe the response was especially strong.

The two winning design teams were granted a total of $3 million in funding to help support the development of projects in New York and Oregon.[8]

The winners from Portland, Oregon will build a building that is 12 stories tall, constructed of cross-laminated timber, and will house retail, office, workforce housing and community space. The project was submitted by Beneficial State Bancorp in partnership with Home Forward and LEVER Architecture. The building is expected to be completed in December 2017.

The winners from New York, New York will build a building that is 10 stories tall, constructed of wood structural elements, including those that are locally-sourced, include renewable products, and will reduce overall energy consumption by at least 50 percent relative to current

[8] Further details on the winners can be found at https://tallwoodbuildingcompetition.org/wp-content/uploads/2015/09/US-Tall-Wood-Building-Competition-Backgrounder.pdf

energy codes. It will be built at 475 West 18th Street. The project was submitted by 130 134 Holdings LLC, in partnership with Spiritos Properties, SHoP Architects, and Atelier Ten. It is expected to be completed in fall 2016.

In total, 39 unique articles and 102,368,882 online impressions related to the announcement were achieved. Social media and a paid media program were used to drive additional views of the competition coverage from key outlets such as the *Wall Street Journal, Fast Company, Architectural Digest, and ARCHITECT Magazine*.

Problem Statement: Seventy two percent of the nonresidential construction market is suitable for conversion to wood from steel, concrete, and masonry based on proven design strategies. Much of this new market potential is due to the emergence of Cross Laminated Timber (CLT) and other mass timber technologies. CLT is an engineered wood construction system designed to complement light and heavy-timber framing options. Because of its high strength and dimensional stability, CLT panels can be used as an alternative to concrete, masonry and steel in many building types. Using computer-guided saws and drills, CLT panels are cut to the precise dimensions in architectural plans, including window, door, plumbing and ventilation openings. This precision allows for rapid assembly on site resulting in both cost savings and improved thermal efficiency. CLT can also reduce greenhouse gas emissions by storing carbon in the structural material itself and by offsetting emissions from conventional material production. By some estimates, CLT in buildings 7 to 15 stories tall could offset the greenhouse gas emissions equivalent of one year's travel of 1.6 to 2.5 million passenger vehicles, while also supporting healthy forests and rural manufacturing opportunities. The material has other favorable design properties such as high fire resistance when compared with steel, and high dimensional stability for design solutions such as long, open floor plans.

The short-term domestic market opportunity will continue to be modest, limited by the number of practitioners who feel confident enough to use CLT and other engineered wood products before they are code-approved. Assuming 200 CLT buildings per year, North American market research estimates that 90 million board feet of lumber would be consumed annually. The mid- to long-term market opportunity is significant with billions of board feet of demand potential. A 5 to 15 percent penetration of the non-residential North American market potentially translates to 800 million to 2.4 billion board feet of lumber consumed annually. Roughly 35 jobs are created for each million board feet of wood processed. Each million board feet of timber harvested provides $614,000 in personal income and $2.6 million in sales of goods and services.

CLT has gained international popularity. For example, in England, a 9 story building - the Stadhaus - was the tallest modern timber residential building at the time of its completion in 2009. A 10 story tower, Forte, opened in Australia in 2013. A 20 story building - the Life Cycle Tower - is also under construction in Austria. Buildings over 7 stories are complete in Germany, Sweden, and Austria. In Canada, a partnership of the Binational Softwood Lumber Council (BSLC), the Canadian Government, and the Canadian Wood Council successfully overcame the challenges of pioneering tall wood construction through a public-private partnership prize competition. Using $3 million in proceeds from the BSLC and $3 million from the Canadian Government, the collaborative effort solicited input from three designs and construction teams to offer approximately $2 million to three projects. One of the projects, the Wood Innovation

Design Center in Prince Georges, British Columbia, is presently under construction and will be approximately 95 feet tall, making it the tallest wood structure in North America.

Sawmill and plywood/panel manufacturing in the U.S. tends to be volatile and linked to the short-term relative economic health of the domestic housing industry. During the recession, the drop in new residential construction from 1.7 million units annually to 450,000 and a decline in home remodeling as residential mortgages tightened and home sales dropped all combined to impact wood manufacturing. From 2005 to 2009, 1,009 sawmills, 15 pulp mills, and 148 other mills closed; together, representing 19 percent of all domestic mills in the forest sector. These closures of primary mills were accompanied by slowdowns or closures in hundreds more secondary wood-manufacturing facilities, resulting in an overall loss of 294,000 full-time jobs from 2005-2010. Thousands more part-time and self-employed jobs were also lost. While the greatest absolute loss of full-time jobs in the wood sector was in the South (113,000), the greatest full-time workforce impact was in the West; 32 percent of the total 2005 workforce (71,000) primarily in rural communities. The ripple effect of the mill closures and loss of jobs resulted in an overall annual decline of $9 billion in full-time wages in the wood-processing sector. Sawmills and solid wood processing facilities accounted for the largest part of the loss, comprising $7 billion (78 percent) of the full-time wage loss. In addition to losing more than 1,000 mills, the remaining sawmills operated at about 60 percent available capacity between 2005 and 2010, and many individual mills operated well below 50 percent capacity, with significant reductions in workforce and payroll. The markets for sawn building materials are recovering but not fully. At the same time, the industry is having difficulty responding to a modest increase in demand over 2009 levels due to the shrinkage in mill and workforce capacity during the recession.

Long term economic resilience for the industry will require more diversification. At a 2013 convening of industry leaders, marketing initiatives to expand wood-based construction into multistory, commercial and residential applications was identified as a key priority and opportunity.[9]

New engineered wood products require research and testing to ensure that design and engineering solutions can achieve safety requirements for fire, seismic and other code approvals. New products used in novel combinations with concrete and steel elements require additional performance testing. Once completed, this research can inform subsequent building innovation and design solutions using wood.

The Competition prize purse has been awarded to selected participants to cover the incremental costs of converting from traditional construction to a mass timber building system. The selected proponents were the teams demonstrating the best ability to utilize new scientific data, to develop technical expertise, and to use incremental funding to safely design, specify, and construct a building of a minimum of eighty feet (80') in height (not including a reinforced

[9] The State and Future of U.S. Forestry and the Forest Industry, Washington, DC, May 29-30, 2013 Workshop Report and Recommendations.

concrete podium) using advanced wood products. Priority was given to applicants that sourced materials from rural domestic manufacturers and domestic sustainably-managed forests. Eligible costs include engineering assessments, incremental design expenses, costs of developing fire and building safety strategies and other design, testing, engineering and modeling requirements to meet performance goals and satisfy code requirements. Applicant teams were evaluated based on a set of mandatory and bonus criteria related to the project's business case, proposed wood design solution, rural economic ties, and the proposed building's overall social and environmental sustainability.

The initiative was a single challenge.

A comprehensive set of requirements were developed to ensure that development teams were capable of overcoming design, engineering, permit approval, financing and other hurdles associated with completing construction of the proposed building project. Additional criteria emphasized ties to bolstering new domestic rural manufacturing of wood products and demonstrating wood as a sustainable building alternative.[10]

Proposed Goals: The objective of the Competition was to identify one or more proponents with existing viable projects and capable design and construction teams willing to convert their existing project from a traditionally constructed tall building to a design and construction approach using advanced wood building materials, new composite or hybrid wood methods. A demonstration project is critical to paving the way for more widespread code adoption of advanced wood products and, in turn, domestic rural manufacturing and supply opportunities.

The prize aims to build one or more high profile demonstration projects capable of educating new audiences about the important role of rural communities and healthy forests in providing clean air, water and renewable resources to supporting a growing global population. Many of these natural resource and rural economic development concerns are not presently considered within the context of building material decisions by the design and development community. In addition to environmental impacts, a key objective of the demonstration project is to create a track record of success to influence building code changes in the future.

Prize funding will support costs associated with pioneering the use of advanced wood products and systems in tall buildings in the U.S. and open the door for widespread adoption and manufacturing opportunities for structural wood materials, such as CLT, in the United States.

Why a Prize: A prize provided the ideal vehicle and flexibility for USDA to encourage innovation, prompt coordination and leadership from multiple partners, and meet multiple agency mission objectives within the Department.

Participants: The agency hoped to mobilize teams of developers, architects, engineers, rural manufacturers and others, and required solvers to complete a demonstration building.

[10] A full description of scoring criteria can be found in the Federal Register notice located at https://www.federalregister.gov/articles/2014/10/10/2014-24198/announcement-of-requirements-and-registration-for-the-us-tall-wood-building-prize-competition.

The competition was open to Project Proponent Teams consisting of real estate developers, institutions (e.g., universities), and other corporations or legal organizations (e.g., partnerships or nonprofit organizations), and their design and construction team partners. All proposed projects needed to be located in the United States, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, Guam, or American Samoa. Additional restrictions on entrants, conflicts of interest and other criteria were also specified.

Eight eligible submissions were received representing diverse U.S. geographies and top design and development firms from across the nation. Given the significant requirements for basic eligibility in the competition, such as a requirement to control ownership of the development site and to have engaged local jurisdictions having authority with proposals for a conditional letter of support, the competition sponsors believe the response was especially strong.

Timeline: The Competition commenced October 9, 2014:

Federal Register Notice[11]	October 10, 2014
Competition Submission Period	October 9, 2014-December 8, 2014.
Evaluation and Judging	December 8, 2014-February 3, 2015
Verification of Potential Winner(s) and project due diligence	February-August 2015
Announcement of Winner(s) and Signing of Preliminary Funding Agreement(s)	Fall and September 17,2015
Funding for eligible incremental costs awarded to winners	Ongoing through project completion.

Solicitation & Outreach: In addition to the Federal Register Notice, SLB issued a press release and the White House Rural Council issued a blog post both on October 14, 2014. Additional press in anticipation of the prize was garnered in connection with the Symposium *Building With Wood: Jobs and the Environment* convened by USDA and the White House in March 2014. The nonprofit WoodWorks, a partner of the U.S. Forest Service, conducted extensive outreach to support entry preparation by development teams.

USDA's early stakeholder engagement was through the White House Rural Council symposium and was effective in garnering interest and media attention for the competition ahead of the official rules being announced in the Federal Register. Given the time it takes to put together a complex development proposal, this advance notice was particularly crucial to receiving quality submissions.

[11] On October 10, 2014, in Vol. 79, No. 197, pp. 6127 S to 61281 of the Federal Register, USDA published the Announcement of Requirements and Registration for the U.S. Tall Wood Building Prize Competition.

USDA, the SLB, and Edelman, a communications firm, created and executed a communications plan for the announcement of the winners of the competition, including renderings of the winning building proposals. The organizers also coordinated an event featuring Secretary Vilsack, members of the winning teams, and New York State and city officials, which garnered additional attention to the competition. In total, the competition achieved 39 unique articles and 102,368,882 online impressions related to the announcement. The competition organizers used social media and a paid media program to drive additional views of the competition coverage from key outlets such as the *Wall Street Journal, Fast Company, Architectural Digest,* and *ARCHITECT Magazine*.

Engagement of the third-party communications firm, Edelman, brought additional capacity to outreach and tracking that allowed USDA to focus on placing interviews with the most significant opportunities.

As the projects are completed, additional media opportunities at milestones such as groundbreakings or finished projects will be pursued.

Incentives: The Prize Purse was a $3 million combined pool, $2 million from SLB and $1 million from USDA. Awards were made to the winning 2 Project Proponent Teams ($1.5 million each) to cover incremental costs of transitioning their building from a traditional structure to a wood structure, i.e., those costs incurred only because of the Project Proponent Team's innovative use of wood products in the demonstration structure. The winning Project Proponent Teams were required to enter into a post-Competition funding agreement ("Funding Agreement") with the SLB, and to submit incremental costs for approval as Eligible Expenses prior to receiving disbursements of funds from the Prize Purse. No agreements were made between the winning teams and USDA. The winning Project Proponent Teams are encouraged to seek additional sources of funding beyond the prize purse to promote the project's transition from a traditional structure to a wood structure. Notably, the prize purse increased over the course of the competition from $2 million to $3 million due to an increased investment from the SLB. The competition anticipated a possible increase in the prize purse in order to support more than one winner which was specifically referenced that in the competition's rules and Federal Register Notice. These provisions were helpful in streamlining the requisite administrative steps to change the prize purse when additional funding became available.

Evaluation and Judging: Given the diverse technical and development expertise required to evaluate submissions, USDA and the SLB convened an international panel of experts spanning design, development, manufacturing, and engineering expertise to serve on the judging panel. Additionally, a group of advisers and observers participated in a day-long session to finalize rankings and provide non-voting insights on technical questions raised by the judging panel. The Judging Panel evaluated entries based upon the following mandatory criteria and bonus criteria:

1. Project Specifics and Details--Mandatory Element Criteria--15%

- Viability of the proposed project--based on site ownership, site parameters, site zoning, the stage of design development as presented, and the stage of the development permit(s) as described.

- Ability of the project to foster transformative change in the built environment--based on the project's iconic architecture or engineering, or high profile accessibility or visibility.

2. Business Case for Project--Mandatory Element Criteria--30%

- The Project Proponent Team's summary of experience with building development and tall building design and construction.
- Viability of the Project Proponent Team's business case--presentation of financial metrics, base assumptions, demand estimation for the project's space, market analysis, budgets, partnership agreements, regional or national socio-economic impact of the project, etc.; and based on an estimated summary of "Eligible Expenses."
- Project Timeline--proposed schedules with realistic estimated project completion dates that are nearer in the future will be evaluated more highly than proposed schedules with estimated project completion dates that are further in the future and/ or are unrealistic.
- Willingness and ability of the Local Authority (ies) to cooperate with the Project Proponent Team--based on the letter(s) from or descriptions of engagement with the Local Authority (ies).
- Competition entries with letter(s) will be evaluated more highly than entries with only descriptions of the engagement between the Project Proponent Team and the Local Authority (ies).

3. Proposed Wood Solution--Mandatory Element Criteria--25%

- Viability of the proposed wood structural solution--based on the system and materials proposed, the level of detail provided about the proposed system, the demonstrated feasibility of the system, and the practicality of the proposed system and its potential for repeat use in the industry.

4. Sustainability--Mandatory Element Criteria-- 15%

- Amount of reduction in environmental footprint over a similar building constructed using traditional materials.
- Amount and types of sustainability elements featured in the project.
- Feasibility of realizing the estimated levels of impact of the project from a sustainability and performance perspective.

5. Rural Economic Ties--Mandatory Element Criteria--15%

- Feasibility of realizing positive impacts to the U.S. rural economy from the project and/ or wood materials used in the project--based on demonstration of the project's potential to be a catalyst for supporting emerging demand for new domestic rural manufacturing and employment opportunities.
- Quality of the plan for development of a Tall Wood Building Demonstration Report (A Case Study).
- Creation of direct rural economic opportunity related to the project--based on documentation of commitment to source wood materials from U.S. Rural Sources.

The Judging Panel also evaluated entries based upon the following optional element criteria:

1. Project Specifics and Details--Optional Element Criteria--Bonus 5%
- A description of the proposed building enclosure solution and its viability.

2. Business Case for Project--Optional Element Criteria--Bonus 5%
- Project Proponent Team's past experience with completed design and construction of projects that are similar to the proposed project in form and scale.

3. Proposed Wood Solution--Optional Element Criteria--Bonus 5%
- A reasonably detailed estimate of construction costs and savings comparing the proposed wood solution to other traditional methods and materials for the proposed project.
- A description of the fire protection strategy being proposed and its viability.

4. Sustainability--Optional Element Criteria--Bonus 5%
- Documentation that links the wood materials and products to be sourced for the proposed project to sustainable timber harvest practices, certifications, or other sustainable land management initiatives.

5. Rural Economic Ties -Optional Element Criteria--Bonus 5%
- Competition entries that go beyond a commitment statement to include details of how and where in rural America wood materials will be sourced will be evaluated more highly than less detailed entries.

The methods were effective. The criteria and evaluation process was a “tried and true” format similar to many architecture competitions and thus was familiar to both applicants and evaluators.

Partnerships: USDA partnered with SLB and BSLC for implementation of the prize competition. The SLB also served as the competition sponsor and after coordination with partners made final decisions related to the development, management, and implementation of the competition.

Resources: Only the resources for the prize purse and personnel required to develop and oversee implementation of the prize and cooperative agreement were used. USDA provided $1 million of the $3 million prize purse. All day-to-day oversight of the competition was delegated to the competition manager through the SLB. Costs associated with prize administration were borne jointly by the SLB and the BSLC and not by USDA.

Results: To date the competition has been very effective in engaging leading developers, architects and engineers to develop proposals. A key objective of the demonstration project is to create a track record of success to influence building code changes in the future. Each proposal required engagement with local code officials to present the concept and garner an initial letter of support to consider the project under an alternative solutions approach under the building code. This engagement of code officials in major municipalities has helped communicate the benefits of mass timber design practices. At least two rural manufacturers of engineered wood products have made significant new capital investment to support supply in connection with the competition. The State of Oregon has established its own competition mirrored after the USDA effort to further support early adoption of mass timber buildings.

The two winning design teams were granted a total of $3 million in funding to help support the development of the New York and Oregon projects. The Portland, Oregon winner/building will be 12 stories tall, constructed of cross-laminated timber, and will house retail, office, workforce housing and community space. It will be built in the Pearl District. The project was submitted by Beneficial State Bancorp in partnership with Home Forward and LEVER Architecture. For the 12-story urban + rural ecological project, Beneficial State Bancorp will provide site control to real estate developer project, affordable housing investor, Home Forward, and LEVER Architecture, for the proposed Framework as a redevelopment of their Pearl District property. The main community space is designed to include a public Tall Wood Exhibit, featuring resources related to the realization and design of the building. The building is expected to complete construction in December 2017.

The New York, New York winner/building will be 10 stories tall, use wood structural elements, including those that are locally-sourced, include renewable products, and will reduce overall energy consumption by at least 50 percent relative to current energy codes. It will be built at 475 West 18th Street. The project was submitted by 130 134 Holdings LLC, in partnership with Spiritos Properties, SHoP Architects, and Atelier Ten. The building is expected to be completed in the fall of 2016.[12]

[12] More details about the winners can be found at https://tallwoodbuildingcompetition.org/wp-content/uploads/2015/09/US-Tall-Wood-Building-Competition-Backgrounder.pdf.

D. Department of Commerce

a. NIST Head Health Challenge III[13]

Summary: Head Health Challenge III seeks to stimulate the development of a range of materials that provide excellent energy absorbing and energy dissipating properties. The National Football League, Under Armour, GE, and NIST are working in partnership on this Challenge, which is offering up to $2 million in prizes. The challenge kicked off February 2, 2015 with an invitation for participants to submit an abstract that described a novel material that met specific performance criteria related to maximizing energy absorption while minimizing momentum transfer. Technical experts evaluated the abstracts and in April 2015 the authors of the top-rated abstracts were invited to submit a more detailed proposal along with samples of the material for testing. Considering the results of mechanical tests performed by NIST and the attributes of the overall proposal, a panel of judges identified five teams to be recognized with a First Round Award of $250,000 each, which was supplied by the challenge partners.

Over the coming year, the teams will further develop their materials in consultation with the challenge partners. In early 2017, the judges will again come together to select one Grand Prize winner to receive up to $500,000 supplied by NIST.

Solution Type: Ideas; Technology demonstration and hardware

Primary Goals: Develop technology, advance science

Results: The competition received 125 abstracts and 55 full proposals from 22 states. NIST tested 21 materials in preparation for first round judging.

The challenge is ongoing. The five winners of the first round were announced in December 2015 and the grand prize winner will be announced in late 2016. First Round winners will receive opportunities to consult and work with NIST, Under Armour, and the other partners as they refine their materials leading up to the Grand Prize.

In August of 2015, the Judges convened and chose the five first round winners. These were announced to the public on December 15, 2015 through a press release that was picked up by more than 200 news outlets, including the major networks.[14] In addition, over 10 journalists produced original stories about the event. The first round winners are:

- Alba Technic, LLC (Winthrop, ME) has developed a patented, shock-absorbent honeycomb material with an outer layer that diverts the energy from a fall or hit. The material is normally soft and compliant, but upon impact, the outer layer changes into a hard shell to spread the energy and protect the user from injury.

[13] www.headhealthchallenge.com

[14] See press release and accompanying NIST video here: http://www.nist.gov/mml/mmsd/20151215head.cfm

- Charles Owen Inc. (Lincolnton, GA) made cellular structures that use a stacked, origami-like design to optimize energy absorption. The essential building block of this winning material is a double corrugated sheet of the material, whose ability to fold efficiently was originally developed for applications in areas such as solar array packing in the space industry.
- Corsair Innovations (Plymouth, MA) has developed a textile that uses tiny, spring-like fibers to repel rotational and linear impacts, thereby reducing potential damage. Unlike foam materials, this textile is washable, breathable, wicks sweat and can be easily engineered to meet impact performance requirements.
- Dynamic Research Inc. (Torrance, CA) and 6D Helmets LLC are collaborating to evolve 6D's single-impact suspension technology for use in repeated impact conditions. The suspension technology consists of a multi-layer, suspended internal liner system that allows the outer layer to move independently of the inner layer in order to reduce the effect of both angular and linear impact forces.
- University of Michigan (Ann Arbor, MI) researchers designed a lightweight, multi-layered composite that includes a viscoelastic material. This material can be uniquely utilized to help limit the force and impulse of multiple and repeated impact events.

Problem Statement: The NFL, Under Armour, GE, and NIST established this joint effort to advance the state-of-the-art in advanced materials for impact mitigation by stimulating the development of materials that provide excellent energy absorbing and energy dissipating properties.

Proposed Goals: The goal of Head Health Challenge III is to spur that creation of innovative impact absorbing materials that will result in increased protection for athletes, the warfighter, and civilians.

Why a Prize: The partners understood that the materials experts who could produce better materials could be found in a hugely diverse set of communities, from aerospace to automotive to sports medicine. A national prize competition would gain the attention of this diverse set of scientists and engineers. This prize seeks to advance the research and technology development in this field by tapping into a diverse network of materials scientists and others with an interest in answering this call to action.

Participants: The Head Health Challenge III follows the eligibility guidelines outlined in COMPETES (e.g., entrants must be US citizens or permanent residents over the age of 18, and validly formed legal entities in the US; entrants could not be NIST employees or guest researchers, or Federal employees or entities acting in their official capacity; or anyone affiliated with the challenge sponsors). Because of the demanding material performance requirements and the obligation to provide a sample of the material if invited to submit a full proposal, many of the participants are practicing materials scientists and engineers.

The 55 proposals received came from 22 states. The proposals from university researchers came from a wide range of departments and specialties, including civil engineering, human ecology, sports medicine, mechanical engineering, aerospace engineering, electrical engineering, materials science and engineering, biomedical engineering, chemical engineering, nanotechnology, and industrial and systems engineering. The industrial entries submitting were almost entirely small businesses and startups that were conducting materials development for a wide range of industry applications, including the chemical sector, aerospace, automotive, athletic protection, military protection, furniture and homewares, advanced fabrics and fibers, and nano-composites. The two large business participants were from the specialty chemical and polymers industry.

Timeline: The challenge details were announced on January 29, 2015 in the Federal Register (Docket Number: 150123071-5071-01). The abstract submission period was from February 2, 2015 – March 13, 2015. The challenge sponsors issued invitations for full proposals in April 2015, and materials testing occurred at NIST during July and August 2015. The First Round winners were announced in December 2015. Over the next year, the winning teams will refine their materials to compete for the $500,000 grand prize that will be announced in early 2017.

Solicitation & Outreach: The Head Health Challenge III follows two previous challenges that were issued by the NFL, Under Armour, and GE as part of a larger program to support head health. This continued programmatic set of competitions helped build awareness of the Head Health Challenge III. The challenge was announced during a press conference in Phoenix, AZ held in conjunction with Super Bowl XLIX. Video segments and interviews on news programs (both local and national) helped generate awareness of the challenge and shed light on this important issue. The challenge platform host, NineSigma, shared information about the challenge with their community of innovators. In addition, NIST reached out to representatives of the top materials science and engineering programs in the nation, and generated interest through soliciting the membership of the Materials Research Society and the American Chemical Society.

Incentives: Up to $2 million in prizes are being offered in conjunction with the Head Health Challenge III. The judges identified five teams to receive First Round awards of $250,000 each, which were supplied by the challenge partners. The First Round winners will compete for a grand prize of $500,000, which NIST is supplying.

Evaluation and Judging: The abstracts and proposals were evaluated by technical reviewers using criteria described in the Federal Register Notice. The winners were determined by a panel of seven judges appointed by the NIST Director. The seven judges represent world-leading expertise in materials science:

- Jeff Crandall, Ph.D., professor in Engineering and Applied Sciences at the University of Virginia. Crandall's research focuses on mechanisms of injury under impact loading.
- Sharon Glotzer, Ph.D., professor of Chemical Engineering at the University of Michigan. Glotzer’s research focuses on the ability to manipulate matter at the molecular, nanoparticle, and colloidal level to create "designer" structures.

- Heinrich Jaeger, Ph.D., professor of Physics at the University of Chicago. Jaeger's team at the University of Chicago is involved in projects ranging from the assembly of next-generation nanostructures to investigations of the complex nonlinear behavior of granular materials, including grain, gravel, pharmaceutical pills and ultrafine powders.
- Michael Maher, program manager for the Defense Sciences Offices at the Defense Advanced Research Projects Agency (DARPA). Maher's current interests include development of new technologies to reduce the manufacturing cycle time and novel lightweight multifunctional material systems.
- Tresa Pollock, Ph.D., chair of the Materials Department at the University of California – Santa Barbara. Pollock's current interests include the mechanical and environmental performance of materials in extreme environments, unique high temperature materials processing paths, ultrafast laser-material interactions, alloy design and 3-D materials characterization.
- Alton D. Romig, Ph.D., former vice president and general manager of Advanced Development Programs Engineering and Advanced Systems, known as Skunk Works, for Lockheed Martin Aeronautics. In this role, Romig focused on generating breakthrough technologies and designs for aircrafts and is known as the leader in aerospace innovation.
- Alan Taub, Ph.D., professor of Materials Science and Engineering at the University of Michigan. Taub is pursuing research in advanced materials and processing and leading an initiative to establish a new center within the U-M College of Engineering that will focus on advanced manufacturing of lightweight material structures for automotive and aerospace applications.

Taking into account the full proposal, the results of material testing performed by NIST, and the subject matter experts' evaluations, the panel of judges selected the First Round winners using the following five criteria:

(1) Significance (30%): The proposed material addresses the problem of impact protection, and extends the current state of the art in materials in this field.
(2) Participant Capabilities (10%): The participant (or, if more than one, the participant team) has, as appropriate, the technical capabilities, scientific expertise, resources, management structure, business awareness, and collaborations necessary to execute its proposal, and a demonstrated track record of success in scientific, engineering and business enterprises as appropriate.
(3) Innovation (40%): The proposed material employs or embodies novel materials science concepts or novel repurposing of a material, and/or the participant/participant team is employing new approaches and methodologies to materials engineering in order to create exceptional impact protection.
(4) Approach (10%): The overall strategy, and methodologies employed by the participant/participant team are scientifically sound and technically feasible.

(5) Material Readiness (10%): It is technically feasible that production of the proposed material can be scaled to commercial volumes. The testing data collected by NIST were of primary importance to the judges' selection of the winners.

Partnerships: The NFL, Under Armour, and GE partnered with NIST in the design and execution of this challenge.

Resources: In FY 2015 NIST invested $600,000 to support its role in the Head Health Challenge III. These funds supported personnel and technical equipment. NIST materials scientists and engineers developed material performance tests, and NIST acquired new equipment to perform these tests on the submitted materials. In addition, about 20 NIST experts in materials and mechanics provided technical reviews of the challenge abstracts and proposals. As a part of their regular duties, staff in the NIST Program Coordination Office and the Department of Commerce's Office of the Chief Counsel dedicated time for scoping and finalizing the challenge. The challenge was hosted by NineSigma under contract with the NFL, Under Armour, and GE. Each of the four partners is contributing funds for the prize awards. The NFL, Under Armour, and GE are contributing to the five $250,000 first round awards, and NIST is contributing $500,000 for the grand prize.

Results: The competition received 125 abstracts and 55 full proposals, and 21 materials were selected for testing by NIST in preparation for first round judging. The 55 proposals received came from 22 states. The academic proposals came from a wide range of departments and specialties, and the industrial entries were almost entirely small businesses and startups that were conducting materials development for a wide range of industry applications. The two large business participants were from the specialty chemical and polymers industry.

In August of 2015, the Judges convened and chose the five first round winners. These were announced to the public on December 15, 2015 through a press release that was picked up by more than 200 news outlets, including the major networks.[15] In addition, over 10 journalists produced original stories about the event. The first round winners are:

- Alba Technic, LLC (Winthrop, ME) has developed a patented, shock-absorbent honeycomb material with an outer layer that diverts the energy from a fall or hit. The material is normally soft and compliant, but upon impact, the outer layer changes into a hard shell to spread the energy and protect the user from injury.
- Charles Owen Inc. (Lincolnton, GA) made cellular structures that use a stacked, origami-like design to optimize energy absorption. The essential building block of this winning material is a double corrugated sheet of the material, whose ability to fold efficiently was originally developed for applications in areas such as solar array packing in the space industry.
- Corsair Innovations (Plymouth, MA) has developed a textile that uses tiny, spring-like fibers to repel rotational and linear impacts, thereby reducing potential damage. Unlike foam

[15] See press release and accompanying NIST video here: http://www.nist.gov/mml/mmsd/20151215head.cfm

materials, this textile is washable, breathable, wicks sweat and can be easily engineered to meet impact performance requirements.

- Dynamic Research Inc. (Torrance, CA) and 6D Helmets LLC are collaborating to evolve 6D's single-impact suspension technology for use in repeated impact conditions. The suspension technology consists of a multi-layer, suspended internal liner system that allows the outer layer to move independently of the inner layer in order to reduce the effect of both angular and linear impact forces.
- University of Michigan (Ann Arbor, MI) researchers designed a lightweight, multi-layered composite that includes a viscoelastic material. This material can be uniquely utilized to help limit the force and impulse of multiple and repeated impact events.

b. NIST Reference Data Challenge[16]

Summary: The Reference Data Challenge was a call to action for app developers to help improve the way NIST shares scientific reference data. Scientists and engineers need data—from the atomic weight of carbon and the structure of benzene to the most precise value for the speed of light. High quality physical and chemical reference data help researchers design experiments, build better products, solve health and environmental problems, and even study the stars. NIST provides some of the most accurate and comprehensive datasets in the world, known as Standard Reference Data (SRD). In this challenge, entrants created an app that used one (or more) of six popular SRD. A panel of judges -- including internet pioneer Vint Cerf and the Department of Commerce Chief Data Officer Ian Kalin -- selected the winning apps based on the apps' potential impact, creativity and innovation, implementation, and use of SRD.

$45,000 in prizes were offered (1st $30,000; 2nd $10,000; 3rd $5,000).
Solution Type: Software and apps

Primary Goals: Improve government service delivery; Solve a specific problem; Engage new people and communities

Results: 25 new apps were created using NIST reference data, helping to initiate a modernization of NIST's publicly accessible data. Over 130 participants registered on the site, building interest in NIST reference data. The contest also stimulated the growth of at least one new company: the First Place winner, Meru Apps LLC, intends to develop products that will help laboratory scientists use data more effectively.

The top prize of $30,000 went to Kris Reyes from Meru Apps LLC in Princeton, N.J. His app, Meru Lab Reference, allows users to quickly access NIST chemical species data with the tap of a near-field communication (NFC) tag, smart chips that are able to store digital information and share it with a smartphone. The second place prize of $10,000 went to college students Zachary Ratliff (Waco, Texas) and Daniel Graham (Danville, Ky.) for their Lab Pal app that is a "go-to"

[16] nistdata.devpost.com

tool for scientists and engineers. The third place award of $5,000 went to a team from MetroStar Systems in Reston, Va. whose app ChemBook provides multimedia information about chemical elements from NIST and other sources. Honorable Mention awards (no cash prize) went to Andy Hall's SciCalc9000 app, a scientific calculator that integrates NIST SRD, and Annie Hui and Neil Wood of R-Star Technology Solutions, whose Thermocouple Calibrator app is a handy tool for converting between voltage and temperature. This challenge kicks off a bigger NIST open data commitment to improve the accessibility of SRD for app developers and other users of this valuable scientific data.

Problem Statement: The Reference Data Challenge was a call to action for app developers to help NIST improve the way scientific reference data are shared. Scientists and engineers need data—from the atomic weight of carbon and the structure of benzene, to the most precise value for the speed of light. High quality physical and chemical reference data help researchers design experiments, build better products, solve health and environmental problems, and even study the stars. NIST provides some of the most accurate and comprehensive datasets in the world, known as Standard Reference Data (SRD).

This challenge can boost awareness of important NIST scientific data resources and modernize the data's use through creative apps developed by challenge participants.

Proposed Goals: There were many goals associated with this challenge. The challenge was designed to incentive others to generate new apps using NIST data, in effect improving NIST's ability to disseminate data using modern tools. However, the challenge was also designed to engage the broader scientific and app developer communities about the existence of Standard Reference Data. As NIST continues to provide more sophisticated data resources, the organizers hope to tap into and grow the app developer community that was born from the Reference Data Challenge.

Why a Prize: NIST did not have app developers in-house available to design mobile apps for SRD. By hosting the challenge, NIST organizers were able to leverage the skills of developers not at NIST and – very importantly – tap into the mindset of those outside of NIST who use data.

Participants: NIST sought app developers and scientists or engineers familiar with SRD to participate in this challenge. The eligibility guidelines required entrants to be U.S. citizens or permanent residents over the age of 18, and validly formed legal entities in the U.S. Entrants could not be NIST employees or guest researchers, or Federal employees or entities acting in their official capacity. The 25 complete submissions came from individuals and teams, some from the private sector. Many entrants noted in their submissions that they were entirely new to NIST data, but several were already familiar with NIST data and had valuable coding skills that helped them build their software submission.

Timeline: The challenge details were announced on July 22, 2015 in the Federal Register (Docket Number: 150702573-5573-01). The submission period was from July 27, 2015 – September 28, 2015. Winners were announced at nistdata.devpost.com on November 16, 2015.

Solicitation & Outreach: NIST's outreach for the Reference Data Challenge was multifaceted. As a precursor to the challenge, NIST invited coders to play with SRD during the National Day of Civic Hacking on June 6, 2015. When the challenge submission period started, NIST and the Department of Commerce issued press releases and blog posts about the challenge. NIST's use of social media tools such as Twitter and Facebook helped spread the word, including essential retweets from other Federal agencies including GSA, DARPA, and NSF. The Challenge Manager shared information about the Challenge during the annual meeting of the American Chemical Society in Boston, MA, and the judges also played an important role in helping to generate interest in the challenge. The Challenge Manager reached out to researchers who had recently published papers or patents that cited the NIST datasets. The challenge website host, Devpost, helped generate developer interest in the contest. Social networks proved to play an important role – the 1st place winner heard about the challenge through professional contacts on LinkedIn.

Incentives: $45,000 in prizes was offered (1st $30,000; 2nd $10,000; 3rd $5,000). The judges selected two honorable mention awards that did not include cash prizes (but the awardees were recognized in the NIST press release announcing the winners).

Evaluation and Judging: A panel of judges was appointed by NIST Director Willie May. The panel included seven experts with a variety of relevant experience:

- Bibiana Campos-Seijo, editor, *Chemical and Engineering News* (C&EN), and vice president, C&EN Media Group;
- Vinton Cerf, vice president and chief Internet evangelist, Google;
- Stuart Chalk, associate professor of chemistry, University of North Florida;
- Robert J. Hanisch, director, NIST Office of Data and Informatics;
- Ian Kalin, chief data officer, Department of Commerce;
- Diana Ortiz-Montalvo, research chemist and co-leader, Postdoctoral Association, NIST; and
- Christopher Sloop, chief technology officer, Earth Networks.

After an initial review by NIST subject matter experts to identify all eligible app submissions that met the minimum criteria described in the rules, the judges rated each eligible app against four equally weighted criteria:

(1) Potential impact: How strong is the potential of the submission to help students and other technical experts use NIST Standard Reference Data?
(2) Creativity and Innovation: To what degree is this submission innovative? Does it bring new thinking and creativity to improving access to NIST Standard Reference Data?
(3) Implementation: Does the App provide an engaging user experience and have interactive capabilities? Does it work well?
(4) Use of Scientific Reference Data: Does the App use at least one of the Eligible NIST Datasets? Preference given to applications that integrate more than one dataset.

Partnerships: No partners, except for the app platform (which is listed below as a resource) provided by Devpost.

Resources: NIST personnel were involved in the design and execution of the Reference Data Challenge. In addition to a significant amount of the challenge manager's (a NIST employee) time, staff in the NIST Office of Information and Systems Management (OISM) were employed to generate data files. NIST research and technical staff were consulted to help identify and prepare the data. The Office of the Chief Counsel also dedicated time for scoping and finalizing the challenge rules and associated documentation per COMPETES requirements. The challenge was hosted on a website provided by Devpost (formerly, Challengepost). The prize funds, challenge website hosting, and OISM time were billed to an account established for the purpose of the challenge. Other staff time was provided in kind and/or as part of established responsibilities. In total, 1/5 FTE (Challenge manager) and 2 FTEs at 10% effort each was utilized, and $37,500 for IT services (data preparation and challenge website).

Results: The Reference Data Challenge, NIST's first-ever app challenge, generated dozens of new apps that showcased creative and innovative ways of using NIST data. The challenge helped NIST reach a broader audience, engaging app developers as well as others already familiar with the agency's scientific data who saw the opportunity to improve how people can access and use it. This improved dissemination of scientific data is essential to NIST's mission and responsibilities outlined in the NIST Organic Act and the Standard Reference Data Act. The winners designed apps using NIST's reference data in new creative ways.

The top prize of $30,000 went to Kris Reyes from Meru Apps in Princeton, N.J. His app, Meru Lab Reference, allows users to quickly access NIST chemical species data with the tap of a near-field communication (NFC) tag, smart chips that are able to store digital information and share it with a smartphone. Reyes wanted to design an app that lets scientists, researchers and students access relevant NIST data in a way that minimally interrupts their workflow. His solution was to integrate NFC tags to allow multiple users in the laboratory to share and store information. The app provides multiple functionalities for search and display of NIST SRD. Reyes had used NIST data (specifically the NIST Chemistry Webbook) many times in graduate school, but Meru Lab Reference is his first attempt at building an app. His company, and shortly thereafter his prize-winning app, were both born out of a passion to help scientists in their day-to-day work, and Reyes plans to use his winnings to develop Meru Lab Reference further.

The second place prize of $10,000 went to Zachary Ratliff from McLennan Community College in Waco, TX and Daniel Graham from Centre College in Danville, Ky. for their LabPal app. LabPal is a quick reference tool for students and professionals in science and engineering. Ratliff and Graham included features that make LabPal a "go-to" tool for scientists and engineers. It incorporates search features, a calculator, an infrared spectrum viewer and lab notes that can easily be shared into one app.

The third place award of $5,000 went to a team from IT-management consulting firm MetroStar Systems in Reston, Va. Their app, ChemBook, is a general purpose iOS app that allows users to search elements and compounds based on name, formula and even common terms such as moth

balls or water. ChemBook combines NIST SRD with other open source data and incorporates informative YouTube videos and other media. The winners demonstrate the range of possible users and uses of NIST SRD, while showcasing the integration of modern technologies to improve the value of NIST data to scientific researchers and the general public.

c. NOAA Right Whale Recognition Challenge[17]

Summary: There are only around 500 North Atlantic right whales alive today making them one of the most endangered animals on the planet. Individuals can be identified by the pattern of callosities on their head along with scars and other markings. Researchers take photographs from vessels and airplanes, and then compare those photographs to the online North Atlantic Right Whale Catalog run by the New England Aquarium. Knowing the individual identity of a whale opens up many possible avenues of research and conservation management including demographics, social structure, reproductive biology, communication, and informed disentanglement operations. The process of matching a photograph to the catalog can be time-consuming, and marine biologists are often working under tight deadlines with limited funding. Finding a way to automate this process would free up valuable time and resources so that scientists have more time and energy to devote towards the conservation of these endangered whales.

NOAA Fisheries partnered with Kaggle, a platform that bridges the gap between data problems and data solutions by hosting public data science challenges, in which sponsors post their problem to the Kaggle platform, then data scientists from all over the world compete to create the best solution. MathWorks agreed to sponsor the competition and NOAA Fisheries is providing the right whale aerial photographic data set. Data scientists will compete to create an algorithm to match a photograph of a right whale to its unique individual identity. The organizers hope to use the winning algorithm to create software to automate the process of identifying whales, thereby freeing up valuable time and resources.

The total amount of monetary incentive for the competition was $10,000 which was provided by MathWorks who sponsored the competition.

Solution Type: Software and apps

Primary Goals: Solve a specific problem; Develop technology

Results: There were 364 teams comprised of 470 players competing to come up with the best solution to classify the individual right whale correctly in the photographic dataset. The deepsense.io team won the competition.[18]

[17] https://www.kaggle.com/c/noaa-right-whale-recognition

[18] http://blog.kaggle.com/2016/01/29/noaa-right-whale-recognition-winners-interview-1st-place-deepsense-io/

Problem Statement: This competition challenges solvers to automate the right whale recognition process using a dataset of aerial photographs of individual whales to create an algorithm that successfully predicts which whale is in each photograph. Submissions will be evaluated using the multi-class logarithmic loss. Each image has been labeled with one true class. For each image, the solver must submit a set of predicted probabilities (one for every whale). This Competition is a challenge of skill and the final results are determined solely by leaderboard ranking on the private leaderboard (subject to compliance with Competition Rules).

Proposed Goals: In order to take advantage of recent technological advances and free up valuable time and resources so that scientists have more time and energy to devote towards the conservation of these endangered whales, this competition attempts to find a way to automate the process of matching photographs to the North Atlantic Right Whale Photo Identification Database.

Why a Prize: Collaborating with Kaggle and MathWorks has allowed NOAA to achieve the goals of this competition with very minimal expenditure at a cost savings to the agency of approximately $100,000 compared to more traditional approaches such as contracting out the development of the algorithm to automate facial recognition of right whales.

Participants: NOAA hoped to mobilize the best and the brightest talent in the field of machine learning to try a variety of different methodological approaches to solve this challenging problem. There were 364 teams comprised of 470 players competing to come up with the best solution to classify the individual right whale correctly in the photographic dataset.

Timeline: The competition launched on August 27, 2015 and ran through January 7, 2016.

Solicitation & Outreach: NOAA has benefitted greatly from the partnership with Kaggle and MathWorks, both of whom have extensive press affiliations that helped to mobilize a high quality pool of data scientists to work on NOAA's data problem. The prize competition has received a fair bit of press coverage on the competition:

- Maxfield, Max. "MathWorks & NOAA team to save right whales with artificial neural network competition." Embedded.com, 02 Dec. 2015.
- Pilotte, Paul and Khan, Christin. "Save the whales! Really, using Big Data." Embedded.com, 01 Dec. 2015.
- Vaughan, Jack. "Programming contest taps analytics to mark endangered whales." TechTarget, 16 Nov. 2015.
- Woodie, Alex. "Kaggle Tackles Whale of an Identification Problem." Datanami, 20 Oct. 2015.
- Darrow, Barb. "Latest big data challenge: Identify the right whales." *Fortune*, 28 Aug. 2015.

Incentives: The total amount of monetary incentive for the competition was $10,000, which was provided by MathWorks, who sponsored the competition. Prizes were awarded to the top 3 winners:

- 1st place - $5,000
- 2nd place - $3,000
- 3rd place - $2,000

Additional incentives included a complimentary license of Matlab software to be used during the competition provided by MathWorks, and prestige of ranking highly within the Kaggle data scientist leaderboard.
Evaluation and Judging: Evaluation of the prize competition was handled by Kaggle personnel. The rules for evaluation were posted on the competition website as follows:

Submissions are evaluated using the multi-class logarithmic loss. Each image has been labeled with one true class. For each image, the participants were required to submit a set of predicted probabilities (one for every whale). The formula was then,

$$logloss = -\frac{1}{N}\sum_{i=1}^{N}\sum_{j=1}^{M} y_{ij}\log(p_{ij}),\ where$$

$N\ is$ the number of images in the test set
$M\ is$ the number of whale label
log( ) is the natural logarithm
$y_{ij} = 1$, if i belongs to whale j and 0 otherwise
p_{ij} is the predicted probability that observation i belongs to whale j

The submitted probabilities for a given image are not required to sum to one because they are rescaled prior to being scored (each row is divided by the row sum). In order to avoid the extremes of the log function, predicted probabilities are replaced with

$$(max(min(p, 1 - \frac{1}{10^{15}}), \frac{1}{10^{15}}).$$

Partnerships: NOAA partnered with Kaggle and MathWorks and both of those partnerships proved immensely valuable. Kaggle brought to the table a large community of data scientists motivated to tackle the problem, and the expertise to facilitate the hosting of the competition. MathWorks provided the prize money, and perhaps more importantly, they hired a public relations firm to get the message out.

Resources: NOAA provided the dataset and personnel time.

Results: The competition ended January 7, 2016 and was won by the deepsense.io team. NOAA hopes to produce an algorithm that can identify individual right whales from photographs with high accuracy which can be used to build automated identification software that will save personal and resources for both the agency and NOAA's other private and public partners.

E. Department of Defense

a. DARPA Cyber Grand Challenge[19]

Summary: The DARPA Cyber Grand Challenge (CGC) is the first-ever tournament for fully automated network defense systems. Currently, top computer security experts test their skills head-to-head in competitive "Capture the Flag" contests that provide a competition rating for the ability of human experts to locate and comprehend security weaknesses. The CGC utilizes a series of competition events to test the abilities of a new generation of fully automated cyber defense systems. CGC teams created automated systems to compete against each other to evaluate software, test for vulnerabilities, and generate and apply security patches to protected computers on a network. To succeed at this, competitors must create software applications that automatically detect and fix flaws in programs. This competition was launched in 2013. During the final competition event in 2016, automated cyber reasoning systems will compete against each other in real time. The CGC seeks to engender a new generation of autonomous cyber defense capabilities that combine the speed and scale of automation with reasoning abilities exceeding those of human experts.

DARPA is funding various entities within DOD (e.g., Space and Naval Warfare Systems Command, Air Force Research Laborato1y, and Naval Postgraduate School) and federally funded R&D centers (e.g., Massachusetts Institute of Technology Lincoln Laboratory) for contracting and specialized technical support in conducting the CGC competition. At the completion of the event in August 2016, CGC cash prizes will total up to $6.75 million. This challenge was reported on in the FY 2014 COMPETES report, but had not yet been completed.

Solution Type: Software and apps

Primary Goals: Solve a specific problem; Build capacity; Engage new people and communities

Results: A total of 104 entrant teams registered. 27 of these teams progressed to scored events, 14 systems achieved autonomous operation during the CGC Qualification Event (CQE), and, of those, 7 teams are qualified as finalists. During the CQE to determine finalists, competitor autonomous systems completed 131 challenges in 24 hours. Collectively, the automated systems participating in CQE were able to mitigate all currently known security flaws in the sample software (no individual system accomplished this). Competitors' systems were able to identify

[19] www.darpa.mil/cybergrandchallenge; www.cybergrandchallenge.com; this challenge was reported on in the FY14 COMPETES report, starting on page 65.

96 of the 131 security vulnerabilities (73%) in the software challenges without human assistance. The automated synthesis of input proofs and secure replacement software without human involvement demonstrates a groundbreaking level of autonomy.

The prize competition complements the traditional BAA approach not just in expanding the competitor pool but by providing direct competition between highly diverse technologies on a level playing field in order to objectively ascertain their strengths and weaknesses.
To date, four cash prizes of $750,000 each have been awarded per Title 15 U.S.C. § 371 and CGC rules to the Open Track finalists; three cash prizes of $750,000 each have been awarded to the Proposal Track finalists by exercising a contract option. The CGC Final Event is scheduled for August 4, 2016.

Problem Statement: See FY14 report, page 65.

Proposed Goals: The goal of the DARPA CGC is to engender a new generation of autonomous cyber defense capabilities that combine the speed and scale of automation with reasoning abilities exceeding those of human experts. Entrants were tasked to field autonomous systems that competed head-to-head in an isolated test environment. The autonomous systems' performance was measured using the same competition rating system used to quantify the performance of human analysts. The results quantified the systems' ability to reason about and mitigate novel software flaws. The ultimate goal is a demonstration of autonomous system performance that exceeds human performance.

Why a Prize: Competitors in the Cyber Grand Challenge indicated in written responses to the Government that their level of investment in CGC is sensitive and proprietary. Regardless, simple calculations will show the CGC has stimulated large research and development (R&D) efforts at relatively low cost.[20] For example, because more finalists emerged from the unfunded Open Track than from the funded Proposal Track (see *Results* section), the organizers conclude that the challenge format achieved greater than a two-to-one "funds multiplier" effect. Furthermore, DARPA estimated that the manpower cost of the program over its two years if DARPA had contracted through traditional mechanisms would be $78.8M, much more than the cost of the program conducted through a prize.

Participants: A total of 104 entrant teams registered; 27 of these teams progressed to scored events, 14 systems achieved autonomous operation during qualification, and, of those, 7 teams are qualified as finalists (listed alphabetically by track).

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[20] During the first year of the program, 113 engineers were reported working on CGC teams; this labor is costed at 113 engineers * $233,333 annual salary (see above) *1 year * 2 overhead (see Note below) = $52.7M. [Note: Overhead is estimated at 100%, which is industry standard today.] During the second year of the program, the finalist engineers numbered 56 for a cost of 56 engineers * $233,333 annual salary * 2 overhead = $26.1M. Estimated manpower cost of the program over its two years if DARPA had contracted through traditional mechanisms is $78.8M. Estimate for lead software security engineers salary taken from a Forbes article from January 9, 2016 ("Top Cyber Security Salaries In U.S. Metros Hit $380,000", http://www.forbes.com/sites/stevemorgan/2016/01/09/top-cyber-security-salaries-in-u-s-metros-hit-380000/#3fceb08277b4).

Team	Affiliation	Hometown	Track (unfunded Open or funded Proposal)
CSDS	University of Idaho	Moscow, ID	Open
Deep Red	Raytheon SI Govs	Arlington, VA	Open
Disekt	disekt	Athens, GA	Open
Shellphish	University of California at Santa Barbara	Santa Barbara, CA	Open
Code Jitsu	University of California at Berkeley	San Francisco, CA	Proposal
ForAllSecure	ForAllSecure, Inc.	Pittsburgh, PA	Proposal
TECHx	GrammaTech, Inc.	Ithaca, NY	Proposal

Timeline: The CGC was launched October 29, 2013. The two-phase registration process included initial applications due November 2, 2014, and extended applications were due February 26, 2015.

Date	Event
December 1, 2014	Scored Event #1
April 16, 2015	Scored Event #2
June 3, 2015	CGC Qualification Event (CQE)
March 14, 2016	Trials Begin
April 3, 2016	Trials End
August 4, 2016	CGC Final Event (CFE)

Solicitation & Outreach: See FY14 report, page 67.

Incentives: To date, four cash prizes of $750,000 each have been awarded per Title 15 U.S.C. § 3719 and CGC rules to the Open Track finalists; three cash prizes of $750,000 each have been awarded to the Proposal Track finalists by exercising a contract option. Because DARPA is the sole sponsor of the CGC, no private funds contributed to the program (nor will private funds be contributed as the program and competition progresses to its final conclusion). CGC cash prizes will total up to $6.75 million; nonmonetary prizes are not offered. Following the CGC Qualifying Event (CQE) on June 3, 2015, seven competitors qualified as finalists; four from the Open Track each received $750,000, and three from the Proposal Track each received $750,000 (see *Evaluation and Judging* section for more information on tracks). Following the Cyber Grand Challenge Final Event (CFE) on August 4, 2016, prizes will be awarded to the first place ($2 million), second place ($1 million), and third place ($750,000) winners.

Evaluation and Judging: DARPA provided two parallel paths for participating in the CGC: the Proposal Track and the Open Track. Proposal Track teams were selected competitively on the basis of proposals submitted in response to a broad agency announcement (DARPA-BAA-14-05). Open Track teams were selected based on applications deemed qualified to compete per Title 15 U.S.C. § 3719 and CGC rules. The two-phase Open Track process included registration

and the submission of an extended application per the CGC rules (see www.darpa.mil/cybergrandchallenge). To ensure objectivity in judging and evaluation, the CGC utilized software automation to provide Federal government subject matter experts the necessary information to make the final determinations.

Partnerships: The CFE will be co-located with the DEF CON 24 Conference in August 2016 due to the cooperative research and development agreement with the conference.

Resources: Funds were drawn from the Program Element (PE) and projects as follows:

PE	Project	Title	FY14	FY15
0602303E	IT-05	Cyber Grand Challenge (CGC)	$10.438M	$16.832M
0602303E	IT-03	Cyber Grand Challenge (CGC)	$ 0.000M	$ 6.233M[21]

Results: Following the CQE on June 3, 2015, seven competitors qualified as finalists. The four Open Track competitors that qualified as finalists, in alphabetical order, are CSDS, Deep Red, disekt and Shellphish. The three finalists, in alphabetical order, from the Proposal Track who each received a $750,000 contract award to continue their research through the final event are CodeJitsu, ForAllSecure, and TECHx. In the DARPA CQE, automated systems were challenged to rewrite flawed software into secure replacement software without human involvement. Viewed as a field, automated systems participating in CQE were able to mitigate all currently known security flaws in the sample software (no individual system accomplished this). Automated systems also fielded proof that at least one vulnerability existed in 73 percent of the sample software. The automated synthesis of input proofs and secure replacement software without human involvement demonstrates a groundbreaking level of autonomy. The CFE is scheduled for August 4, 2016.

F. Department of Energy

a. EV Everywhere Logo Challenge[22]

Summary: The EV Everywhere Logo Design Challenge invited designers to create a compelling graphic that communicates two main ideas: 1) plug-in electric vehicles (PEVs) are beneficial and practical and 2) EV Everywhere, a website produced by the Department of Energy, supplies data-driven, objective information about PEVs. The competition is the first part of an expanded outreach and education effort to increase consumer awareness of PEVs' benefits. DOE was able

[21] The $23M includes Proposal Track contracts, prize funds, competition operations costs, and tournament infrastructure, which includes building a new computer operating system and purpose-built cloud computer on which to stage the Final Event.

[22] https://www.challenge.gov/challenge/ev-everywhere-logo-challenge/

to advertise the competition through Challenge.gov and through the contacts of Clean Cities' coalitions and other EV Everywhere stakeholders.

The total prize purse was $5,000.

Solution Type: Creative (design & multimedia)

Primary Goals: Inform and educate the public; engage new people and communities; find and highlight innovative ideas

Results: The competition drew 50 participants and 89 entries, with several participants submitting multiple entries. The winning logo, announced on November 7, 2015, will be featured in EV Everywhere communications products, potentially including a magnetic decal, the program's website and any other official DOE channels.

Problem Statement: The creation and widespread use of PEVs have the potential to increase the Nation's economic, energy, and environmental security. In order to educate the public about plug-in electric vehicles, DOE established an expanded outreach and education effort, of which EV Everywhere Logo Challenge is the first step to increase consumer awareness about the benefits of PEVs.

Proposed Goals: This challenge aimed to increase consumers' interest in both PEVs and the information DOE provides about them through the development of a logo for the EV Everywhere program.

Why a Prize: The EV Everywhere program team chose a prize to develop the program's logo in order to leverage the creativity of the public through open submissions. The organizers hoped to attract new ideas, especially from professional graphic designers, to supplement the work of the EV Everywhere program.

Participants: The competition was open to all participants generally allowed to participate in competitions on Challenge.gov. An individual participant was required to be a citizen or permanent resident of the United States before the submission period ends; for a private entity to be incorporated in and maintain a principal place of business in the United States; for the participant not to be a Federal employee acting within the scope of their employment; and to not be an entity with an outstanding, unresolved financial obligation to, or that is currently suspended or debarred by, the federal government.

There were 50 participants with 89 entries, with several participants submitting multiple entries. While some participants were associated with a specific company or organization, all participants entered as individuals with some being professional graphic designers.

Timeline: Submissions were accepted from August 13, 2015 until September 25, 2015. The judging period was September 26, 2015 to November 6, 2015, and the winner was announced on November 7, 2015.

Solicitation & Outreach: To advertise the challenge, the EV Everywhere team posted about the contest on the Office of Energy Efficiency and Renewable Energy (EERE) blog and on social media (EERE Facebook, DOE Twitter, Challenge.gov Twitter), and sent information to a number of PEV stakeholders via email, including the PEV Community Readiness listserv with over 5,000 subscribers and Clean Cities coordinators. The organizers felt that advertising through stakeholders and social media were both fairly successful means of outreach.

Incentives: The winning logo received a $5,000 prize purse.

Evaluation and Judging: The contest was judged based on communication effectiveness of the EV Everywhere mission and brand, creativity and originality, and replicability.

- Communicating EV Everywhere mission and brand (50%): EV Everywhere's mission includes defining PEVs, espousing their benefits and their viability for the average driver, and advertising DOE as a source of unbiased, data-driven information. This criterion could be completed through a realistic or abstract design, and counted for a maximum of 500 out of 1000 points (50%).
- Creativity and originality (30%): The visual quality of the logo was judged as whether it was informative and representative of imagery connected to EV Everywhere.
- Replicability (20%): The designs were judged for their ability to be easily replicated for many media formats and cost-effective.

A team of seven volunteer non-Federal experts each evaluated a selection of the logos using the above criteria as guides. A panel of three Federal employees then took these scores into account to develop a consensus on three logos that met the above criteria. The panel of Federal employees presented the three finalist logos to senior leadership, which made the final decision.

The organizers found the criteria and process useful for judging and evaluation.

Partnerships: While not formal partnerships, a number of Clean Cities coalitions and other EV Everywhere stakeholders helped advertise the competition. The organizers received a number of submissions due to these outreach efforts by informal partners.

Resources: DOE used internal resources and existing funding to conduct the competition. The funding for the prize money was allocated from communications funding for EERE's Vehicle Technologies Office. Running of the competition fell under the existing duties of the Federal employees who worked on the challenge. They already focus their time on communications and EV Everywhere.

Results: The competition drew 50 participants and 89 entries, with several participants submitting multiple entries. While some participants appeared to be associated with a specific company or organization, all participants appeared to be entering as individuals and some appeared to be professional graphic designers. The winning logo, announced on November 7,

2015, will be featured in EV Everywhere communications products, potentially including a magnetic decal, the program's website and any other official DOE channels.

The promotion of the contest on social media resulted in 499 likes and 172 shares, the blog post Energy.gov produced 1500 views, and the challenge was featured in an article in the *Washington Post*.

The Federal employees working on the challenge focus on communications and EV Everywhere as part of their normal duties so the challenge allowed another avenue to seek creative ideas from the public in delivering their work.

b. JUMP Prize Competitions[23]

Summary: This year, Oak Ridge National Laboratory (ORNL), in partnership with private sector organizations and the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy Buildings Technology Office, launched the new prize program, JUMP, a buildings technology crowdsourcing platform. JUMP, launched in partnership with General Electric, AO Smith and United Technologies Research Center, aims to solicit novel solutions to a number of technical challenges in energy-efficient buildings technologies. JUMP connects entrepreneurs to major manufacturers that want to bring innovations to the market. Winners, selected by a panel of laboratory and industry technical advisers, may qualify for cash prizes of $3,000 to $5,000 in addition to consideration for up to $320,000 of in-kind technical support. To date, more than 400 participants have registered for the JUMP program. JUMP has conducted three separate prizes to date.

JUMP: Join the Discussions, Unveil innovation, Make connections, Promote Tech2Mkt

1) Improve Water Heater Performance with Phase Change Materials[24]

Technologies such as phase change materials (PCMs) have the ability to store and subsequently release large amounts of thermal energy. It is hypothesized that PCMs can be used to increase the first-hour rating (FHR, as defined in 10 CFR Part 430, Subpart B, Appendix E), of a residential natural gas or electric water heater without increasing either the current dimensional footprint or the water storage temperature. However successful cost-effective application of this technology for use in residential water heaters has proved largely unsuccessful to date.

The challenge is to use phase change materials (PCMs) to get an equivalent first hour rating (FHR) of a greater than 55 gallon water heater in the footprint of a smaller-sized water heater without increasing water storage temperature, resulting in a 15-30% increase in FHR.

A cash award of $5,000 will be sponsored by A.O. Smith for the top selected technology submission. ORNL partnered with A.O. Smith to conceptualize the challenge and incentive and

[23] http://web.ornl.gov/sci/buildings/jump/

[24] http://jump.ideascale.com/a/ideas/top/campaign-filter/byids/campaigns/14527

continues to work closely with them to review ideas, monitor campaign progress, and promote the campaign to relevant audiences.

2) Low-Cost BTU Sensor for Use in Building HVAC Control System[25]

Thermal energy load measurements (i.e., BTU meters) can enable advanced building energy control and diagnostics solutions that have been shown to save 5% to 15% of building HVAC energy. Typical BTU meters consist of a flow meter and temperature sensors at the input and output of a load. Flow meters are the main material cost of BTU meters. These meters, although frequently deployed in industrial process applications, are relatively expensive for use in commercial buildings. Hardware, installation, and commissioning costs often exceed $10,000 per device.

The challenge is to develop a BTU sensor that has an error of less than 10% full scale and costs less than 20% of the installed cost of conventional BTU measurements.

A cash award of $5,000 will be sponsored by United Technologies Research Center (UTRC) for the top selected technology submission. ORNL partnered with UTRC to conceptualize the challenge and incentive and continues to work closely with them to review ideas, monitor campaign progress, and promote the campaign to relevant audiences.

3) Low-Temperature Intrinsically Safe Defrost System[26]

Nearly 100% of US household refrigerators use R-134a (1,1,1,2-tetrafluoroethane) as a refrigerant. However, in many other countries throughout the world, R-600a (isobutane) is used. The benefits of R-600a include: 1) significantly lower global warming potential (GWP), 2) typically lower sound level, and 3) lower energy usage (approximately 4%). The technical specifications and service procedures required to use R-600a as a refrigerant in the US have been developed. Nevertheless, the current barrier-to-entry for manufacturers to use R-600a is the cost of complying with UL 250 (Standard for Safety for Household Refrigerators and Freezers) to ensure customer safety. Specifically, because R-600a is an A3 refrigerant (i.e., low toxicity and high flammability) all electrical devices need to be spark resistant and no surface temperature should exceed 680°F.

During operation of a refrigerator, moisture from the air condenses and freezes on the evaporator. For the forced convection (frost-free) products that make up the entire population of US primary household refrigerators, a defrost heater is used to remove this frost from the evaporator coil. The heater is cycled at regular intervals to maintain cooling performance. In a typical configuration, a defrost heater is placed between the evaporator and a drain pan. The defrost heater warms the evaporator and melts the frost until a pre-determined temperature is reached. The melt water is removed from the refrigerator via a drain line connected to the drain pan. While effective, surface temperatures of the defrost heater may reach 1000 to 1400°F. The

[25] http://jump.ideascale.com/a/ideas/top/campaign-filter/byids/campaigns/14529

[26] http://jump.ideascale.com/a/ideas/top/campaign-filter/byids/campaigns/14528

challenge is to develop a low-cost system to remove ice from the evaporator while conforming to the UL 250 Flammable Refrigerants Addendum.

A cash award of $3,000 will be sponsored by General Electric (GE) for the winning selected technology submission. ORNL partnered with GE to conceptualize the challenge and incentive and continues to work closely with them to review ideas, monitor campaign progress, and promote the campaign to relevant audiences.

Solution Type: Ideas

Primary Goals: Develop technology; Solve a specific problem

Results: The three competitions are ongoing and will be completed in FY16.

Problem Statement:

- Improve Water Heater Performance with Phase Change Materials

The challenge is to use innovative methods (such as PCM) to deliver as much hot water as a 65 or 80 gallon tank from a 50 gallon one, representing an increase in FHR of between 15-30%, without increasing water storage temperature.

Recent increases in minimum energy efficiency standards for WHs implemented on April 16th 2015 (known as NAECA III) essentially mandated the use of more expensive heat pumps for electric WHs and condensing technology for gas WHs for tanks with a volume greater than 55 gallons.

Technologies such as phase change materials (PCM) have the ability to store and subsequently release large amounts of thermal energy. It is hypothesized that PCMs can be used to increase the first-hour rating (FHR, as defined in 10 CFR Part 430, Subpart B, Appendix E), of a residential natural gas or electric WH without increasing either the current dimensional footprint or the water storage temperature. However successful cost-effective application of this technology for use in residential WHs has proved largely unsuccessful to date.

- Low-Cost BTU Sensor for Use in Building HVAC Control System

The challenge is to develop a new BTU sensor that when compared to traditional BTU meters has an error of less than 10% full scale and an installed cost of less than 20%.

Thermal energy load measurements (i.e., BTU meters) can enable advanced building energy control and diagnostics solutions that have been shown to save 5% to 15% of building HVAC energy. Typical BTU meters consist of a flow meter and temperature sensors at the input and output of a load. Flow meters are the main material cost of BTU meters. These meters, although frequently deployed in industrial process applications, are relatively expensive for use in commercial buildings. Hardware, installation, and commissioning costs often exceed $10,000 per device.

- Low-Temperature Intrinsically Safe Defrost System

The challenge is to develop a low-cost system to remove ice from the evaporator while conforming to the UL 250 Flammable Refrigerants Addendum.

Nearly 100% of US household refrigerators use R-134a (1,1,1,2-tetrafluoroethane) as a refrigerant. However, in many other countries throughout the world, R-600a (isobutane) is used. The benefits of R-600a include: 1) significantly lower global warming potential (GWP), 2) typically lower sound level, and 3) lower energy usage (approximately 4%). The technical specifications and service procedures required to use R-600a as a refrigerant in the US have been developed. Nevertheless, the current barrier to entry for manufacturers to use R-600a is the cost of complying with UL 250 (Standard for Safety for Household Refrigerators and Freezers) to ensure customer safety. Specifically, because R-600a is an A3 refrigerant (i.e., low toxicity and high flammability) all electrical devices need to be spark resistant and no surface temperature should exceed 680°F.

During operation of a refrigerator, moisture from the air condenses and freezes on the evaporator. For the forced convection (frost-free) products that make up the entire population of US primary household refrigerators, a defrost heater is used to remove this frost from the evaporator coil. The heater is cycled at regular intervals to maintain cooling performance. In a typical configuration, a defrost heater is placed between the evaporator and a drain pan. The defrost heater warms the evaporator and melts the frost until a pre-determined temperature is reached. The melt water is removed from the refrigerator via a drain line connected to the drain pan. While effective, surface temperatures of the defrost heater may reach 1000 to 1400°F.

Proposed Goals:

- Improve Water Heater Performance with Phase Change Materials

The challenge is to use innovative methods (such as PCM) to deliver as much hot water as a 65 or 80 gallon tank from a 50 gallon one, representing an increase in FHR of between 15-30%, without increasing water storage temperature. Proposed solutions would be subject to the following restrictions:

- must not increase the storage temperature
- must stay within the existing dimensional footprint of 50 gallon units (diameter and height)
- must not negatively impact the EF as defined in 10 CFR Part 430, Subpart B, Appendix E
- must not negatively impact the service life of the water heater
- must not negatively impact the safety aspects of the water heater
- must increase the manufacturing cost by no more than $150 at high volume

For example, prior to NAECA III, standard 65 and 80 gallon electric WHs had FHRs of about 75 and 90 gallons respectively. The goal would be to achieve these same FHRs in the footprint of a current compliant 50 gallon WH (EF of 0.95), meaning an increase in FHR of 20-30%.

- Low-Cost BTU Sensor for Use in Building HVAC Control System

The challenge is to develop a new BTU sensor that when compared to traditional BTU meters has an error of less than 10% full scale and an installed cost of less than 20%. The sensor could be an actual physical device or an advanced algorithm using other available system data to accurately approximate a measured value.

- Low-Temperature Intrinsically Safe Defrost System

The challenge is to develop a low-cost system to remove ice from the evaporator while conforming to UL 250 Flammable Refrigerants Addendum. Specifically, the defrost system

  - must not require substantial physical changes to the existing evaporator or evaporator compartment
  - must meet standard 20-year life requirements (assume 1 defrost per day)
  - must be able to raise an unfrosted evaporator from -10°F to 40°F in 15 minutes or less
  - must be spark resistant and surface temperatures should not exceed 680°F.
  - should be able to raise an unfrosted evaporator from -10°F to 40°F in 15 minutes or less.

Why a Prize: ORNL, in collaboration with the GE and DOE, determined that a prize competition would be superior to alternative authorities such as contracts, grants, etc. due to the inherent flexibility, responsiveness and effectiveness in reaching the widest possible audience of non-traditional partners.

Participants: ORNL hopes to mobilize individuals and small businesses with ideas and/or prototypes (though not with products already on the market) addressing the challenges mentioned above. Eligibility is open to all U.S. citizens meeting the aforementioned criteria. To date, 407 individuals have registered for the campaign. Geographical representation is diverse, with registrants residing in 44 states.

Timeline: All three competitions launched on September 24, 2015, and accepted ideas until January 15, 2016. The voting deadline was January 29, 2016. The judges' decisions were announced March 1, 2016, and future collaboration, as applicable, will be announced May 27, 2016.

Solicitation & Outreach: In recruiting and engaging campaign participants, ORNL is leveraging industry-relevant blogs and social media channels. Additionally, Buildings Technologies Office and Energy Efficiency and Renewable Energy mailing lists are being used. Other relevant industry associations, coalitions, news outlets, events, and groups are also being used. Registered users received notifications of deadlines and updates to spur a high quality and quantity of submissions.

Incentives: For all three competitions, depending on the needs identified, ORNL may provide in-kind technical support of $10,000 - $20,000 to enable ORNL staff to providing prototype

development, testing, 3rd party validation, or other defined needs. A link to the DOE Small Business Voucher (SBV) pilot may also be provided; DOE labs may provide in-kind technical support of up to $300,000 through the SBV program, if SBV approved.

- Improve Water Heater Performance with Phase Change Materials

A cash award of $5,000 will be sponsored by A.O. Smith for the top selected technology submission. The idea submitter will also be invited to discuss future collaboration with A.O. Smith and ORNL technical experts.

- Low-Cost BTU Sensor for Use in Building HVAC Control System

A cash award of $5,000 will be sponsored by UTRC for the top selected technology submission. The idea submitter will also be invited to discuss future collaboration with UTRC and ORNL technical experts.

- Low-Temperature Intrinsically Safe Defrost System

A cash award of $3,000 will be sponsored by GE for the winning selected technology submission. The idea submitter will also be invited to discuss future collaboration with GE and ORNL technical experts.

Evaluation and Judging: For all three competitions, the top ideas were reviewed by an independent panel of judges consisting of ORNL scientists and industry experts, evaluating their technical feasibility and potential for energy savings.

Partnerships: ORNL partnered with A.O. Smith, UTRC, and GE to conceptualize each challenge and incentive and continues to work closely with them to review ideas, monitor campaign progress, and promote the campaign to relevant audiences. ORNL has also partnered with other DOE agencies for support in marketing and outreach efforts for the campaign.

Resources: DOE EERE BTO allocated a total of $25,000 in FY15 for operations of all three prize competitions.

Results: All three campaigns are building off the success of the first crowdsourcing pilot, which served to advance the process of innovation and Technology to Market (T2M).

c. National Clean Energy Business Plan Competition - 2015[27]

Summary: The U.S. Department of Energy (DOE) National Clean Energy Business Plan Competition (NCEBPC) is a unique national business plan competition, designed to build a network of student-focused business creation contests across the country. Student-led teams compete in five DOE-sponsored regional competitions by submitting business plans supporting innovative clean energy technologies. In addition to competing for five $50,000 regional prizes

[27] http://energy.gov/eere/technology-to-market/cleantech-university-prize; the previous iteration of this challenge was included in the FY 2014 COMPETES report, starting on page 71.

across the country, students receive mentorship and training in preparation for the regional and national competitions, enhancing their entrepreneurial skills and preparing them to launch technologies from research institutions and into the market. The NCEBPC culminates in a National Grand Prize event in Washington, D.C., where the six regional finalists compete for a DOE-sponsored $50,000 prize.

DOE directly supported the event and prize at the national event, with support from the Clean Energy Trust and the Pew Center for Charitable Trusts.

Since its inaugural year in 2012, the NCEBPC catalyzed the launch of companies, attracted attention and private sector support for competitions, and created jobs. Through the Competition, more than 200 ventures have incorporated that received more than $70 million in follow-on funding and generated more than 120 jobs. The graduate startups from the Competition have seen enormous success.

Solution Type: Business plan

Primary Goals: Develop technology; Engage new people and communities; Find and highlight innovative ideas; Other (Startups)

Results: For the 2015 competition, 194 submissions were received across the 5 regional competitions. The five regional winners competed at the national event and one national winner, Hyliion from Carnegie Mellon University, was chosen. Living Ink Technologies, the winner of the CU Boulder Cleantech New Venture Challenge in 2015, launched a successful Kickstarter campaign, raising in excess of $20,000 to support the development of their algae-derived ink products.

All five winning teams are actively pursuing their ventures. In the past year, companies have been acquired, secured joint development agreements with major corporations, attracted crowdfunding and traditional investment, and were accepted into prestigious accelerators and incubators.

Problem Statement: Start-ups and innovative technologies are critical to the growth of the clean energy economy in the United States and abroad. However, there exist persistent gaps between innovative technology developers and entrepreneurs. While university student business creation competitions have long been an active source of new U.S. start-ups and a training ground for some of America's best entrepreneurs, at the time of establishing the NCEBPC, there were few competitions or incentives focused on clean energy entrepreneurship.

The NCEBPC aims to inspire clean energy innovation across the country by creating businesses from best in-class technology research, while inspiring and cultivating America's next generation of entrepreneurs to drive those businesses forward. The NCEBPC awards prizes to the teams with not just the best technology, but the premier teams developing early-stage companies to turn technology into products ready for the commercial markets.

Six regional DOE-funded business plan competitions sent a finalist to Washington, D.C. to compete for the Grand Prize in DOE's National Competition.

Region	Name	Lead Organizations	Link
Northeast	MIT Clean Energy Prize	Massachusetts Institute of Technology (Cambridge, MA)	http://cep.mit.edu/
Eastern Midwest	Clean Energy Student Challenge	Clean Energy Trust (Chicago, IL)	http://www.cleanenergytrust.org/challenge/
Western Midwest	CU Cleantech New Venture Challenge	University of Colorado – Boulder (Boulder, CO)	http://nvc.cucleantech.org/
Western Southwest	Rice Business Plan Competition	Rice University (Houston, TX)	http://alliance.rice.edu/rbpc.aspx
Western	First Look West	California Institute of Technology (Pasadena, CA)	http://flow.caltech.edu/

In the Funding Opportunity Announcement, DOE established guidelines that defined the geographical scope of the NCEBPC competitions, while still preserving the integrity of ongoing national competitions:

- Regional competitions may solicit applications nationwide. However, each competition shall focus its outreach and sponsorship efforts regionally. Success or failure to garner regional interest and long-term support may affect continuation applications (go/no-go decisions) at the end of year one.
- Regional competitions are encouraged to communicate and collaborate with other regional organizers in order expand network connections.
- Regional competitions should occur in a coordinated manner and all competitions must be completed by early-May.

Competition Entrant Requirements

Scope of Business Plans

All business plan proposals must fall within DOE's Office of Energy Efficiency and Renewable Energy (EERE) mission and technology portfolio, as defined in the Funding Opportunity Announcement (FOA):

"The Office of Energy Efficiency and Renewable Energy works to strengthen the United States' energy security, environmental quality, and economic vitality in public-private partnerships. It supports this goal through (1) enhancing energy efficiency and productivity; and (2) bringing clean, reliable and affordable energy technologies to the marketplace."

Business plans must fall within EERE's purview, but they may be based upon technical or service-based solutions or products.

Acceptable technology areas are represented by EERE's ten program offices:

1. Building Technologies
2. Advanced Manufacturing
3. Vehicle Technologies
4. Federal Energy Management Program
5. Weatherization and Intergovernmental
6. Biomass Program
7. Geothermal Technologies
8. Fuel Cells Technologies
9. Solar Energy Technologies
10. Wind and Hydropower Technologies

Competition Entrant Limitations and Eligibility

As a program whose goals include the development of the next generation of entrepreneurs, NCEBPC requires that students be highly involved in each competition's management and execution.

The composition of business plan teams shall follow the following criteria:

- Award competitions must include and enforce a criterion for competitor eligibility stating that in order to participate in the proposed regional competition, at least 50% of any participating team's "formal team members" must be actively enrolled in an accredited U.S. university or college. "Formal team members" are defined as those individuals eligible to directly receive prize money or services awarded by the competition.
- Regional competitions should follow university policies of the student applicants to define "enrollment" and "student" status.
- Formal team members may be citizens of foreign countries. However, at least one U.S. citizen must be a formal team member.

- U.S. citizens attending universities abroad may participate in the competitions, given that the overall makeup of the formal team members meets all other criteria.
- Students will be required to present business plans at the regional and the national competitions. Non-student team members must only act as support to the team during presentations.
- Non-student team members may be present on stage to consult with students during Q&A, but students shall respond to all questions.
- Regional organizers should clearly communicate the "Student Eligibility and Participation" rules to the teams prior to the competitions.
- Business plan teams may enter multiple regional competitions.
- No regional competition business plan can win more than one DOE-sponsored competition at the regional level (title and money).

IP Status

DOE promotes openness and transparency by requiring all competition entrants to disclose the status of all intellectual property (IP) used in the competitions:

- Competitions must demonstrate an effort to cultivate and recruit business plans based on technologies derived from U.S. universities and/or national laboratories.

Stage of Business Development and Ownership

To ensure a level playing field among business plan teams nationwide, all entrants must be early stage venture investments. Teams must meet the following criteria:

- Ventures participating in the competitions may not have equity capital totaling more than $200,000 prior to selection of regional winners.
- Teams are not required to incorporate before entering the competition, but must be incorporated and have an Employer Identification Number (EIN) prior to receiving DOE awards or prizes.
- All formal team members must demonstrate ownership by way of equity in the incorporated entity that emerges from the regional business plan competition.
- Student members of the formal team must have combined minimum equity of 20% of the company.

Proposed Goals: The NCEBPC goals include:

- Inspire students to engage in clean energy entrepreneurship;
- Build regional networks through the competitions that create linkages between technologists, academics, and investors;
- Enable the launch of innovative cleantech startups by providing seed funding and in-kind services to young entrepreneurs; and
- Advance clean energy technologies, like those championed by DOE EERE, by engaging students, innovators, and technologists to bring innovative technologies to market.

Why a Prize: The NCEBPC seeks to bridge the investor, technology and academic communities by inspiring cleantech entrepreneurship in students. By working with the private sector, through in-kind sponsorships, cash prizes, and having the business and investor community serve as judges and mentors, the competition brings together the communities in a way that could not be done through a grant alone.

The DOE funds each regional competition's annual grand prize of $50,000, attracting high-caliber technologies and teams. Using prizes as a catalyst for company formation has been a tested and proven model, demonstrated through quantitative and qualitative evidence. By enabling open competitions, the best technologies in all categories are eligible for consideration by using a prize at the regional competitions, rather than creating a single technology-focused grant. And the use of prizes creates additionality for the competition organizers as well, as competitions have successfully fundraised for additional prizes from the private sector.

Participants: The NCEBPC, through its five regional competitions, targets student entrepreneurs and technologists launching clean energy ventures. Registration took place at the regional competitions. In total, the five regional competitions received 194 applications nationwide. The team size ranged based on the number of formal team participants.

Timeline: The NCEBPC launched in 2011. The Competition in 2015 was the fourth year of the Competition. Entry dates for each regional competition varied by competition, ranging from January to March. Regional competitions took place between April and May of 2015. The final event – the National Competition - took place on June 24 in Washington, DC. National Competition finalists were the winners of each of the six regional competitions. The key dates for the regional competitions in 2014 were as follows:

Regional Competition	Application Date	Competition Date
MIT Clean Energy Prize	February 13, 2015	May 11, 2015
Clean Energy Trust Clean Energy Student Challenge	January 8, 2015	April 14, 2015
CU Cleantech New Venture Challenge	March 4, 2015	April 30, 2015

Rice Business Plan Competition	February 21, 2015	April 16-18, 2015
Caltech First Look West	March 3, 2015	May 6, 2015

Solicitation & Outreach: The NCEBPC used multiple media methods to disseminate information broadly about the National Competition and its winners. This included social media, traditional press, energy.gov through the EERE and Secretary's blog, and challenge.gov. A total of six blog posts highlighting each winner after each regional competition and the national competition were released, and connected to social media – including Facebook and Twitter. The lead-up to the national event also included blog posts and broad distribution. To enhance media and awareness, the NCEBPC has several partners that are recognized as Media sponsors for the National Competition.

To attract entrants, each region executed their own outreach strategy.

Incentives: The NCEBPC has several prizes associated with the entire competition. DOE directly sponsors the five regional competition prizes of $50,000, for a total of $250,000. The prizes were distributed by regional organizers. The funding was allocated through a cooperative agreement, awarded originally in 2011. Each region received $75,000 for their respective competition, which includes the $50,000. Each regional competition had other prizes, sponsored by a variety of private and non-profit organizations.

The National Competition prize of $50,000 was sponsored by the DOE.

Evaluation and Judging: The NCEBPC judging criteria are outlined in a policy memo that remained constant through the three year process. The NCEBPC used a software platform provided by a non-profit, the Clean Energy Trust. Each judge had online software. The submissions for the National Competition are the regional winners from each competition. At the regional level, each competition determines selection independently, with the guidelines instructed through the eligibility requirements. Independent reviewers hailing from multiple sectors, including finance, business and non-profits, serve as judges at the application and competition stages. While the regions can determine their own judging criteria, their criteria are subject to DOE approval. Eligibility requirements were outlined as follows:

Solutions/Products (30%)

Value proposition

Teams will be judged on the value their solution/product can deliver to their customers.

The value of the solution/product might include:

- Offering and benefits
- Exclusivity

- Nature and degree of pain customers currently experience
- Willingness to pay

Teams will be judged on whether their value proposition is superior to every alternative being considered. Teams should outline their target customers' needs and wants and explain how their product meets those requirements.

Differentiation

Teams will be judged on clear and convincing description of the market differentiation for their solution/product.

Descriptions should include comparisons to direct competitors and indirect substitute products.

Barriers to Competition

Teams will be judged on their ability to identify and capitalize on barriers against others who seek to imitate their success (i.e., through intellectual property, first movers' advantage, compelling marketing, and/or strategic partnerships).

Teams with technical solutions/products should briefly describe their IP position and/or their IP strategy, including the degree to which they control or are in the process of gaining control of a protectable intellectual property or service.

Technical Feasibility

Teams will be judged on the extent to which their solution/product is technically feasible.

To demonstrate feasibility, teams should discuss:

- Technology research (e.g., document searches, discussions with experts, etc.)
- Proof of concept (e.g., basic technology tests, design concept tests, prototype development, etc.)
- Product development assessments

The technical feasibility should be addressed independently of market feasibility.

Go-To-Market Strategy (30%)

Feasibility of Go-to-Market Plan

Teams were judged on the feasibility of achieving market adoption and successful deployment of the technology, including likely success in accessing manufacturing resources, financing requirements, personnel, regulatory environment, and marketing resources.

Teams should discuss any barriers (e.g., restrictions, monopolies, unreasonable costs, scarcity, energy, equipment, technology, material, process or personnel) that might limit access to required factors of production/implementation. Teams should discuss how they will overcome excessive capital requirements, financing obstacles, regulatory hurdles, marketing challenges or other non-IP barriers.

Customer access and traction

Teams will be judged on their ability to demonstrate to the best of their ability evidence of customer valuation/validation.

Presentations should include a description of the customer research design used to support market assessments.

Teams should identify potential early- and late-adopters of their solution/product and prove they can secure customers.

Scalability

Teams shall prove to the best of their ability that their business is scalable.

Proof of scalability will be based on:

- Total addressable market size
- Plans to achieve economies of scale
- Investments staging
- Production strategy
- Customer recruitment and management

Team Plan (20%)

Quality

Teams will be judged on how well they are positioned to successfully carry out their business plan.

Successful teams will prove their:

- Relevant experience in all aspects of the project

- Diversity of expertise and backgrounds (i.e., technological, entrepreneurial, business and policy)
- Ability to engage appropriate outside expertise

Expertise and backgrounds for the team members should be commensurate with the needs of the business plan.

Teams must execute a strong pitch while conveying creativity, confidence and competency.

Commitment

Teams will be judged on their commitment to the enterprise. Members must exhibit a high-level of enthusiasm for and demonstrable dedication to the company and their partners.

Chemistry

Teams will be judged on whether they possess the right competencies for their plan and ability to blend those skills to achieve synergies.

Gaps and Action Plans

Teams will be judged on gaps that currently exist in their organization and their action plan to fill the gaps.

Descriptions should explain the gaps between their present and desired future states. Teams should articulate the risk associated with any inadequacies and discuss mechanisms to eliminate the gaps.

Impact on EERE Mission (20%)

Teams will be judged on how their solution/product will strengthen the economy, protect the environment and reduce dependence on foreign oil.

Presenters should identify which of the eleven areas of the EERE's mission space will benefit from their solution/product.[28] Teams will be judged on credibility of the quantitative assessment of their solution/product's impact in the clean energy space (i.e., increasing efficiency, improving transmission, increasing clean energy generation, reducing greenhouse gas emissions) as well as its impact in terms of relevance, significance, scale and sustainability.

[28] The eleven areas that make up EERE's mission space are Renewable Energy (Solar, Wind, Water, Biomass, Geothermal, Hydrogen and Fuel Cells) and Energy Efficiency (Homes, Buildings, Vehicles, Manufacturing and Government).

Partnerships: DOE has partnered with a variety of private sector organizations over the last four years. For the fourth year, DOE directly supported the event and prize at the national event, with support from the Clean Energy Trust and the Pew Charitable Trusts. In the first three years, sponsorship was sought for both the prizes and to pay for all of the national competition's expenses. In the fourth year, DOE funded the competition and the prize directly, and executed the funds through an extended DNFA with the Clean Energy Trust. A total of $25,000 went to the event itself, and $50,000 for the national winner.

Resources: To execute the regional prizes, in 2011 the DOE released a competition solicitation to determine the administrators of the prizes. For the fourth year, Direct Noncompetitive Funding Assistance awards were issued to five regions that had participated in the prior three years. Each regional organizer received a total of $75,000 for the 2015 competition. The amount spent on the prize was at the discretion of each organization. Some regions determined that they had adequate internal resources to spend the entire $75,000 on the prize (CET, MIT, Caltech), while some directed up to $25,000 in resources for the event and $50,000 for the prize.

Results: Since its inception, the NCEBPC catalyzed the launch of companies, attracted attention and private sector support for competitions, and created jobs. In the first four years, more than 200 ventures have incorporated that received more than $70 million in follow-on funding and generated more than 120 jobs. The graduate startups from the competition have seen enormous success. In the past year, companies have been acquired, secured joint development agreements with major corporations, attracted crowdfunding and traditional investment, and been accepted into prestigious accelerators and incubators.

All five winning teams are actively pursuing their ventures. The five finalists were deemed to be the top companies in their respective competitions through a judging process at the regional contests. The judging panels comprised of a variety of stakeholders and were organized by each of the contests.

All five had made enormous progress since the competitions last summer:

- Axiom Exergy (Caltech First Look West regional winner): Axiom Exergy develops the Refrigeration Battery™, a thermal energy storage retrofit system that enables supermarkets to "store refrigeration" for later use, enabling supermarkets and food processing/distribution facilities to intelligently shift their refrigeration systems' costly energy consumption to off-peak hours. Axiom, the winner from the Caltech First Look West Competition, closed on a seed round of funding, which includes angel funding from Element 8, this spring. Since the competition, the company has begun ramping up for initial demonstration projects with supermarket chains. The Axiom team expanded its executive team and completed construction of a full-scale test system that is designed to simulate a broad set of energy storage and grid-edge applications at the company's new headquarters.
- FGC Plasma (Clean Energy Trust regional winner): FGC Plasma Solutions is an aerospace engineering firm developing a revolutionary new method for introducing fuel into jet engines with their patent pending GALDI fuel nozzle, which improves safety and efficiency. Since

competing in the competition, FGC's CEO, Felipe Gomez del Campo, was named to Forbes' elite 30 Under 30 for Energy. FGC plans to test their technology at NASA's Glenn Research Center in Cleveland, OH this coming summer.

- Living Ink (CU Boulder regional winner): Living Ink creates the world's first ink that grows—revealing what is written, sketched, or painted over several days. The algae-derived ink product had enormous media attention since participating in the competition, much as a result of their successful Kickstarter campaign, where the company raised more than $60,000 from the crowdsourcing site, with more than 900 backers. The company was recently touted as one of the top 50 startups to watch in Colorado.
- Ayar Labs (formerly OptiBit) (MIT Clean Energy Prize regional winner): Ayar Labs, the winner of the MIT Clean Energy Prize in 2015, built the first ever computer processor to communicate with light instead of electricity, a breakthrough that could significantly reduce the amount of energy needed to power computers. The company, formerly known as OptiBit, is now based in Berkeley, CA and is part of two startup incubators: the CITRIS Foundry at UC Berkeley and Silicon Catalyst in San Jose. This winter, findings from the company's technologies were featured in *Nature*. In November 2015, the company secured a $150,000 NSF SBIR Phase I grant and a $150,000 DOE SBIR Phase I grant. The company is actively raising seed funding.
- Hyliion (Rice Business Plan Competition regional winner and National Competition winner): Hyliion develops an add-on hybrid module for tractor trailers with the potential to reduce fuel consumption by 30% with a payback of under a year. Since participating in the competition, Hyliion won a $100,000 prize at MassChallenge, one of the largest accelerators in the world. They conducted testing of their suspension system on a dynamometer at the Pittsburgh Power testing lab, and early results of the prototype demonstrated that their fuel projection savings are well within reach. Hyliion purchased a new Volvo D13 Tractor so that the company can test and improve all aspects of the suspension system in the real world, from fuel consumption and maintenance requirements, to Auxiliary Power Unit performance and electronic stability control. Hyliion recently released their second version of their prototype, which they claim doubles the power output from their first prototype and that they made strides towards increasing fuel efficiency and power management.

d. SunShot Catalyst Program[29]

Summary: SunShot Catalyst is an open innovation program that aims to catalyze the rapid creation and development of products and solutions that address near-term challenges in the U.S. solar marketplace. Through a series of prize challenges, SunShot Catalyst makes it faster and easier for American innovators to launch cutting-edge solar companies, while tackling time-

[29] http://catalyst.energy.gov; video - http://youtu.be/PA0KI77G05U; this challenge was reported on in the FY14 COMPETES report, starting on page 81.

sensitive market challenges. The tagline of the challenge is "Tomorrow's Solar Startups Launched by People like You."

Catalyst's prize challenge framework introduces the business community to the vast array of tools, capabilities, data assets and additional resources developed by the Department of Energy and the national laboratories. Catalyst's open, fast-paced innovation cycle allows crowd-sourced engagement and frequent partnerships with the nation's growing networks of technology mentors, incubators, and accelerators. In Cycle II, the Solar Energy Technology Office has partnered with a sister Energy Efficiency Renewable Energy technology program, the Buildings Technology Office, in supporting problems in solar and buildings energy efficiency.

For each cycle, the primary incentive is over $1,000,000 total in prize awards given across the 4 steps of the Catalyst prize program. For Cycle I, the prize awards available totaled $1,005,000 and for Cycle II, $1,207,000 was available across the 4 steps. A portion of the prize awards is designated for software development services.

Solution Type: Ideas; Business plan; Technology demonstration and hardware; Software and apps

Primary Goals: Develop technology; Stimulate a market; Engage new people and communities

Results: The Catalyst program has made great strides to reach innovators from outside the solar industry. The program has reached an estimated five million people via Twitter with approximately 10% of active members coming from social media and has enjoyed media coverage including TechCrunch, support from the Secretary of Energy, and mentions by the White House and the White House Office of Science and Technology Policy blog.

For Cycle 1 of this program, the SunShot Catalyst community had over 5,300 active members responsible for submitting more than 285 problem statements, 75 Business Innovation Contest submissions, 36 finalists in the Prototyping Contest, 12 candidates for the Business Incubation Contest and 5 business Incubation winners. The organizers would also like to highlight how quickly these results have been achieved. The program was conceived, approved, and launched in less than six months. Prizes for the Catalyst Business Innovation contest were awarded within 6 weeks of the submission deadline – this includes evaluation of submissions and announcing winners. The Prototyping Contests run over 60 days.

By the end of 2015, DOE had run two Catalyst cohorts. Nineteen teams won the Business Innovation Contest. In total, twelve teams won prizes for the seed round of the Incubation Contest, and five teams won prizes in both the seed and progress rounds of the Incubation Contest. An additional 7 teams won prizes for the first round of the Incubation Contest. . The five teams that won prizes in the two rounds of the Incubation Contest are:

- Utility API
- PV Complete
- Solar Site Design

- GridMates
- Savenia

All five teams are still in business and growing. The five companies collectively raised $1 million in 2015 from private investors and created 20-25 new jobs. One of the teams, Utility API, was competitively awarded a cooperative agreement under the SunShot Technology to Market (Incubator 10) program for $762,530 in federal funds.

Problem Statement: Solar is a relatively new industry that is growing rapidly, but continued growth will be dependent on several issues including cost competitiveness with other energy sources. Through the SunShot Catalyst prize program, communities of innovators use software, data, algorithms, and automation to drive down non-hardware solar soft costs – like permitting, financing, and customer acquisition – that today make up more than half of the cost of a solar electricity system.

Since its inception, SunShot has helped hundreds of innovators bring mature solar solutions to the marketplace. Catalyst's prize challenge framework introduces the business community to the vast array of tools, capabilities, data assets and additional resources developed by the Department of Energy and the national laboratories. Catalyst's open, fast-paced innovation cycle allows crowd-sourced engagement and frequent partnerships with the nation's growing networks of technology mentors, incubators, and accelerators.

Each cycle of the Catalyst program consists of four steps with value awarded to all winning contestants totaling more than $1,000,000, including about $500,000 in cash prizes. In FY15, both cycle I and II completed some steps. Cycle II will complete in FY16.

		Winners	Awards	Timeline
Step 1	Ideation	Up to 5	$1,000 cash per winner	See *Timeline* section for all important dates for Catalyst Cycle I and Cycle II that DOE ran in 2015
Step 2	Business Innovation	Up to 20	$25,000 in services per winner	
Step 3	Prototype	Up to 20 finalists	All finalists advance to Incubation	
Step 4	Incubation	Up to 5	Up to $100,000 prize package per winner	

Step 1: Ideation

The ideation contest focuses on generating and aggregating pressing U.S. solar market needs and problem statements that can be solved through automation, algorithms, data, and software, especially by leveraging available data assets, tools, capabilities, and resources. Anyone can participate by submitting problem statements online or by voting on problem statements submissions from others. A contestant with a problem statement may win $1,000 in cash prizes when a team, who adopted this problem statement in their business solution, has been selected among the top five winners by a panel of judges in accordance with the rules of the incubation contest.

Step 2: Business Innovation

The business innovation contest is designed to help teams form and explore business solutions to the most compelling problems identified during ideation. Anyone can participate by submitting a business plan package online, including a five-minute video describing the proposed business plan. Up to 20 winners will be given the opportunity to move forward in the Catalyst process and work directly with a crowd-centric performance-based software development platform to develop the product proposed in their business plan and to create minimum viable products (MVPs).

Step 3: Prototype

The prototype phase is designed to help business plan contest winners rapidly develop MVPs using the crowd-centric performance-based software development platform. During the contest, teams will be provided with $25,000 worth of support from a DOE-provided software developer over a 60-day period. Each team will formulate its requirements and scope of work for one MVP, working closely with the software developer.

Step 4: Incubation

The Incubation contest is designed to help teams with MVPs start their businesses and accelerate offering new products and services in the solar marketplace. To win cash awards, teams will participate in a DOE-hosted Demo Day to showcase their MVPs, market entry execution strategy, and six-month growth plan. During Demo Day, teams will be evaluated by judges according to pre-established criteria. The top five winning teams will receive up to $100,000 in cash prizes.

Proposed Goals: The proposed goals of this prize competition are as follows:

- Support *new entrants* into the solar "founder's club"
- Bring non-traditional entrepreneurs and human capital into solar industry
- *De-risk technology development* for applicants by providing *rapid* prototyping
- Provide *pre-seed stage prize funding*, integrating well with other SunShot funding opportunities, especially SunShot's Incubator program

Why a Prize: In the spirit of American ingenuity and invention, the SunShot Initiative has invited the public to participate in a new solar prize challenge and find solutions to the solar energy industry's most pressing problems. The approach is to solicit ideas and business solutions from the crowd, specifically software solutions, in an open ecosystem that supports new business solutions and products to help tackle the soft costs of solar. Software development happens rapidly and SunShot needed to create a program that is nimble and allows the participants to rapidly create products to address near-term issues in the U.S. solar marketplace. For this particular effort, a competitive grant would be more restrictive. If a traditional grant were used, all problem statements and proposed business solutions would have to be made confidential. A prize program gives SunShot the greatest flexibility to solicit both problem statements and software solutions to those challenges in a transparent and open fashion, with little overhead.

Participants: Catalyst has reached entrepreneurs, coders, software and data experts, investors, mentors, designers, students, utilities, and solar professionals.

Timeline: For Cycle I, Step 1 was completed in FY 2014 and Steps 2-4 were completed in FY2015. For Cycle II, Steps 1 and 2 were completed in FY 2015, and Steps 3 and 4 are expected to be completed in FY 2016.

	Cycle I	Cycle II
Step 1: Ideation		
Problem Statement Submission Period Begins	May 21, 2014	May 13, 2015
Problem StatementSubmission Period Ends	June 20, 2014	June 30, 2015
DOE and Public Voting Period Begins	June 25, 2014	May 31, 2015
Public Voting Period Ends	August 25, 2014	June 30, 2015
Step 2: Business Innovation		
Video Pitch Submission Period Begins	September 8, 2014	June 15, 2015
Video Pitch Submission Period Ends	November 7, 2014	August 14, 2015
Evaluation and Judging	--	August 17 – 31, 2015
Winners Announced	December 19, 2014	September 4, 2015
Step 3: Prototype		
Teams Orientation	January 19 – 23, 2015	September 11 – 18, 2015
60-Day Prototyping Period Begins	February 13, 2015	September 28, 2015
60-Day Prototyping Period Ends	April 17, 2015	November 30, 2015
Step 4: Incubation		
Demo Day Submission Package Deadline	--	December 4, 2015
Demo Date	May 14 – 21, 2015	December 9 – 10, 2015
Seed Round & 1st Tranche Cash Awards Announcement Date	May 21, 2015	December 10, 2015
6 Month Assessment Period Ends	November 9, 2015	June 17, 2016
6 Month Assessment Submission Deadline	--	June 24, 2016
Progress Round Awards & 2nd Tranche Cash Prizes Announcement Date	December 14 – 20, 2015	July 11 – July 15, 2016

Solicitation & Outreach: By actively participating in the Catalyst community, an individual or team has the opportunity to turn an idea into a funded startup on a national stage. In order to develop this community of active participants in a cost effective manner, the following four channels were opened and maintained for future rounds of Catalyst: 1) direct in-person engagement through road shows, 2) digital channels, 3) member to member, and 4) press coverage.

Direct In-Person Engagement

The main mechanism for initiating direct person engagement is the Road Show. By conducting the Road Show, the core team, current SunShot awardees, and supporting staff generated excitement and awareness about the Catalyst program in regions of the US. The Road Show usually consisted of co-sponsoring an anchor event and conducting additional SunShot Catalyst

Jamathons near that anchor event. This strategy was piloted in three cities: San Francisco CA, Austin TX, and Washington DC.

Digital Channels

The Catalyst platform and its open nature enable a variety of web, media, and digital channels to connect with its growing community of active users. Email, web video, and social media tweets/Facebook posts are used by the Catalyst team to communicate announcements and opportunities. These communication channels can be used both vertically (Catalyst team and community) as well as horizontally (member to member).

During the site launch and near major contest deadlines Facebook/LinkedIn sharing, tweets, and DOE blog posts (links below) are critical to reaching portions of the target audience. Retweets greatly enhanced the visibility and reach of the Catalyst messaging.[30]

Person to Person

A critical component in maximizing the value of the Catalyst ecosystem is the ability for active members to communicate with each other both virtually and in-person. Virtually Catalyst members are able to contact one another via the online platform as well as comment/vote on ideas.

Press

The SunShot Catalyst was featured in Cleantechnica, Digital Gov, Renewable Energy World, Solar Industry Magazine, Solar Novus Today, Gigoam, and TechCrunch.[31] The Sunshot Catalyst

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[30] http://energy.gov/eere/articles/sunshot-catalyst-new-prize-challenge-aims-accelerate-solar-solutions; http://energy.gov/eere/articles/creating-future-solar-energy-today

[31] Cleantechnica " Just in Time for Clear Power Plan, Sunshot Catalyst Puts Up $1 million for Solar Innovation," August, 7, 2015 http://cleantechnica.com/2015/08/07/just-time-clean-power-plan-sunshot-catalyst-puts-1-million-solar-innovation/

Digital Gov. "An Innovation Framework That Delivers: The SunShot Catalyst Program." http://www.digitalgov.gov/2015/08/07/an-innovation-framework-that-delivers-the-sunshot-catalyst-program/ - August 7

Clean Technica. "Winners of First Round of SunShot's Catalyst Prize Competition Announced." - http://cleantechnica.com/2015/06/16/winners-first-round-sunshots-catalyst-prize-competition-announced/ - June 16

Renewable Energy World. "From Finance to Customer Acquisition Catalyst SunShot Finalists Compete to Launch Big" - http://www.renewableenergyworld.com/articles/2015/05/from-finance-to-customer-acquisition-catalyst-sunshot-finalists-compete-to-launch-big.html - May 13

Solar Industry Magazine. "SunShot Awards Grants To Winners Of Its Catalyst Solar Start-Up Competition" - http://solarindustrymag.com/e107_plugins/content/content.php?content.15313 – May 21

Solar Novus Today. "SunShot Announces Solar Start-Up Winners of Catalyst Demo Day" - http://www.solarnovus.com/sunshot-announces-solar-start-up-winners-of-catalyst-demo-day_N8897.html - May 22

Media Advisory May 2015: 2015 SunShot Catalyst Prize Demo Day

also won the GSA's Edison Innovation Award during the Five Years of Open Innovation celebration.[32]

Incentives: The primary incentive is over $1,000,000 total in prize awards per cycle given across the 4 steps of the Catalyst prize program. For Cycle I, the prize awards available totaled $1,005,000 and for Cycle II, $1,207,000 was available across the 4 steps. A portion of the prize awards is designated for software developments services.

Evaluation and Judging:
Step 1: Ideation Evaluation Criteria

During the submission period and prior to the beginning of the voting period, DOE initially screens submissions for compliance with the objectives and rules of this contest. A submission that fails to meet the compliance criteria will be disqualified and will be ineligible for public voting or prizes. DOE reserves the right to delete redundant problem statements or when possible combine similar problem statements into a single problem statement based on timestamps. If problem statements are combined or edited by DOE, only the first submitter will be eligible to receive the $1000 prize. DOE will exercise full discretion in this matter. DOE decisions are final. Submissions that pass the initial compliance screening are published on the contest website and are open for public voting. Publishing a submission to the contest website does not constitute the DOE's final determination of contestant or submission eligibility. DOE publishes a list of all eligible statements at the end of step 1.

Non-Monetary Prize Evaluation:

The screened submissions are evaluated based on two scoring criteria. Any eligible submission that gets a SunShot Thumbs Up and is among the top 25 in terms of total public votes may be granted a letter of commendation from DOE as a non-monetary prize.

Scoring Criterion #1: SunShot Thumbs Up

Press Release May 2015: SunShot Announces Solar Start-Up Winners of Catalyst Demo Day

Press Release: Energy Department Announces $32 Million to Boost Solar Workforce Training, Drive Solar Energy Innovation

EERE Blog Post May 2015: Startups Tackle Solar Challenges

Press Release: "Energy Dept. Announces New Prize Challenge to Drive Down the Cost of Solar Power," May 20, 2014

Gigaom "To Reduce the Cost of Solar Look to Everything but the Hardware," May 20, 2014 https://gigaom.com/2014/05/20/to-reduce-the-cost-of-solar-look-to-everything-but-the-hardware/

Cleantechnica "SunShot Catalyst Takes Aim at Solar Soft Cost," May 21, 2014 http://cleantechnica.com/2014/05/21/sunshot-catalyst-takes-aim-at-solar-soft-costs/

TechCrunch "The Department of Energy Needs your Help to cut the Soft Cost of Solar," November 5, 2014 http://techcrunch.com/2014/11/05/the-department-of-energy-needs-your-help-to-cut-the-soft-costs-of-solar/

[32] https://www.challenge.gov/challenge-gov-celebrates-five-years-of-open-innovation/

A submission will receive the SunShot Thumbs Up vote if SunShot determines that the answer to each of the following questions is "Yes":

- Is the Problem Statement clearly defined and well-articulated?
- Does the problem statement reflect a timely and a compelling solar market need in the U.S. whose solution will have a great and measurable impact consistent with SunShot goals?
- Does the problem statement have the potential to be solved using highly scalable business processes, automation, data, or software?
- Do potential solutions to the problem statement have viable monetization pathways with high probability for yielding market-driven self-sustaining or profitable businesses?

Scoring Criterion #2: Public Votes

Members of the public participate in the voting in the contest by casting one vote per submission during the active public voting period. Any attempt to circumvent the vote limit or to use any form of automated vote process will subject all votes from that person to disqualification. DOE may disqualify the votes and/or submissions of any users or contestants seeking to defraud the voting process.

Public votes may be displayed on the contest website, on a real-time basis, before being verified for integrity. These unverified votes may not necessarily reflect the final number of verified votes to qualify for non-monetary prizes. To qualify for non-monetary prizes a submission must receive a total number of public votes that places them among the top 25 publicly voted submissions during the voting period and as determined by DOE. DOE reserves the right to cancel or extend the voting period at any time for any reason.

Basis for Monetary Prize Awards

To win a monetary prize in an Ideation contest (Step 1), the problem statement of a contestant in Step 1 has to be the referenced problem statement of a winning contestant of a subsequent Incubation contest (Step 4). The winning contestant in Step 4 may be related or unrelated to the contestant in Step 1. A contestant in Step 1 may win more than one cash prize in addition to any number of non-monetary prizes, or none, provided that all requirements are satisfied in accordance with the Official Rules of Step 1 and Step 4. All monetary prizes for Step 1 are equal in the amount of $1,000 per award and not exceeding $5,000 in total.

Step 2: Business Innovation Evaluation Criteria and Judging

DOE initially screens submissions for compliance with the objectives and rules of the contest. Any submission that fails to meet the compliance criteria is disqualified is ineligible to compete. Submissions that pass the initial compliance review are evaluated and scored by a panel of judges. An evaluation of a submission by a panel of judges does not constitute the DOE's final

determination of contestant or submission eligibility. Submissions are judged according to four scoring criteria:

Scoring Criterion #1: Novelty & Impact Potential (Max 40/100)

- The extent to which the proposed approach described in the submission tackles the selected or the stated problem statement. Solutions and business plans that are unrelated to the selected or stated problem statement will receive 0 points.
- Whether the contestant proposed a product or solution that is unique, innovative, economically feasible, and has viable monetization pathways with high probability for yielding market-driven profitable businesses.
- The potential impact of the proposed solution to advance the state of the U.S. solar market readiness, maturity and competitiveness.
- Whether the contestant demonstrated sufficient awareness of competing approaches and identified how the proposed plan provides significant improvements over these other potential solutions.
- The benefits associated with the proposed solution are well articulated and justified with reasonable and rational assumptions that are clearly stated.

Scoring Criterion #2: Business Plan Scope & Quality (Max 40/100)

- Whether the contestant envisions outcomes and deliverables that are clearly defined.
- Whether the contestant demonstrates a reasonable and credible approach to accomplish the proposed objectives, tasks, outcomes and deliverable.
- Whether the contestant proposes a strong and convincing development approach.
- Extent to which the proposed approach uses and integrates existing algorithms, tools, databases, APIs, capabilities, and platforms (public and private resources).

Scoring Criterion #3: Team Experience & Abilities (Max 20/100)

- Quality and qualifications of the contestant Team and the likelihood that they will be able to successfully implement the proposed plan.
- Extent to which the business plan shows a mastery of the skills required to complete the proposed solution including the ability to lead and engage a number of stakeholders to realize the proposed plan.
- Level of commitment and dedication to pursue the proposed solution as determined by availability of key personnel and previous track record of solving similar problems.

Step 3: Prototyping – No Evaluation Criteria

Step 4: Incubation Evaluation Criteria – Seed Round

Step 4 is conducted in two rounds: seed and progress. The seed round's evaluation criteria follows. After the first round (seed), each team receives an initial award to conduct a six-month assessment period and proceeds to the second incubation round (progress).

Scoring Criterion #1: MVP Quality & Impact (Max 40/100)

- Level to which the MVP demonstrates a functional solution to a business need in the solar energy production industry
- Level to which MVP embodies the potential functionality of the final product
- Level to which the applicant demonstrates mastery of MVP as shown by his or her knowledge of the capability and functionality of the software.
- Extent to which project shows potential for scalability of the proposed product to address the desired market

Scoring Criterion #2: Market Entry (Max 20/100)

- Level to which applicant provides a clear path to a functional final product
- Likelihood of a transformational product and/or widespread adoption of proposed product or solution
- Extent to which applicant identifies other competing products and differentiates proposed product from existing market.
- Identification of realistic target market(s), discussion of competitive advantage, and the clarity of the business strategy in identifying market objectives (e.g., segment, price, volume/size, and region) and that these objectives are aligned with the contestant's capabilities and resources
- Identification and accurate assessment of business risks and assumptions

Scoring Criterion #3: Growth Strategy (Max 20/100)

MVPs are scored on the quality of the 6-month deliverables, success verification methods and the level to which deliverables and the team's progress:

- Show progress towards a final commercial product;
- Eliminate highest risk for successful functionality;
- Complement the proposed business plan;
- Show progress in both product development and market acceptance;

- Engage realistic market segments and execute contracting mechanisms

Scoring Criterion #4: Team Success Potential (Max 20/100)

- Quality of partnerships, mentors, and investors as determined by relevant expertise, financial capability and track record of bringing new products to market.
- Extent to which the training, capabilities and experience of the assembled team will result in the successful completion of the proposed goals and outcomes.
- Likelihood that this team will be able to achieve the final outcomes on time and to specification.
- The team has access to facilities, equipment, and any other resources they would require to complete the proposed outcomes.

Step 4: Incubation Evaluation Criteria – Progress Round

DOE evaluates submissions by applicants based on performance and the extent of progress that has been shown during a six month assessment period. Specifically, DOE evaluates each of the five or more performance metrics provided by each team based on the grading scale of A, B, C, or D as further described below.

- Grade A means the team met or exceeded their stated score card metric or met similar goals taking into account reactions to market changes.
- Grade B means the team made significant progress towards meeting the goal or will likely hit their goals based on current performance.
- Grade C means that teams made enough progress towards hitting their goals.
- Grade D means the level of progress made by the team does not indicate a likelihood of future success.

DOE also evaluates each team's performance on the following two questions based on the same grading scale.

- Did the contestant demonstrate substantial progress toward building a viable business in the solar industry as outlined in their Seed Round submission?
- Did the contestant team increase their assets by at least $1 million?

If a team's modal grade is A, the team receives $70,000. If the modal grade is a B the team receives $50,000. If the modal grade is a C, the team receives $20,000 and if the modal grade is a D, then the team receives no additional funds.

Partnerships: Through an innovative partnership with the National Renewable Energy Laboratory (NREL) and TopCoder, winners of the Catalyst Business Innovation Contest have

the opportunity to use the TopCoder platform and developer community to create software prototypes. Teams demonstrated their prototypes before a panel of investors, judges and their peers in May 2015 for Cycle I and in December 2015 for Cycle II. Up to 5 winning teams received $30,000 on the spot, and up to an additional $70,000 in follow-on funding from DOE as they grow and scale their innovative solar solution. In Cycle II, the Solar Energy Technology Office has partnered with a sister Energy Efficiency Renewable Energy technology program, the Buildings Technology Office, in supporting problems in solar and buildings energy efficiency.

Resources: In addition to the prize money, the competition may require up to $700,000 per round to fund and support outreach activities, co-prize administration, and software development vendor support services.

Results: The Catalyst program has made great strides to reach innovators from outside the solar industry. The program leveraged social media, software and technology community events and conferences, and media relations to engage and build the Catalyst community. At this point, organizers estimate over five million people have been reached via Twitter with approximately 10% of active members coming from social media. SunShot has enjoyed media coverage including by TechCrunch, support from the Secretary of Energy, and mentions by the White House and the White House Office of Science and Technology Policy blog.

To date, the SunShot Catalyst community has over 5,300 active members responsible for submitting more than 285 problem statements, 75 Business Innovation Contest submissions, 36 finalists in the Prototyping Contest, 12 candidates for the Business Incubation Contest and 5 business Incubation winners (Cycle I). Finally, the organizers would like to highlight how quickly these results have been achieved. The program was conceived, approved, and launched in less than six months. Prizes for the Catalyst Business Innovation contest were awarded within 6 weeks of the submission deadline – this includes evaluation of submissions and announcement. The Prototyping Contests are running over 60 days. Currently five teams from Cycle I are participating in the Progress Round of the Incubation Contest after receiving $30,000 each in cash prizes.

By the end of 2015, DOE had run two Catalyst cohorts. 19 teams won the Business Innovation Contest. The Incubation Contest is conducted in two rounds for each cohort: the seed round and the progress round. The Incubation Contest is conducted in two rounds for each cohort: the seed round and the progress round. In total, twelve teams won prizes for the seed round of the Incubation Contest, and five teams won prizes in both the seed and progress rounds of the Incubation Contest. The five teams that won prizes in the two rounds of the Incubation Contest are:

- Utility API
- PV Complete
- Solar Site Design
- GridMates
- Savenia

All five teams are still in business, and growing. The five companies collectively raised $1 million from private investors in 2015 and created 20-25 new jobs. One of the teams, Utility API, was competitively awarded a cooperative agreement under the SunShot Technology to Market (Incubator 10) program for $762,530 in federal funds.

e. SunShot Prize: Race to 7-Day Solar[33]

Summary: The SunShot Prize: Race to 7-Day Solar is designed to challenge the ingenuity of America's businesses, organizations and communities to significantly improve the customer experience and length of time to completion of "going solar." DOE's $10 million SunShot Prize challenges the ingenuity of America's businesses and communities to make it faster, easier, and cheaper to install solar energy systems. Prizes are awarded across multiple phases of the competition.

1. SunShot awards cash prizes (up to $100,000) for the top 20 teams to compete and improve (up to $2 million).

2. Teams deploy photovoltaic (PV) systems and accumulate points based on performance during a set 18-month period starting in September 2015 and ending in March 2017.

3. Teams with highest total points above a minimum threshold win a total of $8 million in grand prizes. The first place and second place grand prizes are $3 million and $1 million, respectively, for each of the two contests: Small System Contest and Large System Contest.

Challenge organizers partnered formally with the College of Nanoscale Science and Engineering at State University of New York at Albany to promote and provide ongoing outreach activities.

Solution Type: Ideas; Technology demonstration and hardware; Business plan

Primary Goals: Develop technology; Stimulate a market; Solve a specific problem

Results: For the Small System Contest, DOE received five applications. After evaluating the submissions based on the published evaluation criteria and deeming all submissions worthy of prizes, DOE awarded each of the five teams $25,000 awards as a first tranche of the total $100,000 change prize award. DOE made public announcements of these awards at the Solar Power International conference hosted by the Solar Energy Industry Association (SEIA) in Anaheim, CA during the second week of September. DOE has started the process of active engagement and coordination with the five participating teams during the 18-month performance period that started on September 22, 2015 to validate progress towards the goals of the SunShot Prize: Race to 7-Day Solar.

[33] http://energy.gov/eere/sunshot/sunshot-prize-race-7-day-solar; this challenge was reported on in the FY14 COMPETES report, starting on page 89.

The five teams of the Small System Contest are competing to win grand prizes totaling $4 million in June 2017: $3 million for 1st prize and $1 million for 2nd prize. These five teams are Northern and Central California SunShot Alliance, Sunrun, The Solar Auditor, The Connecticut Permit to Plug-in Team, and Midwestern Solar. Teams are attempting to have a plug-in-to-permit total time average of 7 days with a standard deviation of 2 days.
For the Large System Contest, no applications were received during the submission period, and of $1 million in available prizes for this round, no prizes were awarded from this category. The Large Systems Contest targets mid-size commercial PV systems. This market is growing much more slowly than residential and utility scale and therefore there is less demand, motivation, and willingness to streamline permitting and grid interconnection for these systems at this point.

Problem Statement: Despite unprecedented cost reductions for solar hardware over recent years, the total price to install and commission residential and small-commercial scale solar energy systems remains high. Designing and implementing practices that enable reductions in the associated non-hardware costs of solar is now the greatest challenge to achieving national targets for attaining cost-competitive solar by 2020. Customers often wait as long as six months to flip the switch on a small residential solar system that could be grid-connected simply and easily if these steps were improved. This competition will spur faster, easier, and cheaper solar deployment in the U.S. and will offer a total of $10 million in cash awards to make permitting, installation, inspection and interconnection (permit-to-plug-in) processes more efficient than ever before. Every one day reduction due to process efficiency improvements translates to $2 million of electricity sales at 2013 deployment level. A positive customer experience in the U.S. will lead to a strong cascading network effect for accelerated solar deployment.

Proposed Goals: DOE aims to increase process certainty and reduce the time of permit-to-plugin towards 7 days (Small System Contest) or 7 weeks (Large System Contest).

Why a Prize: The SunShot Prize not only rewards results, but also it seeks to increase the number and the diversity of entities that are addressing this problem, especially cities, local governments, utility companies, and installers. In addition, DOE expects the industry overall to invent and deploy new concepts and models during a period of two years. This will help market players to participate, excel, and improve while focusing on their core value proposition to end consumers.

Participants: The target audiences are teams consisting of numerous organizations such as solar developers, installers (large and small), state and local governments, utilities, property owners and managers, new housing builders, home service providers, trade associations, and new market entrants. The prize is open to all U.S. citizens or permanent residents and to all public and private organizations such as a private or publicly traded company or an institution of higher education, an association, or other non-profit organization, that maintains the U.S. as its primary place of business.

Five teams applied for the Small System Contest, and they are Northern and Central California SunShot Alliance, Sunrun, The Solar Auditor, The Connecticut Permit to Plug-in Team, and Midwestern Solar. No team applied for the Large System Contest.

Timeline: The initial entrance application was due August 14, 2015. Change Champions were announced in April 2016 and Competition Prize Winners will be chosen in June 2017.

Release of Official Rules	Wednesday, March 4, 2015
Letter of Intent Due (Optional)	Thursday, April 2, 2015
Initial Registration Due (Optional)	Monday, May 24, 2015
Entrance Application Due	Friday, August 14, 2015
Announcement of Teams	September 14-17, 2015
Performance Period Begins	Tuesday, September 22, 2015
First Progress Report Due	Tuesday, January 19, 2016
Second Progress Report Due	Monday, March 21, 2016
Second Deadline for adding Jurisdictions	Monday, March 21, 2016
Announcement of Change Champions	Friday, April 29, 2016
Performance Period Ends	Friday, March 17, 2017
Performance Application Due	Friday, April 28, 2017
Announcements of Competition Prize Winners	Monday, June 26, 2017

Solicitation & Outreach: Challenge organizers have hosted and participated in a number of DOE-run events, webinars, meetings, and direct outreach initiated to promote participation in the competition between March 4th and August 4th 2015. The challenge organizers directly contacted and engaged the mayoral offices of the 100 most populated cities in the U.S., the top 100 public utilities, and all 50 state energy offices and agencies. The challenge organizers also conducted an engagement campaign using webinars, email blasts, blog posts, and web updates that target hundreds of communities and organizations. Challenge organizers published a number of press releases about the competition on social media, and through online press outlets focused on energy. The SunShot Initiative website, Energy.gov, and Challenge.gov are also being used as hubs for frequent competition updates and for providing active support to potential contenders. Challenge organizers have partnered with the College of Nanoscale Science and Engineering (CNSE) at the State University of New York at Albany to promote and provide ongoing outreach through annual workshops dedicated to the SunShot Prize and its potential contenders.

Incentives: The primary incentive is a $10,000,000 total cash award given to up to 20 Change Prize winners and up to four Grand Prize winners. The Grand Prizes allocate $4 million for the Small System Contest and another $4 million for the Large System Contest.

Evaluation and Judging: DOE used a statistics-based evaluation approach and relied on an Evaluation Review Committee (ERC) composed of Federal and non-Federal subject matter experts, including third-party organizations, to review entries submitted under this competition and determine winners. In addition, DOE used third-party auditing services to conduct record validation in order to assist the ERC in making its selections.

There are three main criteria in judging final applications:

1. Repeatability: The repeatability criteria measure a team's ability to complete PV systems in set time durations repeatedly. Shorter time durations translate to higher scores. Two metrics are used to evaluate this criterion: 1) Time-adjusted capacity (in MW) and 2) Normalized time-adjusted capacity (in %)

2. Time Performance: The time performance criteria measure a team's ability to consistently reduce the total time for PV system installation and increase the certainty of going solar. Two metrics are used to evaluate this criterion: 1) Total Time expected value (in days) and 2) Total Time variability (in days)

3. Replicability: Replicability criteria measure a team's ability to apply its innovation for time reduction and increased process certainty across wide geographical areas in the U.S. One metric is used to evaluate this criterion: Diversity of Authority Having Jurisdictions (in %).

Partnerships: Challenge organizers partnered formally with the College of Nanoscale Science and Engineering at State University of New York at Albany to promote and provide ongoing outreach activities.

Resources: In addition to the $10,000,000 prize money, DOE pays the prize administrator $50,000 to conduct outreach activities and prize implementation.

Results: DOE received five applications for the Small System Contest by August 14, 2015. After evaluating the submissions based on the published evaluation criteria, DOE awarded each participating team $25,000 change prize awards as first tranche of the $100,000 change prize award. DOE made public announcements of these awards at the Solar Power International conference hosted by the Solar Energy Industry Association (SEIA) in Anaheim, CA during the second week of September, 2015. DOE has started the process of active engagement and coordination with the participating teams during the 18-month performance period that started on September 22, 2015 to validate progress towards the goals of the SunShot Prize: Race to 7-Day Solar. The five teams are competing to win grand prizes totaling $4,000,000 in June 2017. These five teams are Northern and Central California SunShot Alliance, Sunrun, The Solar Auditor, The Connecticut Permit to Plug-in Team, and Midwestern Solar.

The Large System Contest received no applications. This contest targets mid-size commercial PV systems. This market is growing much slower than residential and utility scale and therefore there is less demand, motivation, and willingness to streamline permitting and grid interconnection for these systems at this point.

f. Wave Energy Prize[34]

Summary: The Wave Energy Prize is an 18-month design-build-test prize competition that aims to 1) spur game-changing performance enhancements to wave energy converters (WECs); 2) provide a pathway to sweeping cost reductions; 3) mobilize new and existing talent; 4) provide an opportunity for apples-to-apples WEC testing and evaluation; 5) increase the visibility of

[34] waveenergyprize.org

WECs and attract potential investors; and 6) successfully enable the top performers to become viable and competitive industry members. The Wave Energy Prize aims to double the state-of-the-art performance of WECs, specifically the energy captured per unit structural cost of these devices.

DOE's Water Power Program, along with a contracted Prize Administration Team (consisting of Ricardo, Inc., JZ Consulting, and Polaris Strategic Communications), technical experts from Sandia National Laboratories and the National Renewable Energy Laboratory, and staff at the Naval Surface Warfare Center - Carderock Division are responsible for implementing the prize design, build, and test phases.

The prize purse totals $2.25 million.

Solution Type: Ideas; Technology demonstration and hardware

Primary Goals: Solve a specific problem; Develop technology

Results: Ninety-two teams registered to participate in the prize competition during the registration phase, three times the expected response. Registered teams were required to submit a detailed Technical Submission describing their proposed innovative WEC technology. Twenty Qualified Teams were selected by the Judging Panel based on a rigorous evaluation of these Technical Submissions. All qualified teams had access to small scale testing. Winner(s) of the prize competition will be announced in November 2016, with the grand prize being $1.5 million.

The Prize is not yet completed, but there have been huge successes so far, including the diversification and increase in number of players in the wave energy space, more than three times the number of expected registrants, the development of rigorous metrics to evaluate diverse WEC configurations, the development of public communications and outreach materials that will be used by the Water Power Program for future work, and the building of strong partnerships with the Department of the Navy.

Problem Statement: The wave energy industry is an emerging market that has vast potential for innovation. Prototype tank testing of diverse WEC designs is a key step in evaluating ideal WEC types with rigorous metrics, but funding is hard to secure for performance testing and evaluation of WECs at a meaningful scale. The Water Power Program in the U.S. Department of Energy (DOE) therefore designed an aggressive and ground-breaking technology demonstration prize to spur innovation and establish a pathway to sweeping cost reductions at commercial scale.

Proposed Goals: The Wave Energy Prize encourages the development of more efficient WEC devices that double the energy captured from ocean waves, which in turn will reduce the cost of wave energy, making it more competitive with traditional energy solutions. NREL's standard metric for measuring the efficiency of a technology is the levelized cost of energy (LCOE). LCOE is calculated based on the full life-cycle cost of an energy technology's installation, operations, and financing. For an emerging technology such as WECs, life-cycle cost information is not available, and so NREL developed a new metric (the Average Climate Capture Width per Characteristic Capital Expenditure, or the "ACE") to assess the performance

of WECs that could serve as a proxy. The ACE is a simple benefit-to-cost metric, much as LCOE is a cost-to-benefit metric ($/kWh). The ACE is a brand new evaluation metric and will be rigorously tested on proposed technologies in a testing campaign that will determine which teams are eligible to win the $1.5 million grand prize.

Why a Prize: With more than 50 percent of the U.S. population living within 50 miles of coastlines, there is vast potential to provide clean, renewable electricity to communities and cities across the United States using wave energy. It is estimated that the technically recoverable wave energy resource is approximately 1,170 terawatt hours (TWh) per year. Approximately 90,000 homes could be powered by 1 TWh per year. Extracting just 5% of the approximately 1,170 TWh/year of the technical resource potential could result in wave energy powering 5 million American homes.

The wave energy industry is young and is experiencing many new innovations as evidenced by a sustained growth in patent activity. While private industry is developing these early-concept WECs through design and prototype testing, funding is hard to secure for performance testing and evaluation of WECs in wave tanks at a meaningful scale. This is a problem for the industry since scaled WEC prototype tank testing, validation, and evaluation are key steps in the advancement of WEC technologies through the technical readiness levels in order to reach commercialization.

With clear goals and a firm idea of what would be required to spur the game-changing innovations that would make such a technological leap, the Water Power Program sought to use a prize competition to double the state-of-the-art performance of WECs—and thus halve the current LCOE—to make wave energy economically viable in the future. The Wave Energy Prize has set a high technical bar for participants, and is facilitating rapid advancements by offering a monetary prize purse and providing an opportunity for tank testing and evaluation of scaled WEC prototypes at the nation's most advanced wave-making facility, the U.S. Navy's Maneuvering and Seakeeping (MASK) Basin in Carderock, MD. The Prize also offers important non-monetary benefits that will result in additional value to the industry, such as publicity and investor engagement, along with the ability to compare performance across diverse device configurations.

Participants: The Wave Energy Prize has mobilized engineers, developers, and builders from across the entire country. This includes people who represent universities, small companies, more established players in wave energy, and independent collaborations.

The Water Power Program desired to attract at least thirty teams to register to compete in the Prize during the registration period. With an aggressive communications and outreach strategy, 92 teams registered in the end. Of these, 20 were selected as Qualified Teams (and two Alternates, who have since been eliminated from the competition). Below is a demographic breakdown of these Qualified Teams (and Alternates):

- Companies: 10 Qualified Teams
- Independent/collaborations: 7 Qualified Teams + 1 Alternate

- Universities: 3 Qualified Teams + 1 Alternate

Qualified Teams' innovations span geometry, advanced control strategies, energy absorption and conversion capabilities, and materials. Latest news from the Teams is provided on the Wave Energy Prize website.[35]

Timeline: The Prize was launched on April 27, 2015, at the National Hydropower Association/International Marine Renewable Energy Conference. The Qualified Teams were announced on August 14, 2015. Small-scale (1/50th) model testing was conducted at five universities—Oregon State University, Stevens Institute of Technology, University of Iowa, University of Maine, and University of Michigan—between November 30, 2015 and January 31, 2016. Finalists were announced March 1, 2016. The final round of testing (1/20th scale) will be conducted in August and September 2016, and the winner(s) of the Prize, if any, will be announced in November 2016.

Solicitation & Outreach: Several approaches were used to successfully publicize the Prize and mobilize potential participants as well as a strong following for the Prize including:

- Emailing previous applicants to Water Power Program funding opportunities
- Creating a Prize website (waveenergyprize.org)
- Creating a skill-sharing platform on the Prize website that promoted team-building
- Creating and disseminating a monthly newsletter that answered frequently asked questions about the Prize, presented the technical details of the Prize in simple language, and communicated what DOE's main goals
- Creating a strong social media presence that has engaged a large following for the Prize
- Providing communications outreach and media training for prize participants
- Disseminating publicly all important data generated from the Prize

Incentives: The incentives for the prize competition are as follows:

- A total of $2.25 million is reserved for the Prize purse ($1.5 million Grand Prize, $500,000 for second place, and $250,000 for third place)
- A total of $1.3 million is reserved as seed funding for up to 10 Finalists ($125,000 each) and Alternates ($25,000 each)
- Small scale testing is provided to all Qualified Teams valued at close to $45,000 per team

[35] http://waveenergyprize.org/teams/updates

- Testing for all Finalists at the MASK Basin at Carderock valued at close to $180,000
- The creation of a team-building platform (the Marketplace) located on the Prize website, where teams can solicit expert needs, or experts can seek out teams
- Free access to all MathWorks products for all Qualified Teams
- Free water-lubricated bearings from Lignum Vitae for all Qualified Teams
- Opportunities to engage with technical experts, investors, media representatives, and government employees

Evaluation and Judging: A Judging Panel comprised of technical experts in wave energy from the DOE national laboratories, the Navy, a wave energy company, and the Prize Administration Team (PAT) has been assembled to evaluate participants in the Prize. The Judging Panel is comprised of judges who have diverse backgrounds and skillsets.

To achieve the Prize goals stated above, the participants are required to undertake more and more challenging WEC design and build tasks across each stage of the Prize—the results of which are evaluated by the Judging Panel. First, Registered Teams were required to submit a detailed Technical Submission describing their proposed innovative WEC technology. Qualified Teams were selected by the Judging Panel based on a rigorous evaluation of these Technical Submissions. Teams were then required to numerically model and build a small scale (1/50th) model of their device—a model that would be tested and subsequently evaluated and compared against other devices and against performance metrics developed by the Prize Team. Successful Qualified Teams were deemed as Finalists after the second round of judging, given seed funding, and then were required to build larger (1/20th) scale models of their devices with control capabilities. These 1/20th scale models will be tested in the Naval Surface Warfare Center's MASK Basin in Carderock, MD. The Judging Panel will evaluate whether teams double ACE during this final round of testing, thus determining which teams are eligible to win the $1.5 million grand prize.

Partnerships: DOE has partnered with various branches of the Department of the Navy to successfully design and execute the Prize. The Office of Naval Research has provided funds to develop the technologies and capabilities required to ensure fair and rigorous testing in the MASK Basin; the Naval Surface Warfare Center has provided in-kind support for the Judging Panel; and DOE is looking to further strengthen the partnership between the Navy and DOE through the Prize.

Also, through the Marketplace, the Prize provides an online forum for external interested parties to collaborate with participating teams.

Resources: Through a funding opportunity announcement, DOE selected a PAT, led by Ricardo, Inc., JZ Consulting, and Polaris Strategic Communications. $6.5 million was awarded to the PAT to lead the design and execution of the Prize. This amount includes money for the Prize purse, small scale testing, and seed funding for Finalists and Alternates.

Results: The Prize is not yet completed, but there have been huge successes so far, including the diversification and increase in number of players in the wave energy space; more than three times the number of expected registrants; the development of rigorous metrics to evaluate diverse WEC configurations; the development of public communications and outreach materials that will be used by the Water Power Program for future work; and the building of strong partnerships with the Department of the Navy.

Further, the Prize is providing significant learning that is being transferred to other offices in the DOE through an effort to share best practices on prizes and challenges at DOE.

G. Department of Health and Human Services

a. ASA VizRisk[36]

Summary: VizRisk is the first behavioral-health visualization challenge hosted by the US Department of Health and Human Services (HHS) to foster increased utilization, innovation, and analyses of government data to help inform personal and health policy decisions through critical analyses and applications of the data. This 3-month challenge called on talented designers, coders, government officials, healthcare providers, and experts from around the country to analyze, organize, and visualize behavioral health risk data from CDC's Behavioral Risk Factor Surveillance System (BRFSS) data. Participants were challenged to combine this data with other publicly available government data sets to provide key insights and show compelling relationships.

All submissions were evaluated on the four criteria of innovation, relevance, scientific excellence, and design, and a total prize purse of $15,000 was offered. This challenge was reported on in the FY 2014 COMPETES report, but had not yet been completed.

Solution Type: Software and apps; Creative (design & multimedia); Analytics, visualizations, and algorithms; Scientific

Primary Goals: Stimulate a market; Inform and educate the public

Results: The prize competition advanced the mission of the agency by creating intuitive and insightful visualizations of an important behavior research survey dataset collected by CDC that offered greater visibility. This was evidenced by the 164 registered participants in the challenge. Many of the 11 participating and 3 winning teams had some expertise in data science and visualization, but were not affiliated with organizations that could easily work with government agencies to develop visualizations. The third place winner designed an interactive tool that is both powerful and visually appealing, and could be easily applied to epidemiology. The other

[36] www.hhsvizrisk.org/; this challenge is described in the FY14 COMPETES report starting on page 93.

two winners provided views of the data that, although straightforward, do not currently exist on CDC's site and are therefore improvements on how the data are presented to the world.

Therefore CDC's ability to easily reach this level was viewed as a success and model for others.

Problem Statement: There are now more publicly available volumes of population health datasets than ever. Yet, much of these data have only been utilized by a narrow set of researchers and specialists. This presents a key opportunity to create more accessible forms of the data and to use their insights to create a more complete, nuanced picture of our nation's health. The challenge called on talented designers, coders, health workers, and experts from around the country to analyze, organize, and visualize behavioral health risk data from CDC's Behavioral Risk Factor Surveillance System (BRFSS). Participants were also challenged to combine these data with other publicly available government data sets to provide key insights and show compelling relationships. Participants were asked to submit data visualizations, either static or interactive, that included any combination of datasets, but at a minimum included the CDC BRFSS data. The submissions must have included the following:

- Link to a 2-minute YouTube video pitch explaining the context, goal of project, and process of developing the visualization/application. Videos exceeding 2 minutes were only be evaluated for the first 120 seconds.
- Demo of submission that is accessible via web, slide deck, or pdf
- 250-word explanation of the project
- List of all datasets used in the project development.

Although this was designed to be a single challenge, the sponsors hoped that the model could be replicated by other HHS agencies to spur innovation in the visualization of other datasets.

Proposed Goals: There were three primary objectives of the competition. First, it was designed to catalyze the use of CDC's BRFSS dataset in broader contexts by recruiting a wider set of innovators to create compelling data visualizations. Second, it was designed to recognize the importance of data visualization. Third, it was designed to create a model for other HHS agencies to run similar visualization challenges.

Why a Prize: A prize competition was chosen for three reasons. First, it enabled CDC to target individuals and small businesses, which would not have been possible through a grant or contract. Second, the competition was designed to be quick and nimble, while a grant and contract would have taken significantly more labor and time to execute. Third, the competition was designed to be an example of the power of prize competitions to others within HHS, for those conducting both visualization challenges and other types of prize competitions.

Participants: The competition was open to any U.S. entity (individual or company). The target audience included anyone with interest in data visualization, either those able to use commercially-available tools such as Tableau, or those who could create custom software

applications. Expertise in population-level behavioral data was not required; in fact, the organizers hoped to mobilize those unfamiliar with this type of data in order to broaden awareness of it. The participants were mostly individuals and teams, with one academic group participating. Notably the academic group submitted a dedicated application on which they had been working, while the other participants used commercial visualization tools. No registered companies participated.

Timeline: Submissions were accepted between July 26, 2014 and October 26, 2014. Winners were announced on January 7, 2015.

Planning Phase Initiation	6/1/2014
Federal Register Notice Publication	7/21/2014
Judging Open	10/27/2014
Judging Close	11/22/2014

Solicitation & Outreach: Marketing was done primarily through a dedicated website created on the Squarespace platform, with support from a dedicated Twitter handle and Facebook account and the informal networks of the judges. Through support from the HHS IDEA Lab and Challenge.gov Twitter accounts, the organizers were able to amplify their message. Although not fully leveraged, the organizers did learn that Twitter offers a massive scale for marketing, and that dedicated and specific management can reach a wide set of people, particularly in the data and software space. Organizers did not rely solely on organizational social media accounts, and utilized hashtags and informal networks.

Incentives: A total of $15,000 in prizes was divided into 7 separate possible awards, with a grand prize of $6,000, one second place of $3,000, one third place of $2,000, and four $1,000 awards for top rank in each of the four scoring criteria (innovation, design, relevance, and scientific excellence). A non-monetary incentive of access to experts and mentors throughout the process was also provided.

Evaluation and Judging: The success criterion was divided equally among four subjective components:

- 25% Innovation – novel combination, integration, and application of data
- 25% Design – visually appealing, elegant, intuitive interface and visualizations
- 25% Relevance – to better guide health decisions, relationships are comparable across time, geographies, and populations
- 25% Scientific Excellence – rigorously measured relationships that adhere to the principles of scientific inquiry.

The organizers used a numerical scoring system from a set of 6 judges as the basis of evaluation. The criteria were developed to capture the four elements CDC sought in a good submission:

novel use of data, good visual design, relevance to key policy issues, and scientific excellence. Each judge was asked to score a subset of submissions, and organizers ensured there was enough redundancy so that scores could be compared with one another. Once submissions were received, all materials were sent to judges including a scoring sheet. The aggregate scores were then compiled and used to rank the submissions on the basis of all four criteria together and individually. The organizers found the methods to be efficient and effective, and chose not to have a deliberation session among the judges. Though that saved on time, it may not have created the kind of personal experience that judges likely seek by participating.

Partnerships: No partnerships were formed.

Resources: All $15,000 of the cash prizes originated from the general appropriation funds of the Office of Business Management and Transformation in the Office of the Assistant Secretary of Administration at HHS. Access to HHS mentors and other data experts was also used as a non-monetary incentive to participate.

Results: The prize competition advanced the mission of the agency by creating intuitive and insightful visualizations of an important behavior research survey dataset collected by CDC that offered greater visibility. This was evidenced by the 164 registered participants in the challenge. Many of the 11 participating and 3 winning teams had some expertise in data science and visualization, but were not affiliated with organizations that could easily work with government agencies to develop visualizations. The third place winner designed an interactive tool that is both powerful and visually appealing, and could be easily applied to epidemiology. The other two winners provided views of the data that, although straightforward, do not currently exist on CDC's site and are therefore improvements on how the data are presented to the world.

This challenge aimed to inspire interest internally either to adopt data visualization into business processes or create new versions of data visualization challenges. Since the challenge has been completed, 4 HHS teams have since expressed interest in creating some version of a data visualization challenge, and a CDC group created a data visualization widget on their website.

Therefore CDC's ability to easily reach this level was viewed as a success and model for others. Just as important, the challenge helped reinforce the use of data visualizations as an effective mode of communication of health data within HHS, which CDC has increasingly begun to leverage on its website.

b. CDC "No-Petri-Dish" Diagnostic Test Challenge[37]

Summary: This prize competition asked solvers to describe a novel or innovative method to straintype and characterize pathogenic organisms directly from a complex clinical sample without the need for culture or culture-based amplification.
This challenge asked an open-ended question, and thus, the challenge organizers expected a wide range of proposed solutions. The competition was split into two phases. In the first phase, all

[37] www.cdc.gov/amd/achievements/cidtchallenge/; this competition was reported on in the FY14 COMPETES Report starting on page 113.

submissions were received, and in the second phase, a technical review panel determined which submission was the most promising to be named the winner. The winner would receive all of the $200,000 prize purse. This challenge was reported on in the FY 2014 COMPETES report, but had not yet been completed.

Solution Type: Software and apps; Creative (design & multimedia); Ideas; Technology demonstration and hardware; Scientific

Primary Goals: Stimulate a market; Inform and educate the public; Engage new people and communities

Results: The challenge received some creative solutions to a challenging public health problem. The winning team, a YCombinator startup by the name of OneCodex, developed an elegant cloud-based software solution that incorporated many new and useful features as a result of the challenge and subsequent CDC feedback. The organizers and the winning team are continuing to collaborate on the development of software tools to analyze genomic sequencing data from complex metagenomic samples.[38] While their target customer base is clinical diagnostics, the challenge competition encouraged them to develop a number of features that will be of benefit to public health, and the developed software has secured lasting interest and commitment from their leadership and scientific team.

Problem Statement: The prize competition asked solvers to describe a novel or innovative method to straintype and characterize pathogenic organisms (such as STEC) directly from a complex clinical sample (such as stool) without the need for culture or culture-based amplification.

Proposed Goals: The CDC had a variety of goals for this particular challenge, including finding and highlighting innovative ideas, solving a specific problem, advancing scientific research, developing technology, engaging new people and communities, and stimulating a market.

Why a Prize: The organizers utilized a prize format to engage non-traditional groups and new ideas.

Participants: The organizers targeted both academia and private industry. Eight submissions from 7 teams were received. Two were ineligible due to non-U.S. citizenship. Other submissions were from the University of Maryland, the University of Georgia, Northern Arizona University and the Translational Genomics Research Institute (NAU/TGen North), the Massachusetts Institute of Technology, Reference Genomics and one unaffiliated private citizen.

Timeline: Submissions were accepted between September 1, 2014 and November 30, 2014.

Planning Phase Initiation: 01/05/2014
Federal Register Notice Publication: 08/28/2014

[38] The winning team's website can be found here: https://www.onecodex.com/.

Judging Open: 12/01/2014
Judging Close: 12/20/2014

The winner was notified on December 15, 2014. Winners were announced on January 26, 2015. An award of $200,000 went to the winning entrant. Only one winner was selected.

Solicitation & Outreach: The challenge was marketed through Twitter, email, and CDC webpages. The challenge received a few excellent submissions, but the organizers thought that promotion of the challenge could be improved and a thorough marketing effort would have increased the number and quality of submissions.

Incentives: A single, $200,000 grand prize award was offered as incentive. No private sector or philanthropic funds were used to augment that award.

Evaluation and Judging: A two-phase review process was utilized. First, a technical review panel reviewed the submissions for technical merit. Second, a timed technology demonstration and assessment of performance claims on blinded samples was undergone. A total of 6 judges and reviewers within HHS, from non-profits, and from universities participated in the review process.

These were the requirements set forth in the challenge.

- Resolution and typeability: ability to accurately straintype and characterize STEC at high resolution from a stool sample matrix, without the need for culture-based amplification.
- Reproducibility and stability: ability to return consistent, unambiguous results from three or more replicate specimens.
- Throughput parameters: proposed solutions should have the potential for rapid sample-to-answer turnaround time (e.g., under 48 hours), and potential for economical use (e.g., a per-sample reagent and consumables cost of $100 per sample or less). Methods should be scalable to accommodate high-throughput testing.
- Portability: data should be objective, based on open or established standards, amenable for computerized analysis, and easily disseminated between laboratories.
- Generalizability: the subject organism for this challenge is STEC; nonetheless, special consideration will be given to proposals that may be readily adapted to a range of other pathogenic microorganisms.
- Epidemiologically concordant: the resultant data have potential for epidemiological applications, based on precedents in the scientific literature.

Partnerships: No partnerships were formed for this prize competition.

Resources: A total of 120 FTE hours (80 hours at GS-14 and 40 hours at GS-15) were estimated to be used in the design and execution of the challenge.

Results: The challenge received 8 creative solutions from 7 teams to a challenging public health problem. The winning team, a YCombinator startup by the name of OneCodex, developed an elegant cloud-based software solution that incorporated many new and useful features as a result of the challenge and subsequent CDC feedback. The organizers and the winning team are continuing to collaborate on the development of software tools to analyze genomic sequencing data from complex metagenomic samples. The winning team's website can be found here: https://www.onecodex.com/.

c. CDC Million Hearts Hypertension Control Challenge - 2014[39]

Summary: Million Hearts® is a national initiative to prevent 1 million heart attacks and strokes by 2017. Achieving this goal means that 10 million more Americans must have their blood pressure under control. Million Hearts® is working to control high blood pressure through clinical approaches, such as using health information technology to its fullest potential and integrating team-based approaches to care, as well as community approaches, such as strengthening tobacco control and lowering sodium consumption. To support improved blood pressure control, HHS/CDC announced the 2014 Million Hearts® Hypertension Control Challenge. The challenge aimed to bring prestige to organizations that invest in hypertension control, improve understanding of successful implementation strategies at the health system level, and motivate practices and health systems to strengthen their hypertension control efforts. The challenge identified clinicians, clinical practices, and health systems that have exceptional rates of hypertension control and recognized them as Million Hearts® Hypertension Control Champions. To support improved quality of care delivered to patients with hypertension, Million Hearts® documented the systems, processes, and staffing that contribute to the exceptional blood pressure control rates achieved by Champions.

Million Hearts® partnered with over 130 organizations from the Federal government, state, local, and tribal government, and the private sector to implement this prize competition.[40]

This challenge was reported on in the FY 2014 COMPETES report, but had not yet been completed.

Solution Type: Nominations

Primary Goals: Improve government service delivery; Find and highlight innovative ideas; Engage new people and communities

Results: Improving hypertension control will directly reduce the number of fatal and non-fatal strokes that occur each year in the U.S. Antihypertensive therapy is probably the main reason why stroke fatalities have dropped dramatically in the United States over the past 50 years,

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[39] http://millionhearts.hhs.gov/partners-progress/champions/index.html; this competition was reported on in the FY14 COMPETES Report starting on page 106, and the CDC Millions Hearts Hypertension Control Challenge - 2013 started on page 98.

[40] The full list can be found at http://millionhearts.hhs.gov/partners-progress/partners.html.

according to an American Heart Association study published 12/5/2013 in *Stroke* by DT Lackland, MD.

The challenge received 42 entries and awarded 30 winners for their strategies in reducing hypertension. The average percentage of hypertension control for the 2014 Champions was 78.5% (range – 70.1%-90.6%).[41]

Problem Statement: Million Hearts® is a national initiative to prevent 1 million heart attacks and strokes by 2017. Achieving this goal means that 10 million more Americans must have their blood pressure under control. Million Hearts® is working to control high blood pressure through clinical approaches, such as using health information technology to its fullest potential and integrating team-based approaches to care, as well as community approaches, such as strengthening tobacco control and lowering sodium consumption.

The Million Hearts® Hypertension Control Challenge is a competition to identify clinicians, practices, and health systems that have demonstrated exceptional achievements in working with their patients to control hypertension. The Million Hearts® Hypertension Control Challenge was open to public and private individual clinicians, practices, and health systems providing health care services to patients in a U.S. state or territory.

Proposed Goals: The competition sought to identify practices, clinicians, and health systems that have worked with their patients to achieve hypertension control rates at or above 70% through innovations in health information technology and electronic health records, patient communication, and health care team approaches.

Why a Prize: A potential means of identifying high performing practices was working through national reporting agencies that collect data for payment purposes; these methods are often burdensome and expensive. Recognition programs such as Bridges to Excellence or the National Committee on Quality Assurance base recognition on a very different set of criteria than this Challenge and application can be quite costly. The expense and unknown return to providers to participate in these reporting and recognition initiatives may discourage small providers or health systems from participating, which greatly limits the CDC's ability to learn from this important constituent group. The Challenge format spurs a sense of competitiveness among providers and health systems to improve and share their achievements while protecting the anonymity of providers not recognized by the Challenge. The cost to participate is nominal, requiring only staff to complete the form and participate in data validation. The prize is nominal and is not sufficient to generate much response if offered through a contract as a means to collect and validate data and participate in the development of a 2-page brief. Additionally, the provider groups of special interest to CDC are unlikely to be tracking Federal contract opportunities.

Participants: Intended participants included clinicians, practices and health systems, both large and small, serving both rural and urban settings. Forty-two nomination forms were received: 8

[41] Success stories have been developed on these Champions and they can be found here: http://millionhearts.hhs.gov/partners-progress/champions/index.html

were health systems, 22 were small practice providers (caring for fewer than 50,000 patients annually), and 10 were large practice providers (caring for more than 50,000 patients annually). In addition, two nominations were accepted from Federal entities. Federal nominees were eligible for recognition only – no prize can be awarded. Nominees provide direct clinical care in 25 states. In total, nominees provide care for over nine million adults.

Timeline: Registration for the challenge was open from August 20, 2014 to October 10, 2014. The winners were announced on February 24, 2015.

Planning Phase Initiation: 12/01/2013
Federal Register Notice Publication: 08/20/2014
Judging Open: 01/01/2015
Judging Close: 02/01/2015

Solicitation & Outreach: The agency marketed the challenge primarily through Million Hearts partners in order to effectively reach the most appropriate and high quality nominees. The Challenge was prominently displayed on the Million Hearts® website. A flyer and badge were created and distributed to provide easy access to the Challenge site. Key leaders of agencies and organizations such as the American Medical Association were requested to contact their constituents and encourage them to apply. The following are highlights of how some partners distributed the announcement:

- HRSA posted the notice in their Primary Care Digest reaching Federally Qualified Health Centers.
- Sermo, an online community for physicians, posted an article and a participation poll on their website
- The American Medical Group Association forwarded the letter to all member groups, promoted through their monthly webinar, shared through their social media channels, posted the Challenge badge on their website, and included a notice about the Challenge in Inside AMGA and Public Policy e-newsletters.
- CMS sent it to all 49 Quality Improvement Organizations across the country and promoted at a phone call for members
- The Office of the National Coordinator for Health Information Technology (ONC), contacted the ONC Regional coordinators, Beacon Community leaders, and ONC Million Hearts® Fellows.
- The American College of Physicians posted the Challenge in their Internist Weekly newsletter.
- The American Heart Association posted the Challenge in their State of the Heart Newsletter sent to 500 advocates and in their Quality Improvement newsletter to 25,000 health care quality contacts.

Future Hypertension Control Challenges will use this same method, and will promote the Challenge through relevant conferences and journal notifications.

Incentives: Each champion received $2,000. A total of up to $60,000 of funds was allocated from 2014 general revenue appropriations. Non-monetary incentives included recognition by Centers for Disease Control and Prevention (CDC) Director Dr. Tom Frieden. In addition to recognition on the Million Hearts® and CDC websites, national press releases were developed to recognize and congratulate Champions. Documentation of clinical systems and strategies Champions adopted that support hypertension control are also housed on the Million Hearts website and attributed to Champions.

Evaluation and Judging: Winners must have a hypertension control rate of at least 70% during the 12 month reporting period among the practice's hypertensive patient population. They must also have a data management system (electronic or paper) that allows for verification of data submitted. The type of systems or processes in place that support hypertension control and are likely to endure, such as electronic reminder systems or team based care, is also looked at during the selection of winners.

Nominations were scored using the following criteria: 95% of the overall score was attributed to the reported hypertension control rate and 5% of the score was based on the systems and process reported that supported hypertension control. The nomination was autoscored as it was received. A panel of judges reviewed the top nominations to approve their selection as finalists and to identify questions for further investigation. Each finalist participated in a process to validate the data submitted conducted by an independent contractor. For this type of challenge, a more extensive review and minimal validation of the hypertension control rate reported is required.

Partnerships: Implementation of the Challenge relied heavily upon existing Million Hearts® partners to promote and judge the Challenge.[42] Partners were very responsive in using their social media and web presence to promote and support the Challenge. In future Challenges, partners should be engaged much earlier to plan and promote the challenge and perhaps as a partner in funding and recognizing the Champions.

Resources: Sensis and their platform partner Skild were hired to host the competition, at a total cost of $62,000. A wide range of staff ranging from individuals focused on promotion of the challenge, data validation, and data collection approval are involved in executing the challenge.

Results: Improving hypertension control will directly reduce the number of fatal and non-fatal strokes that occur each year in the US. Antihypertensive therapy is probably the main reason why stroke fatalities have dropped dramatically in the United States over the past 50 years, according to an American Heart Association study published 12/5/2013 in *Stroke* by DT Lackland, MD. CDC received 42 entries and awarded 30 winners for their strategies in reducing

[42] This prize competition included over 130 partners, which are listed at http://millionhearts.hhs.gov/partners-progress/partners.html

hypertension.[43] The average percentage of hypertension control for the 2014 Champions was 78.5% (range – 70.1%-90.6%).[44]

d. CDC Healthcare-Associated Venous Thromboembolism (HA-VTE) Prevention Challenge[45]

Summary: Venous thromboembolism (VTE) – blood clots occurring as deep vein thrombosis (DVT), pulmonary embolism (PE), or both – is an important and growing public health issue. Prevention of healthcare associated VTE (HA-VTE) is a national hospital safety priority. Many HA-VTEs can be prevented, but VTE prevention strategies and are still not being applied regularly or effectively across the United States. To support and promote HA-VTE prevention, HHS/CDC developed the 2015 HA-VTE Prevention Challenge to bring prestige to organizations that invest in VTE prevention, improve understanding of successful implementation strategies at the health system level, and motivate health systems to strengthen their VTE prevention efforts. The top-judged organizations found to have implemented innovative and effective VTE prevention strategies will be recognized as HA-VTE Prevention Champions. CDC will document these successful strategies and highlight the systems, processes, and staffing that contributed to exceptional VTE prevention outcomes achieved by Champions. An estimated 7 of the highest scoring U.S. hospitals, multi-hospital systems, hospital networks and managed care organizations will be recognized as HA-VTE Prevention Champions and will receive a cash award of $10,000. A maximum of $70,000 will be awarded in this challenge. Federal and international winners will receive non-monetary recognition but no prize.

The Sensis Agency supported the implementation of this prize competition

Solution Type: Ideas; Scientific

Primary Goals: Solve a specific problem; Find and highlight innovative ideas

Results: The competition is ongoing and results will be reported in FY 2016.

Problem Statement: To participate, interested parties will navigate to www.challenge.gov. On this site, nominees will have access to the nomination form. Information required of the nominees on the nomination form includes:

- The organization name, address, and contact information of the nominee.
- The size, scope, and general demographic characteristics of the nominee's patient population.
- Details regarding the nominee's VTE prevention strategy and implementation including the population(s) observed, intervention, and methods of implementation. Examples of strategies

[43] The winners are posted at: http://millionhearts.hhs.gov/partners-progress/champions/index.html .

[44] Success stories have been developed on these Champions and they can be found here: http://millionhearts.hhs.gov/partners-progress/champions/index.html

[45] http://go.usa.gov/caRNB

include implementation of sustainable systems or processes that support VTE prevention. These may include but are not limited to implementation of VTE protocols and order sets, risk assessment, electronic alerts, clinical decision support tools, performance monitoring systems and dashboards, patient and/or provider education and post-discharge follow-up.

- A description of the observed results of the VTE prevention strategy including the pre-implementation and post-implementation measures for the observed VTE prevention activity. Examples of outcome measures include but are not limited to the number of patients assessed for VTE risk, the number of at risk patients receiving appropriate VTE prevention, and the number of patients and/or providers receiving education on VTE prevention.
- A brief summary of the barriers and successes to implementation.

The VTE prevention rates achieved should be for the organization's entire patient population observed as outlined in their strategy and intervention methods, not limited to a sample. Data on subpopulations is allowed, but must be inclusive of all patients seen during the stated time period of study. Examples of ineligible data submissions include VTE prevention interventions limited to treatment cohorts from clinical trials of novel anticoagulant drugs.

Proposed Goals: The goal of the challenge is to identify hospitals, multi-hospital systems, hospital networks, and managed care organizations that have implemented an innovative and effective VTE prevention strategy using one or more interventions (e.g., VTE protocols and order sets, risk assessment, electronic alerts, clinical decision support tools, performance monitoring systems and dashboards, patient and/or provider education and awareness, post-discharge follow-up, etc.) designed to increase VTE prevention.

The objectives of the challenge are:

- Identify public and private hospitals, multi-hospital systems, hospital networks, and managed care organizations that have implemented innovative and successful VTE prevention strategies using one or more VTE prevention interventions.
- Document and highlight successful innovative system-level processes or approaches used by high performers to achieve improvement in VTE prevention.

Why a Prize: CDC's resources for VTE are limited. A prize competition provided a cost-effective way for CDC to reach out to all hospitals and healthcare networks that are working on VTE prevention to help CDC identify VTE prevention solutions that are working and share this information to promote and support widespread awareness and commitment to VTE prevention in healthcare. Through this competition CDC was able to collaborate with more partners and stakeholders than could be accomplished through traditional mechanisms and to identify new and effective solutions.

Participants: The competition was developed to reach Federal, non-Federal, and international hospitals, multi-hospital systems, hospital networks, and managed care organizations that have implemented an innovative and effective VTE prevention strategy using one or more

interventions. The competition opened for submissions on November 2, 2015 and information on submissions is not available yet.

Timeline: The submissions opened November 2, 2015 and closed January 10, 2016. Winners will be announced April 1, 2016.

Planning Phase Initiation: 01/02/2015
Federal Register Notice Publication: 09/22/2015
Judging Open: 02/01/2016
Judging Close: 03/15/2016

Solicitation & Outreach: To date, the competition has been marketed through a CDC press release, direct email to partners and stakeholders (medical and hospital organizations), CDC and division partner listservs (Division of Blood Disorders, Division of Cancer Control and Prevention, Division of Healthcare Quality and Promotion, Division of Heart Disease and Stroke Prevention) and Gov delivery distribution lists, and social media including Twitter and Facebook.

Incentives: An estimated 7 of the highest scoring U.S. non-federal hospitals, multi-hospital systems, hospital networks and managed care organizations will be recognized as HA-VTE Prevention Champions and will receive a cash award of $10,000. A maximum of $70,000 will be awarded in this challenge. Additional honorable mention awards, pending availability of funds, may be made if the judges identify more than 7 deserving entries.

Winning submissions from U.S. Federal entities and international entities will be eligible for non-monetary recognition. In addition, all Champions will be recognized by the CDC. Documentation of the clinical systems and strategies used by Champions to improve VTE prevention will be promoted and shared on the CDC website and attributed to Champions.

Evaluation and Judging: Challenge submissions will be evaluated by a panel of three to five judges (CDC, HHS agencies such as the Agency for Healthcare Research and Quality and the Centers for Medicare and Medicaid Services, and external industry experts) using the information provided on, and in accordance with, the nomination form. The judges will score the nomination form using a rubric based on the following evaluation criteria: methods (30% of score); results (50% of score); and feasibility/utility (20% of score) of the strategy and interventions associated with the intended outcome of interest. Nominees with the highest score will be required to participate in a process to verify their data. Final selection will take into account all the information form the nomination form, the background check, and data verification. Geographic location and population treated may be used to break any ties in the event of tie scores at any point in the selection process. An estimated 7 organizations will be recognized as prize winners.

Methods - 30%

- Problem Statement. The extent to which the applicant clearly states and demonstrates a comprehensive understanding of the need for VTE prevention within its healthcare setting.

- Strategy. The extent to which the applicant develops and describes a feasible scientifically sound strategy to adequately achieve the intended intervention outcomes.
- Intervention(s). The extent to which the applicant was able to accurately develop and carry out the proposed intervention to address the needs of the target population.
- Variables and metrics. The extent to which the applicant was able to define data collection variables and measures of effectiveness consistent with the intervention and which are likely to measure the intended outcomes.

Results - 50%

- Adequate time period for measurement. Was the time frame for follow-up sufficient (at least 6 months) to measure the outcomes of interest?
- Results. The extent to which the applicant was able to accurately analyze and interpret the results consistent with the intervention and measure the intended outcomes.
- Success. The extent to which the intervention(s) increased VTE prevention in the healthcare setting.
- Magnitude. The extent to which the increase in VTE prevention was sufficient to be described as a "best practice" for VTE prevention.
- Reflection. The extent to which the applicant clearly states and demonstrates a comprehensive and insightful understanding of keys for success, challenges, and limitations within its healthcare setting.

Feasibility & Utility - 20%

- Sustainable. The extent to which the intervention(s) can be easily and routinely monitored and updated within the healthcare setting.
- Scalable. The extent to which the intervention(s) can be applied to diverse populations and/or applied to other (external) settings.
- Utility. The extent to which the organizational strategy and associated intervention(s) may result in reduced HA-VTE rates over time.

Partnerships: No partnerships were formed.

Resources: The Sensis Agency was contracted to develop the web-based Challenge submission and judging portals as well as to assist with pre and post marketing of the Challenge, at a total cost of $209,931.75.

Results: The competition is ongoing and results will be reported in the future.

e. FDA Food Safety Challenge[46]

Summary: The 2014 FDA Food Safety Challenge was a call to scientists, academics, entrepreneurs, and innovators from all disciplines to submit concepts applying novel and/or advanced methodologies to foster revolutionary improvements in foodborne pathogen detection. Specifically, FDA was most interested in concepts that applied cutting-edge techniques to achieve significant improvements in the speed of detection methods for Salmonella with identification to the subtype/serovar level in minimally processed fresh produce.

The U.S. Department of Agriculture's Food Safety and Inspection Service (FSIS) and CDC collaborated with the FDA in evaluating the contest submissions. Luminary Labs, LLC was contracted to help design and facilitate the challenge.

Cash prizes of $500,000 made up the monetary incentives for this challenge. After the call for open submissions, five finalist teams were awarded $20,000 each and advanced to the Field Accelerator phase. The grand prize winner and runner-up winner received an additional $300,000 and $100,000 in prize money, respectively.

This challenge was reported on in the FY 2014 COMPETES report, but had not yet been completed.

Solution Type: Scientific; Ideas

Primary Goals: Advance scientific research; Stimulate a market; Inform and educate the public

Results: The Challenge received 49 total entries, the majority of which were not yet commercialized. The submissions spanned 25 novel technology areas, going far beyond the research areas identified in the call to action. Solvers spanned scientific backgrounds, geographic regions, and team makeup. Over 20 states/territories were represented, with strong representation by research teams and startups. Solver types included 20 startup companies/corporate entities, 17 academic research teams, 7 cross-organizational teams, and 5 independent solvers.

Teams from Purdue University and Pronucleotein, Inc. were announced as the winners of the 2014 FDA Food Safety Challenge. As the grand prize winner, the team from Purdue University received $300,000 in prize money. The runner up team from Pronucleotein, Inc. was awarded $100,000 in prize money.

The winning team from Purdue University devised a method for concentrating Salmonella in samples to detectable levels using microfiltration. The solution has the potential to greatly reduce the time needed to prepare samples from 1-2 days down to 2-3 hours. The Pronucleotein, Inc. team's runner-up entry featured a portable device for rapid screening using DNA aptamer-magnetic bead sandwich assays. The device promises a total process and analysis time of 30 minutes.

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[46] www.foodsafetychallenge.com; this competition was reported on in the FY14 COMPETES Report starting on page 121.

Problem Statement: While the American food supply is among the safest in the world, the Centers for Disease Control and Prevention (CDC) estimates that one in six Americans is sickened by foodborne illness annually, resulting in about 3,000 deaths and $77 billion in additional health care costs and lost productivity each year. Salmonella represents the leading cause of deaths and of hospitalizations related to foodborne illness. Contaminated produce is responsible for nearly half of foodborne illnesses and almost one quarter of foodborne-related deaths.

In the Food Safety Challenge, FDA was most interested in concepts that explored the acceleration or elimination of sample preparation and/or enrichment in the testing process, and also those that employed novel or revolutionary techniques to achieve pathogen detection. In Phase I, participants submitted concepts and five finalists were selected to move onto Phase II. In Phase II, the Field Accelerator phase, finalists from Phase I were asked to improve on their concepts in order to present them at a Demo Day, where they were judged, and subsequent winners announced. Before Demo Day, finalists received mentorship from FDA subject matter experts (SMEs) and were invited to a Boot Camp to receive hands-on guidance from FDA SMEs and Luminary Labs. FDA is considering winning concepts for inclusion in the design of next-generation detection processes.

Proposed Goals: The primary goals of the Food Safety Challenge were threefold: (1) advance breakthroughs in foodborne pathogen detection, specifically in the area of detection of Salmonella in fresh produce; (2) stimulate a market; and (3) inform and educate the public.

Why a Prize: There are a number of benefits to this approach, as opposed to funding grants or other means to support R&D, including:

- New solvers: Engaging a broad group of solvers including industry, academia, and citizen scientists can lead to novel solutions.
- Engagement: Reaching out to the American public for food safety solutions is resonant with President Obama's emphasis on open government and its component themes of transparency, collaboration, and participation.
- Rapid turnaround: Challenges often are designed so they can be solved, or a proposal submitted, within a period of several months
- Increased awareness: Launching challenges will increase awareness of government efforts in food safety.

Participants: The 2014 FDA Food Safety Challenge called upon scientists, academics, entrepreneurs, and innovators from all disciplines to submit concepts applying novel and/or advanced methodologies to foster revolutionary improvements in foodborne pathogen detection. The Challenge received 49 total entries, the majority of which were not yet commercialized. The submissions spanned 25 novel technology areas, going far beyond the research areas identified in the call to action. Solvers spanned varying scientific backgrounds, geographic regions, and team

makeup. Over 20 states and territories were represented, with strong representation by research teams and startups. Solver types included 20 startup companies or corporate entities, 17 academic research teams, 7 cross-organizational teams, and 5 independent solvers.

Timeline: Phase I submissions were submitted between September 23, 2014 and November 9, 2014. After the judging period, finalists were announced on May 11, 2015, and after a second judging period, the winners were announced on July 22, 2015.

Competition Planning Start: 10/01/2013
Federal Register Notice Publication: 09/23/2014
First Phase Judging Open: 11/10/2014
First Phase Judging Close: 05/10/2015
Second Phase Judging Open: 07/07/2015
Second Phase Judging Close: 07/21/2015

Solicitation & Outreach: Various outlets were used to market the prize competition, mobilize potential participants, ensure high quality submissions and drive awareness including targeted solver community outreach, use of social media, and posting press releases and blogs on both the challenge website and the FDA.gov website. These methods were highly effective and were reflected to a great degree in national media and trade media coverage along with cross-federal agency promotion.

Incentives: Cash prizes of $500,000 made up the monetary incentives for this challenge. After the call for open submissions, five finalist teams were awarded $20,000 each and advanced to the Field Accelerator phase. The grand prize winner and runner-up winner received an additional $300,000 and $100,000 in prize money, respectively. A chance to work with FDA mentors and to bring products closer to commercial reality was a nonmonetary incentive unique to the Food Safety Challenge. Both of the winning teams mentioned the value of getting to work with the food safety experts at the FDA both during and after the challenge.

Evaluation and Judging: The challenge was divided into two phases. The first phase used the following five criteria to judge entrants, each with equal weighting:

1. Speed: Proposed reduction in time from unprepared food sample to verified pathogen to subtype/serovar level for Salmonella in fresh, minimally processed produce. The ability of the solution to also address testing in other foods and other complex matrices is encouraged. The ability of the technique to also address additional pathogens, such as Shiga toxin-producing Escherichia coli, is encouraged.
2. Improved detection and path to impact: Strength of evidence, data, and/or argumentation regarding the application of the submission's technique to create impactful acceleration and improvement of foodborne pathogen detection, inclusive of improvements in specificity and sensitivity for Salmonella and possibly other pathogens.
3. Applicability: Applicability of solution to FDA testing processes.
4. Revolutionary: Whether the concept would be a revolutionary improvement over FDA's current testing procedures with the potential to have a major impact on food testing.

5. Execution: Perceived ability of submitting team or individual to execute and develop the concept.

After the finalists were chosen, the winners were judged based on the original five criteria, plus one additional criterion: Demonstration of team's/individual's ability to effectively iterate and improve the concept over the course of the Field Accelerator phase. All finalists were admitted to the field accelerator phase of the competition

All entrants were evaluated by an expert panel of seven judges, including representatives from the FDA, CDC, and FSIS.

Partnerships: The U.S. Department of Agriculture's Food Safety and Inspection Service (FSIS) and CDC collaborated with the FDA in evaluating the contest submissions. Luminary Labs, LLC was contracted to help design and facilitate the challenge.

Resources: A contractor, Luminary Labs, LLC, provided challenge support services that included challenge design, website development, communications outreach and support, as well as field accelerator and judging facilitation. The total cost was $543,690.80.

Results: Teams from Purdue University and Pronucleotein, Inc. were announced as the winners of the 2014 FDA Food Safety Challenge. As the grand prize winner, the team from Purdue University received $300,000 in prize money. The runner up team from Pronucleotein, Inc. was awarded $100,000 in prize money.

The winning team from Purdue University devised a method for concentrating Salmonella in samples to detectable levels using microfiltration. The solution has the potential to greatly reduce the time needed to prepare samples from 1-2 days down to 2-3 hours. The team from Purdue was particularly excited about the chance to continue working with their mentors at FDA to accelerate production of a viable commercial system that can be used in food safety laboratories. To strengthen their submission during the Field Accelerator phase, the team focused on adapting the instrument to achieve higher sample throughput while maintaining sensitivity.

The Pronucleotein, Inc. team's runner-up entry featured a portable device for rapid screening using DNA aptamer-magnetic bead sandwich assays. The device promises a total process and analysis time of 30 minutes. The Pronucleotein, Inc. team learned a lot during the challenge about how the FDA food safety procedures function. They hope that information will guide them in their future business plans. They are also hopeful that the prize money will facilitate market entry for their device. During the Field Accelerator phase, the Pronucleotein, Inc. team focused on seeing how they could ease the burden of FDA inspectors at ports through rapid screening of suspect foods.

FDA plans to continue working with the challenge winners to advance their technologies with the aim of eventual use in FDA's regulatory testing processes.

f. HRSA Bridging the Word Gap Challenge[47]

Summary: The word gap is the difference between the number of words children from low-income families are exposed to as compared to children from high-income families. By age three, children from low-income families are hearing 30 million fewer words than those from higher-income families. This is staggering, and it can have serious consequences. It can influence how young children develop language skills. It can even affect their future performance at school and ultimately in their careers.

This challenge seeks innovative solutions that can help promote early language development among children from low income families in the U.S. Specifically, participants are asked to submit low-cost, scalable technology-based innovations that drive parent and caregiver interactions with young children (ages 0-4).

The challenge is split into three phases: design (7-10 winners, up to $10,000 each), development and small scale testing (3-5 winners, up to $25,000 each), and scaling (1 winner, up to $100,000). Phase 1 winners will receive mentorship and guidance from early-language learning and community experts as they advance to developing and testing their designs in Phase 2. The winners from Phase 1 advance to Phase 2, where they will focus on prototyping their proposed intervention and testing its effectiveness. Both the evidence base for their proposed intervention and its usefulness should be demonstrated. In the final phase, winners of Phase 2 will test their proposed interventions on a larger scale. With the help of challenge organizers, each intervention will be matched with an appropriate community or program.

Sensis and their platform partner Skild supported the implementation of this prize competition. A total of $300,000 is available in prizes.

Solution Type: Ideas; Technology demonstration and hardware

Primary Goals: Develop technology

Results: The challenge is ongoing and the results will be reported in future years.

Problem Statement: The word gap is the difference between the number of words children from low-income families are exposed to as compared to children from high-income families. By age three, children from low-income families are hearing 30 million fewer words than those from higher-income families. This is staggering, and it can have serious consequences. It can influence how young children develop language skills. It can even affect their future performance at school and ultimately in their careers.

This is a currently open single challenge. It is designed in three phases, and asks participants to develop a low-cost, scalable technology-based innovation that drives parent and caregivers to talk, and engage in more back-and-forth interactions with their young children (ages 0-4).

[47] wordgapchallenge.hrsa.gov

Proposed Goals: The goal is to create a tool to help parents and caregivers talk and engage more with young children, so all children in the U.S. are on the path to success from an early age.

Why a Prize: A challenge will stimulate innovation in addressing the word gap through technology; currently the expertise and technology exist that could be applied to the word gap, but this has not been done in a widespread manner. A challenge will engage innovators in applying technology to this issue in creative ways.

Participants: The organizers hope to attract a diverse array of innovators and solvers, including coders, public health experts, individuals affiliated with academic institutions, research and development communities in the private sector, and others. Data will be available on the current entrants for Phase 1 after 12/31/15. Eligibility requirements are listed at www.wordgapchallenge.hrsa.gov and are the same for all three phases.

Timeline: The competition accepted submissions for Phase 1 from November 8, 2015 to December 31, 2015. Winners for Phase 1 were announced February 10, 2016.

Competition Planning Start	9/1/2014
Federal Register Notice Publication	9/17/2015
First Phase Submission Open	11/8/2015
First Phase Submission Close	12/31/2015
First Phase Judging Open	1/1/2015
First Phase Judging Close	1/31/2016
First Phase Winner(s) Announced	2/10/2016
Second Phase Submission Open	2/11/2016
Second Phase Submission Close	7/11/2016
Second Phase Judging Open	7/12/2016
Second Phase Judging Close	8/12/2016
Second Phase Winner(s) Announced	8/20/2016
Third Phase Submission Open	8/21/2016
Third Phase Submission Close	2/21/2017
Third Phase Judging Open	2/22/2017
Third Phase Judging Close	2/28/2017
Third Phase Winner(s) Announced	3/1/2017

Solicitation & Outreach: The organizers are currently in the process of marketing the challenge, and are working with the contractor, Sensis, to contact media, trade organizations, bloggers, and universities.

Incentives: There is a total of $300,000 available in prizes, distributed across phases. For those who advance to Phase 2, the organizers will offer mentorship and guidance from early-language learning and community experts.

Evaluation and Judging: As of reporting, the competition has not entered the judging phase. There are separate criteria for each phase. The program is currently in Phase 1. The criteria are:

Phase 1: Design

- Accessibility: Will the proposed intervention be easily used by parents and caregivers of diverse economic, social, and cultural backgrounds? Is it functional across disciplines/users?
- Measurability: Will the effectiveness of the proposed intervention be easy to evaluate (in both lab testing and in the real world)? Can it be measured among different audiences?
- Sustainability: Is the proposed intervention "sticky?" Does it fit into daily life? Is it fun to use?
- Impact: Is there a theory or explanation of how the proposed intervention would lead to behavior change?

Phase 2: Development and Small Scale Testing

- Accessibility: What was the impact of the proposed intervention on parents/caregivers and children? What did the data show?
- Evidence Base: Is the proposed intervention grounded in existing science related to the word gap, behavior change, etc.?
- Sustainability: Was the proposed intervention "sticky" among users? Did users want to continually engage with the program?
- Implementation: Is the proposed intervention practical? If it were implemented, what would the estimated financial and time commitment look like?

Phase 3: Scaling

- Impact: How effective was the intervention when implemented at-scale? Did the impact(s) on parents/caregivers from Phase 2 remain consistent?
- Implementation: How practical was the intervention on a larger scale? What were the financial and time commitment requirements for implementation of the model? How challenging was the actual program implementation?
- Scalability: How costly was the intervention in a real-world setting? Would the intervention be cost-effective overall? Can the device be used in existing platforms?

Partnerships: The organizers worked very closely with White House Office of Science and Technology Policy (OSTP), HHS Idea Lab, and colleagues in the Administration for Children

and Families (ACF). The competition has 10 external advisors from non-profits, the technology sector, etc. who have helped to shape the competition. They have provided invaluable insight into the challenge including attracting participants, establishing review criteria, and planning for scale-up after the final winner is selected.

Resources: The organizers established a contract with Sensis and their platform partner Skild to help manage and promote the challenge. The contract totaled $300,000 per year for 3 years.

Results: The challenge is ongoing and the results will be reported in future years.

g. NIEHS Climate Change and Environmental Exposures Challenge[48]

Summary: Research into the effects of climate change on environmental exposures is growing, but data from such studies need real world application. This challenge asks innovators to develop visualizations, analytics, and/or apps that show how particular exposures (e.g., pesticides, toxic waste, etc.) will affect a particular location. Awards are being offered for solutions at both the national and the local/municipal levels. This challenge is part of the larger Climate and Health Innovation Challenge Series.

Participants were asked to use existing tools or platforms or create their own application to produce these visualizations. The geographic scale of the visualization could be as small as the neighborhood or community level or as large as the regional or national level.

Participants were asked to produce submission that could help identify potential areas or zones of increased exposure and/or the degree of changes in exposure or health risk resulting from climate change. Participants could consider a short-term time scale (e.g., 0 to 20 years) for impacts associated with extreme events, or a longer time scale (e.g., 2050 or beyond) for impacts associated with sea level rise or other phenomena whose greatest impact will clearly be decades from now.

The challenge will award prizes for visualizations, tools, or applications for decision making in two categories: Category 1 for use at the local or municipal level and Category 2 for use at a regional (multistate) or national level. In each category, up to three prizes and $17,500 will be awarded, for a total of $35,000 in prize money.

The National Institute of Environmental Health Sciences (NIEHS) is being assisted by Esri, a company that produces GIS software, which is using its networks to promote the challenge.

Solution Type: Software and apps; Analytics, visualizations, and algorithms

Primary Goals: Solve a specific problem; Improve government service delivery; Engage new people and communities

[48] www.challenge.gov/challenge/the-niehs-climate-change-and-environmental-exposures-challenge/

Results: The competition is still underway, and at this point it is difficult to gauge its impact.

Problem Statement: See Summary.

Proposed Goals: The competition is intended to generate tools to help decision makers make better protective decisions regarding potential environmental exposure threats in their area.

Why a Prize: The organizers wanted to include innovators that would not have been possible through normal procurement methods.

Participants: The challenge targets the health and climate community, the geo-mapping health community, data visualization specialists, and the academic community.

Timeline: The submissions were open from October 1, 2015 to February 1, 2016. Winners were announced on February 22, 2016.

Planning Phase Initiation: 06/01/2015
Federal Register Notice Publication: 09/15/2015
Judging Open: 02/02/2016
Judging Close: 02/21/2016

Solicitation & Outreach: The challenge has thus far used e-mail blasts, web pages, and Twitter for solicitation and outreach.

Incentives: NIEHS is providing the entire prize amount of $35,000. The prize awards will be divided into two $10,000 first place awards, two $5,000 second place awards, and two $2,500 third place awards.

Evaluation and Judging: The challenge evaluation weighs scientific validity at 34%, innovative use of data at 33%, and clarity/accessibility at 33%. There were 7 judges, consisting of Federal employees within HHS and those affiliated with corporations and universities.

The specific submission requirements are copied below:

- A brief (less than 250 words) description of the visualization and its potential value in improving our understanding of the relationship between environmental exposures and climate change.
- A detailed description (limited to 1000 words, not including figures or references) of the visualization, tool, or application, including the technical basis for combining data layers and references to the scientific literature supporting the relationships between climate change, altered exposures, and human health outcomes, where relevant.
- The visualization tool and any application or code needed to run the tool. Alternatively, instead of providing the tool or application itself, the participant may provide either a link to

a visualization generated by the tool or application; a video demonstrating the tool or application; or one or more pdfs of example visualizations.

- Instructions on how to install and operate any application behind a visualization tool.
- System requirements required to run the application.
- A description of, rationale for selecting, and complete copy of the data set. For data sets contained within climate.data.gov or otherwise easily obtainable from Federal sources, the URLs for the datasets are sufficient.

Partnerships: NIEHS is being assisted by Esri, a company that produces GIS software, which is using its networks to promote the challenge.

Resources: A total of 200 FTE hours were expended to design and execute the challenge: 100 hours at the GS-12 level, and 100 hours at the SES level. The challenge was run on the no-cost platform Challenge.gov.

Results: The competition is still underway, and at this point it is difficult to gauge its impact.

h. NIH Design by Biomedical Undergraduate Teams (DEBUT) 2015[49]

Summary: The National Institute of Biomedical Imaging and Bioengineering (NIBIB) within NIH is challenging undergraduate student teams to develop technologies to address unmet needs in healthcare.

The challenge offered $45,000 total in prizes to winning teams, $20,000 for first place, $15,000 for second, $10,000 for third and 6 honorable mentions.

Solution Type: Ideas; Scientific; Technology demonstration and hardware

Primary Goals: Develop technology; Stimulate a market; Find and highlight innovative ideas; Other (Student training)

Results: The challenge received 59 entries from 30 universities in 18 states. Nine teams were awarded first place, second, third, and 6 honorable mentions. DEBUT has become a very prestigious competition generating a lot of excitement among BME faculty and students around the country. Many senior design courses require the students to come up with projects that can be entered into DEBUT. Additionally, several past winners went on to form startups to commercialize their work. For example, 2012 winners Andrew Brimer and Abby Cohen went on to secure over $1.5 million in funding to support their app and pocket-sized sensor that plugs into

[49] www.nibib.nih.gov/training-careers/undergraduate-graduate/design-biomedical-undergraduate-teams-debut-challenge/; the previous iteration of this challenge was described in the FY 2014 COMPETES report, starting on page 127.

a headphone jack of a smartphone to measure lung function. They are now seeking FDA approval and plan to launch the product around the end of 2015.

Problem Statement: The DEBUT Challenge is open to teams of undergraduate students working on projects that develop innovative solutions to unmet health and clinical problems.

The main requirement was a working solution to a real-world problem in health-care technologies. Specific judging criteria were significance, impact, innovative design and working prototype.

Proposed Goals: The goals of the challenge are threefold:

1) to provide undergraduate students valuable experiences such as working in teams, identifying unmet clinical needs, and designing, building and debugging solutions for such open-ended problems;
2) to generate novel, innovative tools to improve healthcare, consistent with NIBIB's purpose to support research, training, the dissemination of health information, and other programs with respect to biomedical imaging and engineering and associated technologies and modalities with biomedical applications; and
3) to highlight and acknowledge the contributions and accomplishments of undergraduate students.

Why a Prize: A prize competition was the best way to appeal to the competitive nature of students and engage a great number of them in advanced projects at a relatively small cost.

Participants: The goal was to engage undergraduate biomedical engineering (BME) students in teams of at least 3. 59 entries from 30 universities in 18 states were received. The teams ranged in size from 3 to 12 members, and freshman to senior levels. Several teams had members from different departments, satisfying NIH's goal to engage students in multidisciplinary teams.

Timeline: Submissions were submitted between March 16, 2015 and May 29, 2015. Winners were announced on August 21, 2015.

Planning Phase Initiation: 01/09/2014
Federal Register Notice Publication: 03/15/2015
Judging Open: 6/8/2015
Judging Close: 8/7/2015

Solicitation & Outreach: Twitter, email blasts, NIH press releases, HHS IDEA Lab promotion, and direct communication were used for outreach. Direct emails to Biomedical Engineering Department chairs and design course faculty worked best. The organizers also included DEBUT in factsheets, and in talks introducing NIBIB and its funding mechanisms.

Incentives: $45,000 total in prizes were offered: $20,000 for first place, $15,000 for second place, $10,000 for third place and 6 honorable mentions.

Evaluation and Judging: A judging panel of 9, all within HHS, judged entries made recommendations for winners based on the following criteria:

- Significance of the problem addressed—does the entry address an important problem or a critical barrier to progress in clinical care or research?
- Impact on potential users and clinical care—how likely is it that the entry will exert a sustained, powerful influence on the problem and medical field addressed?
- Innovative design (creativity and originality of concept)—Does the entry utilize novel theoretical concepts, approaches or methodologies, or instrumentation?
- Working prototype that implements the design concept and produces targeted results—Has evidence been provided (in the form of results, graphs, photographs, films, etc.) that a working prototype has been achieved?

Partnerships: No partnerships were utilized in the 2015 DEBUT challenge.

Resources: An approximate total of 440 FTE hours (40 at GS-9 and 400 at GS-14 level) were expended in the design and execution of this challenge. No other costs were incurred.

Results: DEBUT has become a very prestigious competition generating a lot of excitement among BME faculty and students around the country. Many senior design courses require the students to come up with projects that can be entered into DEBUT. Additionally, several past winners went on to form startups to commercialize their work.

Andrew Brimer and Abby Cohen won first prize in 2012 in the "Technology to Aid Underserved Populations and Individuals with Disabilities" category of the DEBUT Challenge. Their winning project, Low-Cost Spirometer, addressed the lack of devices to measure lung function for the diagnosis and monitoring of respiratory diseases in the developing world. The $10 device developed by the team offered a significant cost reduction compared with traditional spirometers costing $1,000-$2,000, without compromising accuracy or precision. While seniors at the Washington University in St. Louis, the team won 10 of 12 grant competitions for $273,000 in grant funding to work on their startup Sparo Labs full-time after graduation, and in September 2014, raised $1.3 million from angel investors. With this seed funding, they grew their team to 5 full-time employees and nearly a dozen interns and contracted employees. Sparo Labs is submitting Wing™, their app and sensor combination tool that plugs into the headphone jack of a smartphone to easily measure lung function, to the FDA and planning to launch the product around the end of 2015.

i. NIH Follow that Cell Challenge[50]

Summary: The NIH Single Cell Analysis Program (SCAP) is searching for novel robust methods for analysis of individual cells that can serve as the basis for predicting alterations in cell behavior and function over time. The ultimate goal is to develop new tools and methods that allow time-dependent measurements at the single cell level in a complex tissue environment to assess functional changes, provide information on the health status of a given cell, and help guide diagnosis and therapeutic treatments related to human disease states. Technological breakthroughs in this arena will allow researchers and physicians to identify rare cells in a mixed population such as individual cells that may begin to transform and become cancerous; cells that are latently infected with a pathogenic virus; or cells that develop resistance to drugs over time. Through a $500,000 prize competition, SCAP aims to spur the development of innovative solutions that allow the research community to "Follow that Cell."

Phase 1 of the Challenge required a written proposed solution that describes a novel method for analyzing dynamic states of individual cells that can serve as the basis for predicting alterations in cell behavior and function over time. Phase 2 is a reduction to practice where Phase 2 Solvers will execute their proposed solution(s) from Phase 1 and produce single cell data addressing a significant biological or clinical question by measuring changes in a single cell over time.

InnoCentive supported the implementation of this prize competition. This was a $500,000 Challenge structured in two linked phases: Phase 1 was a total prize award pool of $100,000 and Phase 2 has a total prize award pool of $400,000.

Solution Type: Scientific; Ideas

Primary Goals: Advance scientific research; Solve a specific problem; Stimulate a market

Results: Phase 1 of the Follow that Cell challenge is completed and of the 33 eligible submissions NIH received, 16 were selected as Phase 1 finalists, five of whom received cash prizes totaling $100,000. These finalists were from a variety of academic disciplines, including biology, physics, bioengineering, pharmacy, computer sciences, and neurosciences. Two of the finalists were postdoctoral fellows, 6 assistant professors, 2 associate professors, and 6 were tenured professors. Six of the finalists had never received an NIH research grant prior to the Challenge, while 3 had received only one grant. Submissions were received from institutions across all regions in the United States.

Each of the submissions described potential advances that, if successful in Phase 2, would significantly impact research efforts. The top 5 (prize-winning) submissions offer highly innovative solutions that show particular promise and originality.

NIH policy does not allow the use of Federal grant or contract money to support development of solutions. Organizers did ask the Phase 2 Solvers if they were able to secure funding support for

[50] http://commonfund.nih.gov/singlecell/challenge; this challenge was described in the FY 2014 COMPETES report, starting on page 130.

Phase 2. Some Phase 2 Solvers have secured non-Federal funding for support of Phase 2, but other Phase 2 solvers have not provided this information. The organizers do not expect the 16 finalists to convene again, but the teams are mostly still intact and working on Phase 2. NIH has requested 6 month status updates and have encouraged the Solvers to bring any issues or problems to the attention of the NIH scientific team.

Phase 2 started in March 2015 and will complete in 2017. Up to 2 prizes may be awarded from the total pool of $400,000 for Phase 2, and depending on the scientific assessments by the Technical Evaluation Panel, the judges will determine how to allocate the prize pool.

Problem Statement: In this Challenge, the NIH is seeking novel and robust methods for analysis of individual cells in complex environments. These methods will detect and assess changes in cell molecular composition, behavior and function over time, either as a result of natural state changes or when perturbed (e.g., by a drug, biological stimulus, infectious agent, pathological lesion, or mechanical forces). It is hoped that such methods will yield creative and new, yet feasible, solutions for following individual cells over time in a complex multicellular environment, such as a living organism. Phase 1 of the Challenge required a written proposed solution which describes a novel method for analyzing dynamic states of individual cells that can serve as the basis for predicting alterations in cell behavior and function over time. Phase 2 is a reduction to practice where Phase 2 Solvers will execute their proposed solution(s) from Phase 1 and produce single cell data addressing a significant biological or clinical question(s) by measuring changes in a single cell over time.

Submissions for Phase 1 of the Challenge were evaluated using specific criteria for: 1) Time Course Measurements, 2) Predictability, 3) Cellular Environment 4) Significance, and 5) Adaptability plus feasibility, throughput, and data content. Phase 2 (Reduction to Practice) will be evaluated using the same criteria. Additionally, as part of the evaluation process for Phase 2, the panel may request a demonstration of the technology.

Proposed Goals: The organizers hope that combining the immense brainpower of scientists, engineers, and innovators around the world will propel the development of the next generation of single cell analysis, galvanizing this field. Advancements in cellular analysis may lead to earlier diagnosis and improved therapies for diseases such as cancer, Alzheimer's, or AIDS. This prize competition not only constitutes a great opportunity to better understand disease and deliver better healthcare to the world, but also it serves as a great environment to build a vibrant and engaged community that will stimulate new businesses and support economic growth in biomedical communities.

Why a Prize: The NIH Common Fund currently supports SCAP grants, the majority of which are associated with academic institutions. This Challenge, structured in two phases, was designed to strengthen and complement the existing SCAP grant portfolio by reaching out to a more diverse population of innovators and solvers, including not only those who are from academic institutions but also those who are from research and development communities in the private sector and those who are outside biomedical disciplines. The NIH believes this Challenge will stimulate investment from both public and private sectors in single-cell analysis research and product development, which, in turn, could lead to the development of more sensitive, robust,

and cost-effective assay approaches, reagents, tools, and devices for basic research and clinical diagnosis.

Participants: NIH hoped to mobilize innovators from all sectors, public and private, and those outside the NIH biomedical community. NIH expects Phase 2 Solvers to form additional partnerships to further develop their solutions. Phase 1 of the Follow that Cell challenge is completed and of the 33 eligible submissions NIH received, 16 were selected as Phase 1 finalists. These finalists were from a variety of academic disciplines, including biology, physics, bioengineering, pharmacy, computer sciences, and neurosciences. Two of the finalists were postdoctoral fellows, 6 assistant professors, 2 associate professors, and 6 were tenured professors. Six of the finalists had never received an NIH research grant prior to the Challenge, while 3 had received only one grant. Submissions were received from institutions across all regions in the United States. The Team Solvers ranged from two to seven team members.

Timeline: Submissions for Phase 1 were received between August 15, 2014 and December 15, 2014. Winners were announced March 16, 2015. Phase 2 submissions opened March 17, 2015 and will close March 30, 2017. Winners of Phase 2 will be announced in July 2017.

Competition Planning Start: 08/13/2013
Federal Register Notice Publication: 08/11/2014
First Phase Judging Open: 12/16/2014
First Phase Judging Close: 02/16/2015

Solicitation & Outreach: Three science journals, numerous e-mails to various listservs, personal e-mails from NIH leadership, NIH press releases, promotion by SCAP leadership as various scientific meetings/ symposiums. NIH continues to identify additional ways to reach non-traditional audiences, outside of the InnoCentive platform.

Incentives: This was a $500,000 Challenge structured in two linked phases: Phase 1 was a total prize award pool of $100,000 and Phase 2 has a total prize award pool of $400,000. Phase 1 Finalists, including the 5 prize winners and 11 finalists, were invited to participate in Phase 2 which is a Reduction to Practice to provide proof of concept data related to their Phase 1 entries. In addition to any direct monetary prizes, the Phase 1 finalists were sponsored to attend the 3rd Annual Single Cell Analysis Investigators Meeting near Bethesda, Maryland, USA on April 20-21, 2015 and presented posters on their proposed solutions. Approximately $12,000 was used for travel reimbursement to Phase 1 finalists. All prize funds were obligated from NIH FY 2014 appropriations.

Evaluation and Judging: In response to this Challenge announcement, the challenge received in total 53 Phase 1 Solutions. InnoCentive screened the submitted solutions to evaluate the eligibility of the Solver(s) as well as completeness of the submission, resulting in 33 Solutions for the subsequent scientific evaluation:

a) A Technical Evaluation Panel consisting of NIH intramural investigators convened in person to evaluate the submissions based on the criteria published in the Federal Register Notice.

b) In parallel, NIH extramural staff reviewed each submitted solution for scientific alignment with the Single Cell Analysis Program, relevance to the NIH mission, and potential overlap with existing projects.

Evaluation Summaries were generated for all 33 Phase 1 Solutions, which included the Executive Summary describing the research, a Technical Evaluation Panel Discussion Summary, and an Extramural Staff Summary. The SCAP Challenge Workgroup then met to discuss the evaluation outcomes and to develop a rationale for recommending the selection of prize winners and runners-up as the finalists for Phase 2 competition. Overall, the SCAP Challenge Workgroup agreed it was important to encourage highly innovative ideas and be inclusive of projects that may appear to still be in the early stage of development and some that may not reach the proposed goal in two years because the recommendation of a relatively large pool of finalists to participate in Phase 2 would enhance competitiveness, stimulate more development in different technology areas, and does not require any financial commitment from the NIH (other than the prize funds set aside for Phase 1 winners).

Phase 2 (Reduction to Practice) will be evaluated using the same criteria and process. Additionally, as part of the evaluation process for Phase 2, the panel may request a demonstration of the technology. Organizers were unable to develop a process or policy for ascertaining and managing conflict of interest of external individuals who could serve on the Technical Evaluation Panel without limiting participation of Solvers so NIH chose to use Federal employees. However, since Challenges are a new way to engage individuals outside of the normal biomedical community, limiting use of external leaders and innovators in both Challenge development and evaluation of solutions unnecessarily limits NIH's ability to challenge innovation. Guidance on this should be developed, similar to the guidance issued for research grants and contracts.

Partnerships: No partnerships were formed.

Resources: InnoCentive was hired to perform project planning, coordinate development of goals and evaluation criteria with subject matter experts, review and report on potential issues dealing with intellectual property, prepare and execute marketing strategy, host the Challenge platform, publicize the Challenge on a platform reaching over 700,000 innovators worldwide, assist in the evaluation of submissions, issue payments to winners and provide HHS-required documentation of payments. The total cost, for both Phases of the Challenge over 2.5 years, is $260,583. $11,226 for additional advertising in online journals was expended. Additionally, an estimated total of 5,600 FTE hours were expended to design and execute the challenge, 1,200 intern hours, 1,190 at the GS-12 level, 784 hours at the GS-14 level, and 2,430 at the GS-15 level.

Results: The competition received 33 submissions for Phase 1 and chose 16 finalists. Phase 1 Finalists presented a variety of solutions that they will now, in Phase 2 of the challenge, use to attempt to generate proof-of-concept data related to their Phase 1 entries. [51] Each of the

[51] Please see You-Tube video of Dr. Insel discussing the Challenge https://www.youtube.com/watch?v=QRvdQ_FzvUs and also the video of the 5 prize winning finalists discussing

submissions described potential advances that, if successful in Phase 2, would significantly impact research efforts. The top 5 (prize-winning) submissions offer highly innovative solutions that show particular promise and originality.

NIH policy does not allow the use of Federal grant or contract money to support development of solutions. Organizers did ask the Phase 2 Solvers if they were able to secure funding support for Phase 2. Some Phase 2 Solvers have secured non-Federal funding for support of Phase 2, but other Phase 2 solvers have not provided this information. The organizers do not expect the 16 finalists to convene again, but the teams are mostly still intact and working on Phase 2. NIH has requested 6 month status updates and have encouraged the Solvers to bring any issues or problems they encounter to the attention of the NIH scientific team.

Up to 2 prizes may be awarded from the total pool of $400,000 for Phase 2, and depending on the scientific assessments by the Technical Evaluation Panel, the judges will determine how to allocate the prize pool.

j. NIH Harnessing Insights from Other Disciplines to Advance Drug Abuse and Addiction Research[52]

Summary: The National Institute on Drug Abuse (NIDA) sought submission of ideas from the general public on how to leverage specialized knowledge, methods, and tools from other disciplines to inform new directions in drug use and addiction research. NIDA aims to gain insights into new methods or approaches that could transform discovery in order to expand basic understanding of drug use and addiction processes, accelerate the development of novel and more effective prevention and treatment strategies, and/or enhance NIDA's capacity to implement and improve upon evidence-based interventions.

This challenge is being issued as part of NIDA's strategic planning process for 2016-2020. Winning proposals may be used to guide the development of new research programs within NIDA. NIDA planned to award $25,000 in total prizes.

Solution Type: Ideas

Primary Goals: Engage new people and communities; Improve government service delivery; Build capacity

Results: After completing a thorough review of the 19 applications received, the judging panel found that none was sufficiently meritorious and responsive to the concept of the challenge. NIDA has therefore decided not to award any prizes.

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their views on the Challenge and why it is important tool to use to stimulate innovation (https://www.youtube.com/watch?v=lwvsvIPZLUI).

[52] http://nida.ideascale.com/a/pages/challenge-2

The organizers see outreach as an area that could have been improved, including devoting more staff hours to outreach efforts.

Problem Statement: NIDA was seeking submission of ideas from the general public on how to leverage specialized knowledge, methods, and tools from other disciplines to inform new directions in drug use and addiction research. The overarching goal of the present Challenge was to identify and parlay the untapped power of other (unexpected) technologies, fields, and innovations to inspire transformative advances in the area of addiction research. Each submission for this Challenge required a white paper describing a concept for an innovative research initiative to advance drug abuse and addiction research. It was a single stage idea challenge.

The challenge judges evaluated each submission based on three criteria: Novelty (5 points), Feasibility (5 points) and Importance of the question being addressed/likelihood of impact (5 points). The score for each submission was the sum of the scores from each of the 5 voting judges, for a maximum of 75 points.

Proposed Goals: This challenge was issued as part of NIDA's strategic planning process for 2016-2020. Winning proposals may have been used to guide the development of new research programs within NIDA.

Why a Prize: This Challenge welcomes bold new ideas in NIDA priority areas from the wider array of scientific, clinical, and technological fields.

Participants: Challenge Solvers may be from a broader community of stakeholders—including those not formally involved in biomedical or addiction-related disciplines. Rules for participation in the challenge are online.[53] NIDA received 19 submissions. All papers were submitted by individuals.

Timeline: Submissions were received from May 26, 2015 to June 30, 2015.

Planning Phase Initiation: 2/9/2015
Federal Register Notice Publication: 5/26/2015
Judging Open: 7/1/2015
Judging Close: 7/31/2015

Solicitation & Outreach: Twitter and email blasts were used for outreach. The outreach should have been much larger. More staff time efforts are required for the challenge dissemination.

Incentives: NIDA planned to award $25,000 in total prizes. No non-monetary incentives were planned.

Evaluation and Judging: A total of 10 judges, all within HHS, were identified for evaluation, using the following formula:

[53] http://nida.ideascale.com/a/pages/rules-for-participating-in-the-challenge-2

The challenge judges evaluated each submission based on three criteria: Novelty (5 points), Feasibility (5 points) and Importance of the question being addressed/likelihood of impact (5 points). The score for each submission was the sum of the scores from each of the 5 voting judges, for a maximum of 75 points.

Partnerships: No partnerships were formed.

Resources: An estimated total of 240 FTE hours were expended in the design and execution of the challenge, including 160 at GS-13 level, 15 at GS-14 level, 60 at GS-15 level, and 5 at SES level. Additionally, IdeaScale was used as the platform at a cost of $14,641.

Results: After completing a thorough review of the 19 applications received, the judging panel found that none was sufficiently meritorious and responsive to the concept of the challenge. NIDA has therefore decided not to award any prizes.

k. NIH Innovations in Measuring and Managing Addiction Treatment Quality[54]

Summary: Addiction is one of our nation's most pressing health care problems, but it is treatable. This challenge sought bold new ideas, based on the latest science of addiction, its treatment, and quality improvement, about how the clinical quality of addiction treatment could best be measured and how that clinical quality could be managed and improved.

The National Institute on Drug Abuse (NIDA) planned to award $100,000 in total prizes for white papers that described:

1) novel quality measurement and management concepts
2) how these concepts could conceivably be used to improve the quality of addiction treatment
3) the research or other gaps that need to be addressed to make these quality improvement concepts a reality and
4) how these new measurement and management systems might be evaluated.

NIDA engaged in a partnership with another NIH Institute, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) to support the judging process. NIDA planned to award $100,000 in total prizes: $35,000 for first place, $30,000 for second place, $25,000 for third place, and $10,000 for honorable mention.

Solution Type: Scientific; Ideas

Primary Goals: Advance scientific research; Build capacity

Results: After completing a thorough review of the 5 applications received, the judging panel found that none was sufficiently responsive to the concept of the challenge to meet the standard

[54] http://nida.ideascale.com/a/pages/challenge-1

for a First Prize Award. NIDA awarded an honorable mention award of $10,000 to Jeremy Martinez, MD of the Matrix Institute on Addictions located in Los Angeles, California for the submission titled: "The Patient-Oriented Treatment Information Framework (POTIF)".

Still, the Challenge advanced the agency mission by identifying a critical area of research that will require more investment. This challenge was the agency's first look at supporting research that takes a comprehensive approach to developing new tools, data, and methods for measuring and managing addiction treatment quality.

Problem Statement: Through the "Innovations in Measuring and Managing Addiction Treatment Quality" Challenge (the "Challenge"), the National Institute on Drug Abuse (NIDA), a component of the National Institutes of Health (NIH), challenges the general public to make concrete advances toward improving the quality of addiction treatment. Specifically, through this Challenge, NIDA hopes to incentivize the development of innovative concepts for quality measurement and quality management systems based on the latest science of addiction and its treatment and of quality measurement and management. These new concepts would be game-changing because they would go beyond current performance measurement concepts by removing the limitations of only using the data commonly available in current provider and payer data systems. Instead, they would

- more directly reflect the clinical effects that can and should be expected from high-quality addiction treatment;
- capture what clinicians and provider organizations need to measure to help them provide high-quality addiction treatment; and
- provide a solid basis for measuring clinician and provider performance that may be used by patients and other purchasers to select and incent high-quality treatment.

NIDA believes that the development of such quality measures and management systems has the potential to meaningfully improve the quality of addiction treatment both by giving clinicians and providers the information they need to assess and improve the quality of the care they provide and by providing tools patients and purchasers can use to shop for the highest quality providers, allowing market forces to provide another incentive for improvement.
The challenge judges evaluated each submission based on six criteria: Novelty of the concept (5 points); Clinical effectiveness of the concept (5 points); Scientific basis for the concept (5 points); Quality of the conceptual model (5 points); Potential for the concept to be implemented and evaluated (5 points); and Quality of the research agenda (5 points).

The score for each submission was the sum of the scores from each of the 5 voting judges, for a maximum of 150 points.

Proposed Goals: This challenge aimed to develop innovative concepts for quality measurement and quality management systems based on the latest science of addiction and its treatment and of quality measurement and management.

Why a Prize: NIDA was seeking innovative, forward-looking concepts synthesizing the latest scientific findings from a broad array of relevant disciplines to address the challenge questions.

Participants: The Agency sought challenge Solvers from a broader community of researchers, as well as addiction treatment professionals not formally involved in NIDA sponsored research. Rules for participation in the challenge are online.[55]
NIDA received 5 submissions. All papers were submitted by individuals. Some were addiction treatment professionals with little or no research experience, some were researchers from the addiction field, others were researchers from the broader quality improvement field, and one applicant was an individual in recovery.

Timeline: Submissions were open from January 14, 2015 to June 1, 2015. The winner was announced on September 30, 2015.

Planning Phase Initiation: 7/13/2013
Federal Register Notice Publication: 1/14/2015
Judging Open: 6/2/2015
Judging Close: 7/15/2015

Solicitation & Outreach: Twitter, agency announcements, email blasts, and direct communication were used for outreach. The outreach should have been much larger. More staff time efforts are required for the challenge dissemination.

Incentives: NIDA planned to award $100,000 in total prizes, $35,000 for first place, $30,000 for second place, $25,000 for third place, and $10,000 for honorable mention. No non-monetary incentives were planned.

Evaluation and Judging: A total of 6 judges, all within HHS, were identified for evaluation.

The judging panel made recommendations to the Award Approving Official based upon the following five criteria and point allocation:

- Novelty of the concept (5 points): Concepts are to move beyond the existing quality measurement and management paradigms and administrative data elements commonly used in the addiction treatment field. They are to focus on clinical effects that can be obtained as a direct result of treatment in the context of what is often a chronic, relapsing condition. How novel is the concept? Does it address important clinical effects that are not currently or adequately considered in existing quality measurement and improvement efforts in the addiction treatment field?
- Clinical effectiveness of the concept (5 points): Are changes in the identified effects something that high-quality treatment could conceivably affect in a meaningful way? How

[55] http://nida.ideascale.com/a/pages/rules-for-participating-in-the-challenge

effective would improvements in these clinical effects likely be in addressing addiction and improving other outcomes important to patients and other purchasers of care?

- Scientific basis for the concept (5 points): Concepts must rely on the latest scientific understanding of addiction and its treatment from a broad range of fields, as well as the latest science of quality measurement and management. How meaningfully, comprehensively, and effectively does the concept incorporate these latest advances in areas of science relevant to addiction, its treatment, and quality improvement?
- Quality of the conceptual model (5 points): How well is the conceptual framework or model developed? How well does it consider factors relevant to the ultimate success of the concept? How well does it address the clinical means for improving the candidate measures and potential unintended consequences of implementing the measures and using them to inform, gauge, and reward improvement? How well does it address the likely impact of improvements in these measures on the provider industry?
- Potential for the concept to be implemented and evaluated (5 points): Concepts, and the measures and systems derived from them, must have the potential to be implemented and used in at least some types of treatment programs or other settings once all relevant research gaps have been addressed. Is it within the realm of possibility that these concepts, measures, or quality improvement systems could be implemented in at least some organizations once all of the research gaps have been addressed? How useful would the measures be to patients and payers making purchasing decisions? How reasonable is the plan for how the measures and systems could be evaluated and improved once implemented?
- Quality of the research agenda (5 points): How well does the research agenda describe the gaps in the relevant areas of science that need to be addressed for this novel quality measurement and management concept to be achieved and implemented? Does the agenda describe a logical, feasible plan and timeframe for addressing those gaps?

The judges first reviewed each application independently and then met to discuss the most meritorious applications. The process worked well, with the judges able to clearly articulate the strengths and weaknesses of each application. This information was used to make the final funding recommendation.

Partnerships: NIDA engaged in a partnership with another NIH Institute, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) to support the judging process.

Resources: An estimated total of 576 FTE hours were expended in the design and execution of the challenge, including 210 at the GS-13 level, 8 at the GS-14 level, 350 at the GS-15 level, and 8 at SES levels. Additionally, IdeaScale was used as the platform at a cost of $14,641.

Results: After completing a thorough review of the 5 applications received, the judging panel found that none was sufficiently responsive to the concept of the challenge to meet the standard

for a First Prize Award. NIDA awarded a meritorious/ honorable award of $10,000 to Jeremy Martinez, MD, of the Matrix Institute on Addictions located in Los Angeles, California for the submission titled: "The Patient-Oriented Treatment Information Framework (POTIF)". Still, the Challenge advanced the agency mission by identifying a critical area of research that will require more investment.

l. NIH Up For a Challenge (U4C) - Stimulating Innovation in Breast Cancer[56]

Summary: Breast cancer is the most commonly occurring cancer in women, and the second most common cause of women's cancer deaths in the United States. Epidemiologic studies suggest that genetic factors play a key role in determining who is at increased risk of developing breast cancer. To date, genome-wide association studies (GWAS) have helped researchers identify more than 90 common genetic variations. Although GWAS has greatly increased the understanding of the genetic components of breast cancer risk, results to date explain only a small proportion of the estimated genetic contribution to the risk of breast cancer. Shifting the focus of analysis from individual single nucleotide polymorphisms (SNPs) to pathways could lead to the identification of novel gene sets involved in breast cancer risk. Therefore, in June 2015, the National Cancer Institute (NCI), in collaboration with Sage Bionetworks, launched "Up For a Challenge (U4C) – Stimulating Innovation in Breast Cancer Genetic Epidemiology" to encourage unique approaches to more fully decipher the genomic basis of breast cancer. Utilizing innovative approaches, the goal of this Challenge is to identify new genes or combinations of genes, genetic variants, or sets of genomic features involved in breast cancer risk. In addition, NCI aims to advance innovation in the field of genetic epidemiology by making data more widely available, increasing the amount and diversity of minds approaching a difficult scientific problem, and promoting broader collaborations. NCI will award up to $50,000 in prizes based on identification of novel findings, replication of findings, innovation of approach, evidence of novel biological hypotheses, and collaboration. Sage Bionetworks provided support in the superior design, management, coordination, assessment and evaluation of a challenge.

Solution Type: Ideas; Scientific

Primary Goals: Advance scientific research; Solve a specific problem; Find and highlight innovative ideas; Engage new people and communities

Results: Submissions were accepted from June 15, 2015 to January 16, 2016. Winners will be announced on April 16, 2016. Since this challenge is completing in FY16, full results will be included in the FY16 report.

Problem Statement: Despite knowing that genetic factors play a key role in determining who is at increased risk of developing breast cancer, results to date explain only a small proportion of the estimated genetic contribution to the risk of breast cancer. Participants were challenged to shift their focus of analysis from individual single nucleotide polymorphisms (SNPs) to pathways, ideally leading to the identification of novel gene sets involved in breast cancer risk. Participants will submit a project narrative, which addresses the challenge evaluation criteria, including

[56] www.synapse.org/#!Synapse:syn3157598/wiki/232604

identification of novel findings, replication of findings, innovation of approach, evidence of novel biological hypotheses, and collaboration. Currently this is a single challenge but NCI is considering additional challenges.

Evaluation criteria include identification of novel findings, replication of findings, innovation of approach, evidence of novel biological hypotheses, and collaboration. The challenge criteria are explained in detail on the challenge webpage.

Proposed Goals: The goals of U4C included 1) making breast cancer genetic epidemiologic data more widely available (when consistent with participant informed consent); 2) increasing the number and diversity of minds tackling a tough scientific problem; 3) shifting the focus of analysis from individual genetic variants (i.e., single nucleotide polymorphisms or SNPs) to pathways (i.e., combinations of genes, genetic variants, or sets of genomic features); 4) encouraging the use of innovative approaches to identify novel pathways, which might lead to the discovery of additional gene sets involved in breast cancer risk and 5) exploring the heritable contribution to breast cancer disparities.

Why a Prize: The organizers used the prize competition format as a way to encourage innovation. It is another way that the National Cancer Institute (NCI) can support BC research, which complements more traditional approaches.

Participants: Organizers hope to engage genetic epidemiologists as well as participants from other disciplines such as bioinformatics and computer scientists. Currently 167 participants are registered for the challenge. Full participation will be reported on in FY16.

Timeline: Submissions were open from June 15, 2015 to January 15, 2016. Winners will be announced April 16, 2016.
Federal Register Notice Publication: 6/05/2015
Judging Open: 1/16/2016
Judging Close: 3/31/2016

Solicitation & Outreach: The organizers used many methods to market the challenge including newsletters, targeted emails, blogs, Twitter (including a thunderclap campaign) and Facebook. They also advertised at several scientific meetings through oral and poster presentations.

Incentives: The NCI will award up to $50,000 in prizes based on identification of novel findings, replication of findings, innovation of approach, evidence of novel biological hypothesis(es) and collaboration. The grand prize entry will be awarded up to $30,000. The second place entry will be awarded a runner-up prize of up to $20,000. The competition will also have a People's Choice Award. The top 5 entries (grand prize, second place, and the next three runner-ups) as well as the People's Choice Award winner will be highlighted on the Challenge and DCCPS EGRP websites. The top 5 Entries (grand prize, second place, and the next three runner-ups) as well as the People's Choice Award winner will be invited to prepare a manuscript for publication in a special issue of PLoS Genetics describing their approach and results. Winners will also be invited to speak at an NCI-sponsored session at the American Association of Cancer Research (AACR) annual meeting in April 2016.

Evaluation and Judging: Entries will be scored by the Challenge Evaluation Panel using the following criteria: identification of novel findings, replication of findings, innovation of approach, evidence of novel biological hypothesis (es) and collaboration. After the Challenge Evaluation Panel provides final scores, the highest scoring applications will be evaluated for reproducibility. In order to qualify for a Challenge prize, it must be possible for challenge data scientists to reproduce the Entry results within 1 month. The NCI Judges will review scores and reproduction results and make recommendations to the NCI Director. The NCI Director will make the final selection of Entries for award.

Partnerships: NCI formed many informal partnerships to ensure a successful prize competition. Most partnerships were focused on sharing challenge best practices marketing and outreach.

Resources: Sage Bionetworks provided support in the superior design, management, coordination, assessment and evaluation of a challenge. The total cost was $200,000.

Results: The U4C Challenge is still ongoing; however, the organizers see it as consistent with the NIH mission to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability. The U4C is particularly aligned with NIH's goals to foster fundamental creative discoveries, innovative research strategies, and their applications as a basis for ultimately protecting and improving health; to develop, maintain, and renew scientific human and physical resources that will ensure the Nation's capability to prevent disease; to expand the knowledge base in medical and associated sciences in order to enhance the Nation's economic well-being and ensure a continued high return on the public investment in research; and to exemplify and promote the highest level of scientific integrity, public accountability, and social responsibility in the conduct of science.

Submissions were accepted from June 15, 2015 to January16, 2016. Winners will be announced on April 16, 2016. Since this challenge is completing in FY16, full results will be included in the FY16 report.

m. NIH Wearable Alcohol Sensor Challenge[57]

Summary: Current technologies for real time monitoring of alcohol consumption, used in criminal justice applications, have performed adequately, but have disadvantages for broader use. Current technology for continuous alcohol monitoring takes a reading every 30 minutes. In this challenge, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) seeks the design and production of a wearable device to monitor blood alcohol levels in real time. The device should be inconspicuous, low profile, and appealing to the wearer. The design can take the form of jewelry, clothing, or any other format located in contact with the human body. A non-invasive technology is preferred.

[57] www.challenge.gov/challenge/a-wearable-alcohol-biosensor/

The device should be able to quantitate blood alcohol level, interpret and store the data, or transmit it to a smartphone or other device by wireless transmission. Data storage and transmission must be completely secure in order to protect the privacy of the individual. The device should have the ability to verify standardization at regular intervals and to indicate loss of functionality. The power source should be dependable and rechargeable. A form of subject identification would be an added benefit. The device can be removable. NIAAA partnered with the National Archives for a panel discussion on the history and future of alcohol monitoring and science.

The challenge offered $200,000 for the first place prize and $100,000 for the second place prize.

Solution Type: Technology demonstration and hardware

Primary Goals: Develop technology; Solve a specific problem

Results: Submissions were accepted from March 2, 2015 to December 1, 2015. Winners will be announced on February 16, 2016. Since this challenge is completing in FY16, full results will be included in the FY16 report.

Problem Statement: NIAAA seeks the design and production of a wearable device to monitor blood alcohol levels in real time. The device should be inconspicuous, low profile, and appealing to the wearer. The design can take the form of jewelry, clothing, or any other format located in contact with the human body. A non-invasive technology is preferred.

Current technologies for real time monitoring of alcohol consumption, used in criminal justice applications, have performed adequately, but have disadvantages for broader use. Current technology for continuous alcohol monitoring takes a reading every 30 minutes. NIH is seeking a solution that improves on this interval and most closely approximates real time monitoring and data collection. The device should be able to quantitate blood alcohol level, interpret and store the data, or transmit it to a smartphone or other device by wireless transmission. Data storage and transmission must be completely secure in order to protect the privacy of the individual. The device should have the ability to verify standardization at regular intervals and to indicate loss of functionality. The power source should be dependable and rechargeable. A form of subject identification would be an added benefit. The device can be removable. This is a reduction to practice challenge that requires written documentation and a working prototype of the submitted solution. NIAAA is open to a range of design forms which can accomplish the above tasks. This is part of a larger portfolio which aims to spur the creation of a wearable biosensor through both this challenge and the SBIR program.

The award is contingent upon experimental validation of the submitted solution by the Seeker. This is a reduction to practice challenge that requires written documentation and a working prototype of the submitted solution.

Submissions will be judged by a qualified panel selected by NIAAA. The panel will evaluate submissions based on the following judging criteria:

1. Accuracy, reliability, and frequency of blood alcohol measurement
2. Functionality, accuracy, and integration of data collection, data transmission and data storage
3. Safeguards for privacy protection and data integrity
4. Plans for process of manufacture
5. Marketability and likelihood of bringing the product to market
6. Appeal and acceptability to wearers
7. Feasibility

The award is contingent upon experimental validation of the submitted Solution by the Seeker. During the judging period, the expert panel may request additional information or clarification in order to evaluate the entry.

Proposed Goals: The competition sought the creation of a prototype of a wearable device to monitor blood alcohol levels in real time.

Why a Prize: The prize competition opens up the search to others not traditionally involved in NIH grants, contracts, or cooperative agreements, thereby increasing the potential for creative and innovative solutions to the challenge. This method also allows for a more agile and expedited search as compared to more traditional mechanisms.

Participants: NIAAA aimed to mobilize the science, technology, and design industry, as well as students. While the competition has not closed, NIAAA has received several indications that certain individuals or entities will enter, however NIAAA doesn't expect to receive solutions until the closing date of December 1, 2015. As of yet organizers have no real data on entrants.

Timeline: Submissions were accepted from March 2, 2015 to December 1, 2015. Winners were announced February 16, 2016.

Planning Phase Initiation: 08/01/2014
Federal Register Notice Publication: 02/27/2015
Judging Open: 01/02/2016
Judging Close: 01/30/2016

Solicitation & Outreach: NIAAA used targeted press releases, individual outreach which that included attendance of conferences and symposiums, as well making it a part of leadership talking points for interviews. NIAAA also partnered with the National Archives for a panel discussion on the history and future of alcohol monitoring and science.

Incentives: $200,000 was offered for the first place prize and $100,000 for the second place prize. The second place funding was contributed by an unrestricted gift fund.

Evaluation and Judging: Evaluation and judging are still ongoing.

Partnerships: No partnerships were formed.

Resources: An estimated total of 541 FTE hours were expended to design and execute the challenge, 128 hours at the GS-12 level, 122 hours at the GS-13 level, 286 at the GS-14 level, and 100 hours at the GS-15 level.

Results: This competition has furthered NIAAA's mission in several ways. First and foremost the outreach and press served to increase NIAAA's presence in not only traditional circles but also in areas of industry and academia that have historically been less aware of the institute and its mission. Secondly, the competition has led to interest and the possibility of novel and innovative solutions to monitoring and tracking alcohol use and its effects. Thirdly, if a successful solution is obtained it will have profound effects on every area of NIAAA's programs, science, and ability to achieve its mission. Since this challenge is completing in FY16, full results will be included in the FY16 report.

n. ONC EHR Innovations for Improving Hypertension Challenge[58]

Summary: The Office of the National Coordinator for Health Information Technology (ONC) seeks to uncover the practices that have used clinical decision support to implement the most successful evidence-based blood pressure (BP) treatment protocols. ONC will then further reward organizations that spread these tools for use by the most providers.

The challenge tasked medical practices to gather specific descriptions of health IT tools and approaches used to implement an evidence-based blood pressure (BP) treatment protocol that has led to improvement in practice-wide blood pressure control (Phase 1), and identify models for quickly and widely spreading these to other practices (Phase 2).

The full $40,000 in award funds was provided by ONC. $30,000 was offered for first place, as well two, $5,000 semi-finalist awards. This was a full collaboration with the Million Hearts Initiative, in all aspects except funding.

Solution Type: Ideas

Primary Goals: Advance scientific research; Find and highlight innovative ideas; Solve a specific problem; Engage new people and communities

Results: Each phase of the competition garnered three submissions, two of which competed in both phases. The low number of submissions was largely a result of a similar ongoing effort that was not learned of until the competition had already launched. The repeat participants both won semi-finalist awards at the end of Phase 1, and one was the final winner of Phase 2. This final winner was a small internal medicine practice located in Maryland. The other semi-final winner was a small system of family clinics in Wisconsin made up of three sites.

ONC held several webinars following Phases 1 and 2 to disseminate the models and practices of the winners; had the final winner participate on a panel at ONC's Annual Meeting; and disseminated the winners' practices online. Feedback from organizations interested in the results

[58] www.challenge.gov/challenge/ehr-innovations-for-improving-hypertension-challenge-2/

of the challenge indicated that they were more interested in picking and choosing individual elements of the winners' models to adapt to their processes rather than adopting the models wholesale.

Problem Statement: In Phase 1 (three months), practices were asked to document the electronic health record (EHR) tools they used to implement an evidence-based BP control protocol, as well as to describe the details and results of the implementation. In Phase 2 (nine months), practices and their partners conducted, evaluated and documented dissemination strategies for tools recognized in Phase 1, emphasizing widespread, effective use of these tools by other practices. Submitters must demonstrate successful use of these tools in at least two additional practices.

Phase 1

Practices must demonstrate high blood pressure control levels and/or improvement to ensure that their tools and strategies merit replication across other practice settings. Submissions must provide documentation describing the elements below.

- Blood Pressure Control Results. Challenge entry requires exemplary blood pressure control for hypertensive patients driven by EHR/Clinical Decision Support (CDS) interventions – a practice-wide control rate of at least 70%, and/or a significantly improved level from before the enhanced CDS interventions described in the submission were deployed.
- Blood Pressure Protocol and CDS Support Overview. Describe the CDS interventions and implementation strategies believed to have had the greatest effects on BP control. In a narrative, the solvers were asked to describe the protocol elements addressed and how they used EHR and related CDS interventions to address them.
- CDS Intervention Details. For each intervention used to implement the blood pressure protocol, solvers were asked to provide a detailed description that included, for example, categories and orders within an order set, data entry fields/options in a documentation template, rules used to produce data, and report layout for patient lists from registries. Solvers were asked only to submit material for which widespread use is acceptable, without payment or limitation. Solvers were also warned not to submit any propriety material without submitting all pertinent permissions (e.g., from EHR vendor) nor any protected health information (PHI).
- Workflow Integration Details. Solvers were asked to describe how to integrate into the practice and clinical workflow the interventions described in the previous section and to provide enough detail so that other practices wanting to use the same interventions would experience similar success with them in controlling blood pressure. Solvers were asked to use both a narrative description and the CDS/Quality Improvement worksheets for standard presentation/replication.

Phase 2

To participate in Phase 2, solvers were asked to provide documentation describing the following elements:

- CDS Tools Spread. Solvers were asked to describe which tools from Phase 1 the solver's team spread to other practices using the format of the Phase I CDS Intervention Details and to describe, in detail, any modifications that were made to the Phase 1 version of the tools.
- Spread Results:
  - Successful implementations: Solvers were asked to describe the number and nature of practices to which the CDS interventions were spread, and for each practice, to provide details as described in Phase 1 Practice Information.
  - Blood pressure control and process improvements: For each practice and in the aggregate, solvers were asked to describe the blood pressure control improvements generated by the tools using the instructions in Phase 1 Blood Pressure Control Results. If BP control improvements have not yet been achieved, the solvers were asked to provide compelling evidence of significant value to the practice(s) and their hypertensive patients from the tool implementation.
  - Additional commitments: Solvers were asked to provide evidence about any additional sites that have committed to adopt the CDS tools that are being spread but have not yet reached implementation.
  - Spread Strategy. Solvers were asked to describe how to support successful use of the CDS tools in practices, and to provide enough detail, such as critical success factors and pitfalls to avoid, so that others could replicate it. See Phase 1 items CDS Support Overview and Blood Pressure Protocol, and Workflow Integration Details for guidance on providing details about protocol/CDS implementation details for individual sites.

Proposed Goals: The goals of the EHR Innovations for Improving Hypertension Challenge were to gather specific descriptions of health IT tools and approaches used by individual practices to implement an evidence-based blood pressure (BP) treatment protocol that has led to improvement in practice-wide blood pressure control (Phase 1), and identify models for quickly and widely spreading these to other practices (Phase 2).

Why a Prize: The goals of the competition, to gather multiple processes, tools, and other methods of clinical decision support, and sharing them, would not have been possible to achieve through other mechanisms. Contract, grants, and cooperative agreements would only have resulted in intellectual property-protected proposals that could not be shared and implemented.

Participants: The organizers hoped to mobilize practices of all different sizes, populations, locations, and demographics. Each phase of the competition garnered three submissions, two of which competed in both phases. The low number of submissions was largely a result of a similar effort going on that was not learned of until the competition had already launched. The repeat participants both won semi-finalist awards at the end of Phase 1, and one was the final winner of Phase 2. This final winner was a small internal medicine practice located in Maryland. The other semi-final winner was a small system of family clinics in Wisconsin made up of three sites.

Timeline: Submissions for Phase 1 were open from July 9, 2014 to October 10, 2014, and winners from Phase 1 were announced November 7, 2014. Submissions for Phase 2 were received between January 23, 2015 and October 30, 2015. Winners for Phase 2 were announced December 10, 2015.

Federal Register Notice Publication: 07/09/2014
Second Phase Judging Open: 11/02/2015
Second Phase Judging Close: 11/20/2015

Solicitation & Outreach: The competition used standard, widely-used methods to market the competition, including social media, blog posts, and emails to previous challenge participants. To market the final winner, ONC plans to hold webinars targeted to different relevant communities and inform key individuals and communications offices within HHS and its agencies.

Incentives: The full $40,000 in award funds was provided by ONC. $30,000 was offered for first place, as well as two, $5,000 semi-finalist awards.

Evaluation and Judging: Challenge submissions were evaluated on similar criteria in both phases: blood pressure control, comprehensiveness and innovation in addressing protocols using EHRs or other health IT, descriptions of tools and implementations in a replicable/scalable way, and ease with which others could implement the tools and approach. Phase 2 replicated these criteria, modified to demonstrate new implementations and effectiveness, and added criteria for the number of new practices implementing. In total 12 judges consisting of Federal employees within and outside HHS and those affiliated with non-profit organizations participated.

Partnerships: This was a full collaboration with the Million Hearts Initiative, in all aspects except funding.

Resources: Approximately 500 hours of GS-12 time were expended in the design and execution of this challenge. The challenge was run on challenge.gov, so no additional platform costs were incurred.

Results: The winners of the challenge provided novel tools and methods of engaging patients to achieve blood pressure improvement, from paper-based to digital. These demonstrated ways that

EHRs and clinical decision-making can be customized and implemented in different types of practices that do not disrupt staff workflows and can enhance internal adoption.[59]
ONC held several webinars following Phases 1 and 2 to disseminate the models and practices of the winners; had the final winner participate on a panel at ONC's Annual Meeting; and disseminated the winners' practices online. Feedback from organizations interested in the results of the challenge indicated that they were more interested in picking and choosing individual elements of the winners' models to adapt to their processes rather than adopting the models wholesale.

o. ONC Market R&D Pilot Challenge[60]

Summary: Developers and startups have difficulty getting access to patients in real-life care settings in order to test new products. This is a problem not just for the innovators themselves, but also for potential investors who want to see evidence of a working product; for providers who are searching for ways to improve the care they deliver; for those in the innovation community who want overall improvement in the healthcare system; but most of all for patients who will benefit from innovative technologies and treatments. This challenge was designed to lower some of the barriers that get in the way of these collaborations, leading to a six-month pilot.

The Office of the National Coordinator for Health Information Technology (ONC) Market R&D Pilot Challenge helps bridge technological gaps by bringing together health care organizations and innovative companies through $300,000 in pilot funding awards and facilitated matchmaking.[61]

Solution Type: Business plan; Technology demonstration and hardware

Primary Goals: Develop technology; Other (encourage uptake of ONC standards and technologies); Engage new people and communities

Results: Ultimately 82 applications were received (four eliminated for being ineligible). Innovator companies represented 23 states and Washington, D.C., with 80% coming from California, New York, Massachusetts, Pennsylvania, Texas, Florida, Wisconsin, and D.C.

Six teams were selected as winners, five of which moved forward with the pilots as originally proposed. Three of the pilots have since been completed on schedule:

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[59] The websites of the winners are found at http://www.greenspringmed.com/ and http://www.vibranthealthclinics.com, respectively.

[60] www.oncpilotchallenge.com

[61] Facilitated matchmaking entailed having the innovator companies and clinical hosts complete and submit short forms that were used to compare interests and create matches. This provided the foundation to schedule meetings at one of three in-person sessions held in Washington DC, New York City, and San Francisco. At each of these sessions, hosts met with the innovators they were matched with in 15 minute meetings. After these meetings, it was entirely up to the innovators and hosts to determine if they wanted to move forward with a partnership.

- The collaboration between ClinicalBox and Lowell (Massachusetts) General Hospital implemented a tool for patients that educated them on their orthopedic surgery both before and after the event.
- The partnership between Vital Care Telehealth Services and Dominican Sisters Family Health Service implemented a telehealth program for senior citizens on the Shinnecock Indian Nation Reservation in New York.
- In the Rio Grande Valley in Texas, CreateIT Healthcare Solutions and MHP Salud used the former's platform to deliver culturally, linguistically, and literacy level appropriate SMS text messages to the local underserved community.

The remaining two pilots are delayed, but projected to complete this summer.

The challenge provided the opportunity for ONC to gain direct insight into how innovative technologies are implemented in care settings and how well they actually work, with a variety of technologies and platforms that will become more prominent over the coming years. Observing these pilots from start to finish will enable ONC to implement policy and programs that will be more appropriate to the current innovative health IT landscape. Additionally, lessons learned from the running of the pilots will be exportable to the advice and guidance ONC provides for electronic health record implementation.

Problem Statement: Developers and startups have difficulty getting access to patients in real-life care settings in order to test new products. This is a problem not just for the innovators themselves, but also for potential investors who want to see evidence of a working product; for providers who are searching for ways to improve the care they deliver; for those in the innovation community who want overall improvement in the healthcare system; but most of all for patients who will benefit from innovative technologies and treatments. This challenge was designed to lower some of the barriers that get in the way of these collaborations, leading to a six-month pilot.

Because innovators don't necessarily have the contacts with care settings or know the right people, ONC first held three matchmaking events, on both coasts, to facilitate initial interactions between developers and providers around common topics of interest that were also ONC priority areas. To apply for the challenge, innovators and providers teamed up to create a pilot proposal that included a description of the technology to be piloted, a budget, and a pilot timeline and narrative.

Innovators and providers had to meet basic criteria to be eligible to win. Innovators were meant to be small entities, determined by having raised under $10 million in venture capital funding and employing no more than 50 people. Their products also had to be far along enough in development that they were ready to be deployed in a production setting. Providers were required to demonstrate that they had the capacity to host the pilots.

Proposed Goals: The primary objectives of the competition were to encourage early collaboration between medical and public health personnel, entrepreneurs, developers, and

patients in order to link innovation in health IT to innovation in health care delivery; de-risk early-stage digital health products for future clinical testing and development; and encourage uptake of ONC standards and technologies.

Why a Prize: Between funding, agency priorities, and programmatic limitations, other authorities were not suitable to achieve the goals and needs of the challenge.

Participants: At the three pre-proposal matchmaking events held in San Francisco, New York, and Washington, D.C., a total of 183 organizations attended - 151 innovator companies and 32 host organizations.

Ultimately 82 applications were received (four eliminated for being ineligible). Innovator companies represented 23 states and Washington, D.C., with 80% coming from California, New York, Massachusetts, Pennsylvania, Texas, Florida, Wisconsin, and D.C.

Timeline: Submissions were accepted from October 21, 2014 to March 2, 2015. Winners were announced April 30, 2015.

Federal Register Notice Publication: 10/21/2014
Judging Open: 3/10/2015
Judging Close: 4/7/2015

Solicitation & Outreach: The matchmaking events facilitated meetings between innovator companies and potential host organizations. Over the course of a three-hour event, each host had ten to 12 meetings with innovators. In addition to the meetings, the events also provided valuable networking time and idea sharing among the participants.

Significant time was also spent reaching out to individual provider organizations. The organizers anticipated more difficulty engaging with individual provider organizations. Since the organizations' patients and customers would ultimately be using the technology products, organizers spent months engaging, not just to advertise the challenge, but also to learn how to craft a better challenge to meet their needs.

Incentives: Six awards of $50,000 apiece were allocated for the winners. They would be disbursed in two batches, with an initial $25,000 being awarded upon being chosen as winners, with the remaining $25,000 going out upon completion of the pilot. This was done to incentivize pilot completion and make sure the program was not abandoned should they take a turn for the worse.

Evaluation and Judging: Reviewers were drawn from all different types of organizations and areas of expertise. As always, it was very important to define the evaluation criteria very specifically so that they could determine their scores consistently and with the proper balance between objectivity and subjectivity.

Proposals were evaluated on: pilot proposal and design, pilot budget and scale, potential for health impact, relevance to ONC priorities, potential of innovator's product, team experience and strength of match, and proposed public deliverable.

Partnerships: No partnerships were formed.

Resources: This challenge entailed roughly 10% time of a GS-12 over a year of setup and preparation and roughly 20-25% time overall during the actual 1.5 years of execution. Capital Consulting Corp. was the primary contractor and Health 2.0 a subcontractor, at a total cost of $175,000. The subcontractor provided a great deal of subject matter expertise on how to run the competition, as it was something that ONC had not previously done. The cost was largely for the administration of the challenge - communications work, answering emails from participants, executing the matchmaking events, etc.

Results: ONC policy largely deals specifically with electronic health records (EHRs), but also relates to all the other technologies that affect the patient health record and patient data. Not being a large grant-making agency, however, leads to a more limited ability to gain direct insight into how innovative technologies are implemented in care settings and how well they actually work. The challenge provides that opportunity, with a variety of technologies and platforms that will become more prominent over the coming years. Observing these pilots from start to finish will enable ONC to implement policy and programs that will be more appropriate to the innovative health IT landscape. Additionally, lessons learned from the running of the pilots will be exportable to the advice and guidance ONC provides for EHR implementation. Ultimately 82 applications were received (four eliminated for being ineligible). Innovator companies represented 23 states and Washington, D.C., with 80% coming from California, New York, Massachusetts, Pennsylvania, Texas, Florida, Wisconsin, and D.C.

Six teams were selected as winners, five of which moved forward with the pilots as originally proposed. Three of the pilots have since been completed on schedule, while the other two that moved forward are delayed, but projected to be completed this summer.

The collaboration between ClinicalBox and Lowell (Massachusetts) General Hospital implemented a tool for patients that educated them on their orthopedic surgery both before and after the event. This contributed to higher patient satisfaction, reduced readmissions, and greater adherence to post-surgery clinical recommendations. The success of the pilot led to new demand for the tool and its spread to other specialties and sites in the network.

The partnership between Vital Care Telehealth Services and Dominican Sisters Family Health Service implemented a telehealth program for senior citizens on the Shinnecock Indian Nation Reservation in New York. The program connected patients with remote clinicians, including telehealth screenings at community events and monthly monitoring for those with chronic conditions. Given the unfamiliarity of the elderly population with the technological tools and processes, additional emphasis was placed on building trust within the community through their leaders and representatives. The team brought in Stony Brook University as a partner and is pursuing further funding and grant resources to continue work.

In the Rio Grande Valley in Texas, CreateIT Healthcare Solutions and MHP Salud used the former's platform to deliver culturally, linguistically, and literacy level appropriate SMS text messages to the local underserved community. These messages contained educational and clinically relevant material along two separate tracks, diabetes prevention and breastfeeding. The pilot's findings included the abandonment of flip phones in favor of smartphones among all participants, the importance of in-person outreach and touchpoints, and highlighting of on-the-ground concerns like data usage and costs when crossing over the Mexico border.

p. SAMHSA Offender Reintegration Toolkit Challenge[62]

Summary: Studies show that people leaving the criminal justice system have a higher proportion of substance use and mental disorders than the general population. The Substance Abuse and Mental Health Services Administration (SAMHSA), an operating division of the U.S. Department of Health and Human Services, invites developers to create an innovative software-based solution, with housing, employment, prevention, treatment and recovery information, to assist offenders and their friends, family, probation officers, jail and prison case workers, and others who help them reintegrate into their communities.

A total of $22,500 in monetary incentives was broken into first ($10,000), second ($7,500), and third ($5,000) place prizes. Devpost supported the implementation of the prize competition.

Solution Type: Software and apps

Primary Goals: Solve a specific problem; Develop technology

Results: The competition received 65 total registrants, 9 submissions, and 3 winners. All three winners produced websites that fulfilled SAMHSA's goal of building tools that provide important resources all in one place for individuals leaving the criminal justice system, thereby helping to reduce recidivism and promote the public health and safety of communities.

- The first place prize went to Obodo, an interactive membership website designed to be a hub that provides resources, information, and connection for persons formerly incarcerated and functions like a community portal. Users set up profiles, add photos, bookmark resources and interests, learn new skills, and can email with other members. Resources are localized wherever possible.
- The second place prize went to the Second Chances Resources Library, a website designed to look and behave like a library and to provide resources and information for persons formerly incarcerated. Once a user selects a topic from the bookshelf, a book appears and the user can scroll through page by page to get the information, resources and links it provides.

[62] http://offenderreintigrationtoolkit.devpost.com/

- The third place prize went to Right Path, a website that provides resources and information for persons formerly incarcerated and persons who help them (parole officers, community service staff, family and friends.)

Problem Statement: Studies show that people leaving the criminal justice system have a higher proportion of substance use and mental disorders than the general population. Treatment and recovery support, along with housing and employment, are necessary to help newly released individuals address substance use and mental disorders and to keep them from reoffending. Easy to find information and resources can help them (and their family and friends) as they return to their communities.

Proposed Goals: SAMHSA is seeking solutions to this problem through cost-effective, portable, technology-based products that effectively reach a diverse population of ex-offenders being released from jail or prison, and the friends, family, parole officers, case managers, and service center staff who help them. Technology-based products may include, but are not limited to, web applications, mobile apps, and Web sites.

Why a Prize: Driven by the America COMPETES Reauthorization Act of 2010 signed by President Obama in 2011, HHS Competes seeks to make the challenges faced by government and industry transparent by enabling participation from innovators both within and outside of government. These challenges were SAMHSA's way of participating in the America COMPETES Act, and spurring innovation to meet public health needs that SAMHSA may not be able to fund otherwise.

Participants: SAMHSA hoped to reach innovators and developers.

Timeline: Submissions opened for this challenge on June 1, 2015 and closed on July 28, 2015. Winners were announced on September 9, 2015.

- Planning Phase Initiation: 02/01/2015
- Federal Register Notice Publication: 05/08/2015
- Judging Open: 08/05/2015
- Judging Close: 08/14/2015

Solicitation & Outreach: This challenge used a variety of outreach channels, including listservs, agency blog, and social media (Twitter, Facebook).

Incentives: A total of $22,500 in monetary incentives was broken into first ($10,000), second ($7,500), and third ($5,000) place prizes.

Evaluation and Judging: Ten judges were used, within HHS and from other federal agencies. SAMHSA used the following evaluation criteria to judge submissions:

- Quality of Performance - 40 points -includes how well the Application functions technically, and extent to which the Application responds to the Competition topic & target audience, and how thoroughly & clearly the solution utilizes the required assets.
- Quality of User Experience - 25 points -includes visual aesthetic and ease of use.
- Potential Impact - 25 points -includes the potential impact related to successfully informing target audiences about the resources available to them for employment, housing, healthcare, treatment and recovery.
- Feasibility of Use - 10 points -includes how easily target audiences and members of the public can access and use the Application

Partnerships: No partnerships were formed.

Resources: A total of 120 FTE hours were expended to design and execute the challenge, 100 at the GS-13 level and 20 at the GS-14 level. Additionally, the challenge was run as part of a contract with Abt Associates. The challenge was run on devpost.com at a cost of $3,000.

Results: There were 65 total registrants, 9 submissions, and 3 winners. SAMHSA's goal was to use the technology challenge to build a tool that provides important resources all in one place for individuals leaving the criminal justice system, thereby helping to reduce recidivism and promote the public health and safety of communities. A team of judges evaluated the submissions to assess their possible impact. The winners were:[63]

- The first place prize went to Obodo, an interactive membership website designed to be a hub that provides resources, information, and connection for persons formerly incarcerated. The site functions like a community portal. Users set up profiles, add photos, bookmark resources and interests, learn new skills, and can email with other members. Resources are localized wherever possible.
- The second place prize went to the Second Chances Resources Library, a website designed to look and behave like a library and to provide resources and information for persons formerly incarcerated. Once a user selects a topic from the bookshelf, a book appears and the user can scroll through page by page to get the information, resources and links it provides.
- The third place prize went to Right Path, a website that provides resources and information for persons formerly incarcerated and persons who help them (parole officers, community service staff, family and friends.)

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[63] For more information about the winners, go to their websites:

- Obodo https://obodo.is/
- SecondChanceResources Library http://secondchanceresources.org/
- RightPath http://devpost.com/software/rightpath

q. SAMHSA Opioid Overdose Prevention Challenge[64]

Summary: The Substance Abuse and Mental Health Services Administration's (SAMHSA's) Opioid Overdose Prevention Challenge seeks technology-based solutions to help reduce the number of deaths from opioid overdoses. Challenge participants were asked to develop innovative, software-based products that help people know the signs of opioid use, how to prevent death from opioid overdose, and support treatment and recovery. The product should be developed for family and friends who are concerned about someone at risk for overdose.

Two non-profit organizations, the National Council for Behavioral Health and the National Council on Alcoholism and Drug Dependence Inc, partnered with SAMHSA.

A total prize purse of $22,500 was to be split amongst a first prize of $10,000, a second prize of $7,500, and a third prize of $5,000.

Solution Type: Software and apps

Primary Goals: Solve a specific problem; Develop technology

Results: In total, 83 technology developers registered for the competition. 15 entries were submitted, and 13 entries met the eligibility criteria to be reviewed and judged in the competition.

SAMHSA selected first, second and third place winners from the eligible submissions. The winners were:

- The first place prize was awarded to RX Assurance's OPI Rescue, a free support tool created to serve as a patient support network application for OpiSafe, a service that promotes best practices and PDMP/PMP checking for prescribers of opioids.
- The second place prize was awarded to Jared Schwartz's Smart Response, an interactive, pin-based website designed to put critical information about opioid overdose front and center for users seeking direction about how to prepare or respond to an opioid overdose. The website delivers important information from SAMHSA's Opioid Overdose Prevention Toolkit, and other resources, in a colorful, engaging, and easy to use website format.
- The third place prize was awarded to iHealthventure's Overdose Prevention iPhone application, which provides overdose prevention information in a colorful, easy to use iPhone app.

Lessons learned include conducting the competition during the academic calendar in order to garner student entries, and to have a longer submission period for more complex challenges.

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[64] http://opioidoverdoseprevention.devpost.com/

Problem Statement: Death from opioid overdose is preventable! Nearly 17,000 deaths in 2011 were related to prescription opioid medications. According to the 2013 National Survey on Drug Use and Health (NSDUH), 4.5 million Americans engaged in the non-medical use of prescription painkillers in the last month, and over 300,000 people were regular (past month) users of heroin. SAMHSA launched a challenge to help prevent opioid overdose and support recovery through innovative, software-based solutions that help people understand what to do and how to prepare for when a family member or friend overdoses on heroin or opioid pain medications.

The innovation created was required to use material from SAMHSA's Opioid Overdose Prevention Toolkit as well as draw from a list of prevention, treatment and recovery resources SAMHSA provided. Submissions could be newly created or preexisting products modified to meet the content and requirements of the challenge. Winning submissions were judged on quality of performance, user experience, feasibility of use, and potential impact the tool has on successfully informing the audience about how to prevent opioid overdose and support prevention, treatment, and recovery of opioid misuse and abuse.

Proposed Goals: The proposed goals of the applications developed from this challenge were threefold:

1. Prevent deaths from opioid overdose.
2. Help friends and family understand what to do in the event of an overdose and to have this knowledge ahead of time.
3. Support recovery from addiction.

SAMHSA has an organizational goal to extend the reach of opioid overdose prevention information. It seeks to empower individuals likely to witness overdose with information on how to respond. The challenge allowed developers, coming from a different perspective, to transform SAMHSA information through a technological solution. The challenge met expectations by spurring innovation and creating tools to allow individuals to access overdose prevention information in the palm of their hands.

Why a Prize: Driven by the America COMPETES Reauthorization Act of 2010 signed by President Obama in 2011, HHS Competes seeks to make the challenges faced by government and industry transparent by enabling participation from innovators both within and outside of government. These challenges were SAMHSA's way of participating in the America COMPETES Act, and spurring innovation to meet public health needs that SAMHSA may not be able to fund otherwise.

Participants: The agency hoped to reach innovators and developers. In total, 83 technology developers registered for the competition. 15 entries were submitted, 13 entries met the eligibility criteria to be reviewed and judged in the competition.

Timeline: Submissions for this challenge were received between June 1, 2015 and July 29, 2015. Winners were announced on September 4, 2015.

Planning Phase Initiation: 12/19/2014
Federal Register Notice Publication: 05/08/2015
Judging Open: 08/05/2015
Judging Close: 08/14/2015

Solicitation & Outreach: Before and after the competition, SAMHSA reached out to federal and national partners, grantees, university technology and public health programs, and relevant associations to market the challenge, garner participation, and highlight prizewinners. SAMHSA also promoted the challenge on its blog and social media throughout the competition. State legislators were also contacted regarding prizewinners from their state. Devpost, the challenge website, marketed the challenge to its audience of registered members. The methods were effective. Lessons learned include conducting the competition during the academic calendar in order to garner student entries, and to have a longer submission period for more complex challenges.

Incentives: Three winning solutions received a first prize of $10,000, a second prize of $7,500, and a third prize of $5,000. No private sector or philanthropic funds were contributed for prizes.

Evaluation and Judging: There were eight judges, comprised of agency staff, agency subject matter experts, and technology experts. Eligible entries were judged in a first round of judging by a minimum of three judges each who judged/scored each submission (on their own, privately) according to the following list of criteria.

- Quality of Performance (40 points) (includes how well the Application functions technically, and extent to which the Application responds to the Competition topic and target audience, and how thoroughly and clearly the solution utilizes the required assets);
- Quality of User Experience (25 points) (includes visual aesthetic and ease of use);
- Potential Impact (25 points) (includes the potential impact related to successfully informing target audiences about how to prevent opioid overdoses and provide a spectrum of additional support for the prevention, treatment and recovery of opioid misuse and abuse); and,
- Feasibility of Use (10 points) (includes how easily target audiences and members of the public can access and use the Application).

Top scoring submissions from the first round went on to the second round of judging that was conducted in person with a minimum of four judges. When possible, app solutions were reviewed on devices. Demonstrations of each entry were conducted and discussion was held for each one. Judges scored each submission and results were tallied. These methods were effective. The three highest scoring entries were the prizewinners. Lessons learned about judging were to secure more judges than necessary and to have confirmed back up judges in case judges need to drop out.

Partnerships: Marketing partners promoted the challenges to their members, notably two non-profit organizations, the National Council for Behavioral Health and the National Council on Alcoholism and Drug Dependence Inc, partnered with SAMHSA.

Resources: A total of 100 FTE hours at the GS-13 level were expended to design and execute the challenge. Additionally, the challenge was run as part of a contract with FEi Systems. The challenge was run on devpost.com at a cost of $4,000.

Results: There were 83 registrants and 15 submissions.

SAMHSA selected first, second and third place winners from the eligible submissions. The winners included:

- The first place prize was awarded to RX Assurance's OPI Rescue, a free support tool created to serve as a patient support network application for OpiSafe, a service that promotes best practices and PDMP/PMP checking for prescribers of opioids.[65]
- The second place prize was awarded to Jared Schwartz's Smart Response, an interactive, pin-based website designed to put critical information about opioid overdose front and center, for users seeking direction about how to prepare or respond to an opioid overdose. The website delivers important information from SAMHSA's Opioid Overdose Prevention Toolkit, and other resources, in a colorful, engaging, and easy to use website format.
- The third place prize was awarded to iHealthventure's Overdose Prevention iPhone application, which provides overdose prevention information in a colorful, easy to use iPhone app.

H. Department of Homeland Security

a. "Where Am I and Where Is My Team?" Indoor Tracking of the Next Generation First Responder[66]

Summary: The Department of Homeland Security (DHS) sought innovative solutions to help track the next generation of first responders while they are inside of a structure without having to set up prepositioned towers or other devices.

InnoCentive supported the implementation of this prize competition. A $25,000 cash prize purse was the incentive for this prize competition. The first place prize was $20,000 and the second place prize was $5,000.

Solution Type: Ideas

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[65] https://opirescue.com/

[66] https://www.challenge.gov/challenge/where-am-i-where-is-my-team/

Primary Goals: Develop technology; Solve a specific problem; Find and highlight innovative ideas; Advance scientific research; Engage new people and communities; Inform and educate the public

Results: A total of 330 users registered during the submission period on InnoCentive's public facing competition web site. A total of 58 solution proposals were submitted to the prize competition. The submission rate for this prize competition was 18%, which is significantly higher than the InnoCentive, average of 10% for Ideation -prize competitions. InnoCentive considers this significant metric to be a clear indication that outreach efforts were successful in reaching the target audience.

The prize competition advanced the DHS S&T mission by gaining fresh and unique ideas on how to solve a problem that DHS S&T had spent several years and millions of dollars engaging in research and development. The previous investment had been narrowly focused on one technological solution that appeared appropriate years ago. With the advances in electronics, computers, and nano-manufacturing, DHS S&T sought the perspective of both traditional and non-traditional innovators and the potential technological solutions for further research and development. The First Responders Group (FRG) also wanted to stimulate innovators and industry to consider investments for addressing this technology gap and the marketing potential if a successful solution was found. The DHS S&T FRG Next Generation First Responder APEX program is currently pursuing a program to assess the winning and non-winning solutions for further research and development.

The first place winning solution was submitted by Thomas Vreeland on behalf of the Vreeland Institute located in Copake, NY. The proposal consists of a combination of existing technologies for determining an individual's location. When combined together the technologies are capable of building a three dimensional awareness of the operational environment, the building's interior, and a responder's location in real time. The First Responder Indoor Tracking System (FRITS) solution provides a new approach consisting of MEMS sensors, dead reckoning, altimeter sensors, LIDAR odometry, sensor fusion, auxiliary sensor mapping, 3-D world building, crowdsourced navigation, filtering techniques, augmented reality, and heat maps.[67] The Vreeland Institute received a $20,000 cash prize for its first place submission.

The second place winning solution was submitted on behalf of Certa Cito, LLC of Rochester, NY by its founder and co-founder Susan and Andrew Sheppard. In their proposal, they offer a solution currently under development called JUNO™. JUNO™ is a context-spatial awareness system that incorporates an existing tracking and localization system, a Wireless Ad hoc System for Positioning (WASP), and supports context driven spatial awareness. The solution provides an overview of WASP capabilities and then explains the components of the JUNO™ system. The solver discussed each building structure case with detailed solution requirements and an overview of how JUNO™ would operate in each case. Certa Cito also provided an overview of the recommended research, development and testing path required to execute the JUNO™

[67] Odometry is the use of data from motion sensors to estimate change in position over time.

technology and a timeframe for development. Certa Cito, LLC received a $5,000 cash prize for its second place submission.

Problem Statement: The DHS S&T prize competition sought solutions to overcome a technology gap for locating first responders when environmental factors obstruct the location accuracy of currently available technologies and sensors. First responders include law enforcement, firefighters, medical, and other emergency management personnel. Locating first responders within a structure is important for resource deployment and extracting personnel if needed. The common factors that obstruct location sensors are fixed features (differences in building design and construction) and dynamic features (smoke, fire, heat, etc.).

The competition required innovators to propose technology solutions that could track a first responder in real-time while moving inside of a structure without establishing prepositioned towers or other devices. The proposed device should be wearable, self-reporting of the responder's x, y, z position, report in real time, scalable, and have the ability to be used by any first responder discipline. The technology sought could not be obstructed by differences in building structure, material (concrete, steel, and glass), height or number of stories. The prize competition was a single ideation competition that was not part of a larger portfolio or staging of prize competitions.

Solution Requirements

Prize competition solution providers were required to address four areas: building structure, location accuracy, real-time reporting, and portability. Solutions that discussed the technology's feasibility or adaptability received additional evaluation points as a part of the judging criteria. The section below, taken from the solution requirements of the prize competition statement, provides further detail of the competition's submission and judging requirements.

The three use cases, listed under (1) below, apply to this competition and, at a minimum; at least two of these must be addressed.

1. Building structure (0-30 points)
    a. Case 1 - Should be able to track multiple first responders inside of a 2-story residential structure above and below grade;
    b. Case 2 - Should be able to track multiple first responders inside of a warehouse structure with a minimal footprint of 20,000 square feet;
    c. Case 3 - Should be able to track multiple first responders inside of a multi-storied commercial building above grade and below grade.
2. Location Accuracy (0-50 points) – The solution should provide 3-dimensional positioning accuracy within a 3 meter by 3 meter by 2 meter box (X, Y, Z), where error is within 0.5 meters, 0.5 meters, and 0.25 meters, respective to dimension.
3. Real-time reporting (0-10 points) - The solution should be able to provide real-time reporting within 15 seconds of the on-scene commander and must be able to transmit omni-directional position location no less than 1500 feet from within the structure.
4. The solution should be man-portable and weigh less than 5 pounds (0-10 points).
5. Bonus Points (Maximum 50 bonus points)

a. Feasibility (Bonus worth up to 30 points) - Solvers should provide sufficient details to support the feasibility that the proposed solution can be demonstrated with further research and development in less than two years, including published or unpublished data, scientific basis, technological capability, and resources.
b. Adaptability (Bonus worth up to 20 points) - Must describe broad utility and scalability. The approach should lend itself to more than one first responder discipline, such as law enforcement, firefighting, and emergency medical services.

Proposed Goals: The primary objective of the prize competition was to find innovative solutions that could help track next generation first responders in real time while they are inside of a structure without having to set up prepositioned towers or other devices. The desired outcomes included:

1. Develop technology;
2. Solve a specific problem;
3. Find and highlight innovative ideas;
4. Advance scientific research;
5. Engage new people and communities; and
6. Inform and educate the public

This prize competition was the first conducted by DHS under the America COMPETES Act. The competition provided an opportunity to examine operational procedures and best practices collected and implemented from other Federal agencies. The prize competition permitted DHS S&T to further explore the benefits of crowdsourced problem solving and methods to engage non-traditional problem solvers that normally do not engage in government contracts.

Why a Prize: For several years, DHS S&T researched and developed multiple technological approaches to solve the problem of tracking first responders in three dimensions. DHS S&T and the research and development (R&D) community spent millions of dollars on this topic but did not fully address the technology gap. Previous solutions were partially successful, too costly to be used by the first responder community at large, and based on outdated electronics, communications, and computer technologies. The DHS S&T FRG used this prize competition to reach a diverse audience of non-traditional problem solvers to gain new and unique approaches that could be incorporated into future R&D. Additionally, the prize competition sought ideas that could be combined into a unique project for testing and evaluation.

Participants: DHS S&T utilized the prize competition tool to reach non-traditional innovators and small companies to propose low cost, state of the art solutions to the large first responder marketplace with low budgets for equipment modernization and upgrades.

Eligibility Rules

Prize competitions conducted under the America COMPETES Reauthorization Act of 2010 require solvers to meet Act eligibility requirements in order to be eligible for a prize. The eligibility section below is taken from the Federal Register Notice for this prize competition.

Solver Demographics

A total of 330 project rooms were opened by solvers on InnoCentive's public facing competition web site. A total of 64 solutions were submitted, and 58 solution proposals were accepted to the prize competition. 50 of the submissions came from across the United States.

Timeline: The prize competition opened the submission period on March 3, 2015, and stopped accepting submissions on April 2, 2015. Winners were announced May 20, 2015.

January 30, 2015	Prize Planning and Meeting Kick-Off
February 20, 2015	Planning Phase Ends: Final competition document review
February 23, 2015	Federal Register Notice Signed by Under Secretary for Science & Technology
March 3, 2015	Federal Register Notice Published. Competition posted on InnoCentive.com and Challenge.gov websites
April 3, 2015	Judging Period Begins
April 20, 2015	Judging Period Ends – top five finalists selected
April 21, 2015	Winner Verification Period Begins
June 2, 2015	Electronic Payment of Winners Confirmed

Solicitation & Outreach: On March 3, 2015, DHS S&T announced the "Where Am I, Where Is My Team?" Indoor Tracking of the Next Generation First Responder prize competition with the goal of reaching a non-traditional audience of innovators and inventors. After the official announcement was posted to the Federal Register, the prize competition was listed on Challenge.gov and the InnoCentive Prize Competition page. DHS S&T issued a press release, posted targeted web content, and launched a social media campaign to reach as much of the general public, first responder community and non-traditional innovators as possible. In addition, InnoCentive, Inc. notified their 360,000 registered solvers of the new indoor tracking prize competition through a blast email.

As a result of this targeted outreach, 330 users registered during the submission period, indicating their interest in learning more about the prize competition. In total, 64 submissions were uploaded with 6 determined ineligible by the DHS S&T Prize Competition Manager creating a final total of 58 submissions, of which 50 were from the U.S. The submission rate for this prize competition was 18%, which is significantly higher than the InnoCentive average of 10% for Ideation -prize competitions. InnoCentive considers this significant metric to be a clear indication that outreach efforts were successful in reaching the target audience.

To ensure high-quality submissions, the DHS S&T and InnoCentive teams worked diligently to ensure that the prize competition submissions met the requirements of the Federal Register Notice and contained specific criteria and use cases. By defining some of the technical requirements of the solution-without providing too many directions about how to create such a

capability-DHS S&T provided an open door to creative problem solving. This tactic was validated by the technical merits of the submissions received.

DHS S&T staff developed a comprehensive communications and outreach package and rollout schedule, which included: press releases; competition announcements; public affairs guidance; new web pages for the DHS S&T website; social media posts for the DHS S&T Twitter account; and the DHS S&T FRG Facebook page.[68] The outreach efforts are considered effective because the target audience - non-traditional innovators, small businesses - was successfully reached, as demonstrated by the first and second place prize winners.

Prize Announcement, March 3, 2015

After the Federal Register Notice, Challenge.gov post, and InnoCentive prize competition pages were made publicly available, DHS S&T announced the beginning of the prize competition submission period through multiple press releases.

Press

The DHS S&T prize competition press release was issued on Tuesday, March 3, 2015 and was further distributed via wire services Newswise and GovDelivery. The story was picked up by the following news sites:

- GNC: "DHS offers prize for indoor tracking tech"
- Homeland Security Today: "DHS S&T Launches Prize Competition for Tracking First Responders Indoors"
- Fierce Homeland Security: "DHS launches $25K prize for innovative ways to track first responders indoors during incidents"
- Federal News Radio: "Jim Grove, Prize & Small Business Office, S&T Directorate, DHS"

Web Content

The following pages were made publicly available before the press release was issued:

- DHS InnoPrize Program - Prize Competitions
- Department of Homeland Security Prize Competition 15-01
- Frequently Asked Questions: The America COMPETES Act and DHS Prize Authority

[68] The DST S&T Twitter account is located @dhsscitech and the FRG Facebook page is located at www.facebook.com/firstrespondersgroup.

In addition to the content at the start of the submission period, DHS S&T also published a blog post from the Under Secretary for Science and Technology on March 30, 2015 reminding potential solvers of the April 2, 2015 deadline and reiterating DHS S&T's efforts to attract non-traditional innovators to submit to this prize competition.

Social Media

From March 3 to April 3, 2015, the DHS S&T Twitter account posted 25 tweets with one post on the FRG Facebook page.

InnoCentive, Inc. tracked the traffic of visitors to their prize competition page. A total of 4,011 people visited the InnoCentive prize competition site. Below are the landing pages visitors came from and the number of page views per landing page.

Visitor Landing Page	Number of Page Views
Challenge.gov	565
DHS marketing	101
DHS.gov	471
InnoCentive	2759
InnoCentive marketing	72
Firstresponder.gov	43
Grand Total	**4011**

<u>Prize Competition Winners Announcement, May 20, 2015</u>

Press

The DHS S&T prize competition winner's press release was issued on Wednesday, May 20, 2015 and was further distributed via wire services Newswise and GovDelivery. The story was picked up by the following news sites:

- Homeland Security Today: "DHS S&T Announces Winners of Innovation Prize Competition for First Responder Tech"
- Government Security News: "DHS S&T announces winners of innovation prize competition"
- Fierce Homeland Security: "DHS S&T competition awards 2 companies for tech proposals to track first responders indoors"
- Rochester Business Journal: "Certa Cito takes second in Homeland Security competition"
- Fire Engineering: "Firefighting Technology Roundup: Indoor Tracker Competition Winner, Chemical Exposure Rankings, More"

Web Content

In addition to the previously mentioned pages, the press release announcing the winners and the Under Secretary for Science and Technology's blog post on the subject were publicly distributed on May 20, 2015. A secondary blog post on DHS S&T's FirstResponder.gov was publicly distributed on May 21, 2015. During the period March 3 to June 3, 2015, a total of 4, 744 web pages and blog posts were viewed from across the six DHS S&T websites containing information on this prize competition. This represents 3% of the total DHS S&T pages viewed during that period with an average viewing time of 00:02:04. Social Media DHS S&T posted three tweets from May 20-22, 2015 to announce the winners, using various graphics and the hashtags #findtheway, #prize, and #firstresponders. The FRG Facebook page also posted one announcement, linking to the press release. The following infographic depicts the DHS S&T prize competition social media presence from March 3 to May 30, 2015:

Recommended Improvements: Greater coordination with the DHS Office of Public Affairs (OPA) will help to ensure greater publicity. For this prize competition, DHS S&T did not coordinate with DHS OPA to leverage the DHS Twitter account, which has over 600,000 followers compared to the 13,400 DHS S&T followers, or the DHS Facebook page, which has over 314,000 followers compared to the 2,334 First Responders Group followers. This additional visibility could have significantly increased the public's awareness of the prize competition, led to more submissions, increased winner recognition efforts, and could have helped to stimulate private-sector investment in the winning companies. In addition to coordinating within DHS headquarters, linking to other stakeholders such as the Department of Defense, DHS Centers of Excellence, or groups like the International Association of Fire Chiefs could have helped DHS S&T reach a wider audience.

Incentives: A $25,000 cash prize purse was the only incentive for this prize competition. The first place prize was $20,000 and second place prize was $5,000. The competition was solely funded by the DHS S&T and there were no other private sector or philanthropic funds contributed.

Evaluation and Judging: In the first phase of the evaluation period, the DHS S&T Prize Competition Manager screened the initial submissions by eligibility, quality, content, and format. A total of 42 proposals were sent to 13 judges from DHS S&T, the Federal Communications Commission, the Department of Justice, and the National Geospatial-Intelligence Agency. The prize competition judges assessed the technical requirements of each submission based on the judging criteria contained in the Federal Register Notice. The 20 highest rated submissions were then reviewed collectively by the judges based on feasibility and how the solution aligned to current and future DHS S&T FRG programs and the DHS mission. The top 5 finalists' eligibility was then verified by DHS S&T and InnoCentive, Inc. with the top 2 solvers notified of their winning status on May 8, 2015.

Partnerships: DHS S&T leveraged its existing partnership with the first responder community through the First Responders Requirements Group, which consists of 150 responders from federal, state, local, tribal and territorial first responder organizations. This group was utilized to validate the initial requirement for incident commanders to track each responder during operations and their inability to do so inside buildings and underground structures using currently available technologies. This prize competition was one result of that partnership.

Resources: InnoCentive, Inc. was utilized as a third party vendor to help plan and conduct the prize competition.

The following DHS resources were utilized in the planning and conduct of the prize competition.

- DHS S&T First Responders Group, Program Manager provided overall planning and support of the prize competition.
- DHS S&T First Responders Group, Communications Outreach and Responder Engagement (CORE) planned and conducted public affairs and communications plan, public affairs announcements, Twitter chat, Facebook update.
- DHS Office of Corporate Communications developed support material and approval for all public affairs announcements, supported a public facing website for the prize competition, and addressed inquiries from the public.
- DHS S&T General Counsel provided legal review and support to the planning and execution process.
- DHS S&T Prize and Small Business Innovation Office provided prize competition planning oversight and interaction with the contractor.
- DHS, DHS S&T, FCC, DOJ, and NGA provided judging support.

Prize Accounting	
Category	**Cost**
Estimated Government Personnel Labor & Source	
Public Affairs, Communications, and Solver Community Outreach	$14,854.47
Finance	$630.63
Judging	$17,560.29
Leadership/Management Support	$2,806.35
APEX Program Management and Support	$28,487.18
S&T Prize and Small Business Innovation Office Management and Support	$27,086.69
First Responder Program Funds to Support the Competition	
Prize Contractor	$27,493.67
Prize Purse	$25,000.00
Invitational Travel Funds for Judges	$2,712.58
TOTAL	**$146,631.85**

Results: The prize competition advanced the DHS S&T mission by gaining fresh and unique ideas on how to solve a problem that DHS S&T had spent several years and millions of dollars in research and development trying to address. The previous investment had been narrowly focused on one technological solution that appeared appropriate years ago. With the advances in electronics, computers, and nano-manufacturing, DHS S&T sought the perspective of both traditional and non-traditional innovators and the potential technological solutions for further research and development. The FRG also wanted to stimulate innovators and industry to consider investments for addressing this technology gap and the marketing potential if a successful solution was found. The DHS S&T FRG Next Generation First Responder APEX program is currently pursuing a program to assess the winning and non-winning solutions for further research and development.

- 1st place winner: Vreeland Institute's "First Responder Indoor Tracking System (FRITS)"

The first place winning solution was submitted by Thomas Vreeland on behalf of the Vreeland Institute located in Copake, NY. The proposal consists of a combination of existing technologies for determining an individual's location. When combined together the technologies are capable of building a three dimensional awareness of the operational environment, the building's interior, and a responder's location in real time. The First Responder Indoor Tracking System (FRITS) solution provides a new approach consisting of MEMS sensors, dead reckoning, altimeter sensors, LIDAR odometry, sensor fusion, auxiliary sensor mapping, 3-D world building, crowdsourced navigation, filtering techniques, augmented reality, and heat maps. The Vreeland Institute received a $20,000 cash prize for its first place submission.

- 2nd place winner: Certa Cito, LLC's "JUNO™ Tracking and Context-Spatial Awareness System"

The second place winning solution was submitted on behalf of Certa Cito, LLC of Rochester, NY by its founder and co-founder Susan and Andrew Sheppard. In their proposal, they offer a solution to a tracking system currently under development called JUNO™. JUNO™ is a context-spatial awareness system that incorporates an existing tracking and localization system, a Wireless Ad hoc System for Positioning (WASP), and supports context driven spatial awareness. The solution provides an overview of WASP capabilities and then explains the components of the JUNO™ system. The solver discussed each building structure case with detailed solution requirements and an overview of how JUNO™ would operate in each case. Certa Cito also provided an overview of the recommended research, development and testing path required to execute the JUNO™ technology and a timeframe for development. Certa Cito, LLC received a $5,000 cash prize for its second place submission.

I. Department of Housing and Urban Development

a. Second Annual Innovation in Affordable Housing Competition[69]

Summary: The Second Annual HUD Innovation in Affordable Housing Student Design and Planning Competition (IAH) challenges multi-disciplinary, graduate student teams to respond to a real life affordable housing design and planning issue. HUD partners with a public housing authority (PHA) to identify a PHA site that needs redevelopment and students from architecture, planning, business, and real estate submit proposals as to how to redevelop the site and meet the needs of the community.

For the 2015 competition, HUD partnered with the Houma-Terrebonne Housing Authority (HTHA), in Houma, Louisiana. The total cash prize for IAH 2015 was $30,000. A prize of $20,000 was awarded to the winner and $10,000 awarded to the runner-up.

Solution Type: Ideas; Business plan; Creative (design & multimedia)

Primary Goals: Build capacity; Solve a specific problem; Find and highlight innovative ideas

Results: A total of 35 submissions were received and jurors selected four finalists. On April 21, 2015, the four finalist teams presented their ideas in front of a panel of jurors at HUD's headquarters in Washington, D.C.

The runner-up team, which received a $10,000 prize, was the team from UCLA, which designed a gut rehabilitation of the existing Bayou Towers structure with an emphasis on energy efficiency coupled with strong healthcare partnerships. The jurors felt the team demonstrated a deep understanding of the senior population and its needs. The team also emphasized reuse of materials and designed an innovative modular façade.

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[69] http://www.huduser.gov/portal/challenge/past_competitions.html; the first annual competition was described in the FY 2014 COMPETES report, starting on page 148.

New York University took home the grand prize of $20,000. The team employed a sophisticated design that minimized the bulk of the building in response to the local context. The team also received very high marks for its innovative financing scheme that included adopting a mixed-use strategy to create economic development and positive community-wide impact.

Problem Statement: The need for quality, affordable housing has never been greater. At its best, housing can help strengthen the social and physical fabric of communities and neighborhoods. It is the hope of HUD's Office of Policy Development and Research (PD&R) that by initiating and funding this competition, a new generation will advance the design and production of livable and sustainable housing for low- and moderate-income people through research and innovation.

PD&R worked with the Office of Public and Indian Housing to issue a call for interested public housing authorities (PHAs). The PHAs were evaluated on a first-come, first-serve basis. For the 2015 competition, HUD partnered with the Houma-Terrebonne Housing Authority (HTHA), in Houma, Louisiana.

The HTHA provided a site for the participants' redevelopment proposals. The site held an eleven-story senior housing facility containing 300 dwelling units. This existing building was first occupied in 1971. Although structurally sound, the development was approaching physical obsolescence and was in need of significant upgrade or replacement. The operational and energy costs were very high due to the lack of insulation and outdated glazing systems. Mechanical systems were mostly original and, as such, were nearing the end of anticipated useful life. The HTHA envisioned an exemplary project which demonstrated sustainability, efficiency, durability, and resiliency to the highest order, while simultaneously meeting the physical and social needs of the senior occupants.

The competition ran in two phases:

Phase I: In Phase I, multi-disciplinary teams of graduate students submitted their first round electronic proposals. A schematic design level site plan as well as a schematic floor plan, section and building massing were required. The evaluation criteria emphasized understanding of and provision for community services, planning context (including zoning), and economic considerations related to affordable housing development (including financing, first cost, maintenance and operation, rental subsidies, etc.), as well as design. The submissions were to include a narrative of two to three pages and four electronic slides showcasing the design. The panel of jurors evaluated all submissions in February 2015 and chose four finalist teams to move on to Phase II of the competition.

Phase II: In Phase II, finalists were challenged to further refine their solutions, incorporate more detail, develop floor plans, and analyses (economic, energy, etc.). The finalists traveled to the site for a walk-thru and meeting with HTHA staff. The teams had the opportunity to hear from representatives from HUD headquarters, HUD's New Orleans Field Office, the Terrebonne Parish Consolidated Government, Terrebonne Council on Aging, and the Golden Agers Resident Council. In the afternoon, the group was taken on a two-hour tour of the City of Houma, stopping at various new and planned housing developments, a senior center, and local sites.

Wrapping up the day, competitors were guided through an extensive tour of the existing building, led by the Bayou Towers' Asset Manager and Maintenance Supervisor, which included viewing several apartments as well as the mechanical rooms. The trip provided significant insight into the community, the population served, and the challenges to be met.

The final jury and award ceremony was held on April 21, 2015, at HUD headquarters in Washington, D.C. Student finalist teams prepared short presentations and two design boards. They presented their final project ideas and designs in front of a live audience, a webcast audience, and the panel of jurors. After all the finalists presented, the jurors deliberated, and the winners were announced.

Proposed Goals: While aiding the HTHA, the competition also aimed to encourage research and innovation in quality affordable housing design that strengthens the social and physical fabric of low- and moderate-income communities and neighborhoods, raise practitioner and future practitioner capacity to produce more livable and sustainable housing for low- and moderate-income people through disseminating best practices, and foster cross-cutting teamwork within the design and community development process.

Why a Prize: A prize competition was necessary in order to incentivize graduate students to participate and garner nationwide interest and excitement. It was deemed the best way to reach the intended audience of participants, as contracts are not an appropriate vehicle for soliciting student work.

Participants: The participants were graduate students from a wide range of disciplines. Each team had to include three to five students and at least one had to be from a non-design background. Examples of eligible disciplines include architecture, urban planning, law, public policy, business, finance, real estate, and engineering. In order to be eligible to participate in the competition each student must be enrolled in a graduate degree program from an accredited educational institution in the United States. For the 2015 competition, students also had to be citizens or permanent residents of the United States.

Timeline: The registration opened on October 17, 2014 and the deadline for teams to submit Phase I proposals was February 9, 2015. Finalists were announced on February 20, 2015 and Phase II winners were announced on April 21, 2015.

10-17-2014 Registration opened
11-12-2014 Competition launch; problem and criteria released
12-18-2014 Deadline for teams to register
12-19-2014 Phase I questions released (site and housing authority information)
02-09-2015 Deadline for teams to submit Phase I
02-20-2015 Finalists announced; Phase II information released
03-18-2015 Site visit for finalists
04-21-2015 Final jury presentations; winners announced in Washington, D.C.

Solicitation & Outreach: A webpage dedicated to the competition was created on HUDuser.gov. An initial announcement of the competition was sent to PD&R's listserv as well as those who

requested to receive information on last year's competition. Recipients could sign up on the webpage to receive further competition updates. Throughout the recruitment phase, information was sent to these self-selected individuals. HUD also hired a contractor to help with the competition and aid in solicitation and outreach. The contractor researched contacts at architecture and urban planning graduate schools and sent them the electronic information as well as posters to hang up in the school. Twitter, Facebook, and LinkedIn accounts of both HUD and the contractor were used to reach out to students and keep them informed of competition developments as well.

A blog was posted on the HUDdle (www.blog.hud.gov) to keep the general public and the potential student participants informed. An announcement was also posted on Planetizen.

Incentives: The total cash prize for IAH 2015 was $30,000. A prize of $20,000 was awarded to the winner and $10,000 awarded to the runner-up.

Non-monetary incentives were also used to motivate participants. Finalists were invited to travel to Washington, D.C. (two members of each team received travel funds) and to present in front of a jury panel of esteemed experts in the fields of architecture, affordable housing, and community development. This was an excellent opportunity for graduate students that they may have put on their résumé as they entered the job market.

All prize money and travel expenses were paid out of the contracted obligations from PD&R's Research and Technology funds.

Evaluation and Judging: HUD recruited a jury of five non-federal employee experts in the fields of architecture, affordable housing, and community development. The jury was asked to evaluate the proposals on three main factors: environmental, financial, and social. Each main factor contained seven to eight sub factors. The jurors were also encouraged to look for innovation throughout the proposal.

Partnerships: HUD had a formal partnership with the Houma-Terrebonne Housing Authority (HTHA), a public housing authority. HTHA provided the competition site in Houma, Louisiana, upon which the second year of the competition was based. They provided staff time and original design drawings of the site during the planning phase, as well as additional staff time during the site visit.

Resources: HUD contracted with Steven Winter Associates (SWA) for assistance in executing the competition. SWA provided assistance and technical expertise in all areas of the competition. Their contract was funded through FY 2014 Research and Technology funds.

Results: On April 21, 2015, the four finalist teams presented their ideas in front of a panel of jurors at HUD's headquarters in Washington, DC. HUD staff members and interested members of the public attended the event, with many others nationwide viewing it via webcast. Each student team devoted 20 minutes to its presentation and then spent 10 minutes answering questions from the jury.

All of the student finalists submitted innovative and intelligent plans for the project site, making the jurors' task of choosing a winner and a runner-up a difficult one.

The runner-up team, which received a $10,000 prize, was the team from UCLA, which designed a gut rehabilitation of the existing Bayou Towers structure with an emphasis on energy efficiency coupled with strong healthcare partnerships. The jurors felt the team demonstrated a deep understanding of the senior population and its needs. The team also emphasized reuse of materials and designed an innovative modular façade.

New York University took home the grand prize of $20,000. The team employed a sophisticated design that minimized the bulk of the building in response to the local context. The team also received very high marks for its innovative financing scheme that included adopting a mixed-use strategy to create economic development and positive community-wide impact.

J. Department of the Interior

a. USBR New Concepts for Remote Fish Detection[70]

Summary: The prize competition sought ideas for new or better ways to reliably track fish throughout their life-cycle. The ability to track fish is central to efforts to recover threatened and endangered fish species and reduce impacts to at-risk species. Reliable, affordable detection and tracking provides vital information about how many fish are present, where and why mortality occurs, and where and why species thrive. This information enables fish recovery program managers to pursue targeted and more effective actions that can reduce mortality rates, improve habitat, and increase survival rates while continuing to meet the Bureau of Reclamation's mission of delivering water and power to customers and stakeholders. New fish tracking capabilities can also reduce costs and increase the effectiveness and efficiency of various fish recovery efforts led by other federal, state, and local organizations.

Current methods to track fish rely on capture and handling of fish to implant or attach tags that can be complex, costly, and stressful to the fish. Current tagging technologies also have longevity and detection capability shortcomings, which limit the data interpretation needed to inform fish recovery actions.

The world-wide public and private sectors were allowed to submit ideas. However, to comply with the Federal law used that authorizes prize competition (15 USC 3719), only United States citizens, permanent residents, or incorporated entities are eligible to win a prize. The eligibility restrictions to win a prize are stated in the rules of the competition.

InnoCentive supported the implementation of this prize competition and a total prize purse of $20,000 was offered.

Solution Type: Ideas

[70] https://www.challenge.gov/challenge/new-concepts-for-remote-fish-detection/

Primary Goals: Solve a specific problem; Improve government service delivery; Find and highlight innovative ideas; Engage new people and communities

Results: The competition received 22 submissions, awarded monetary prizes to 4 submissions, and recognized 2 submissions from foreign citizens for their merit. The foreign citizens are not eligible to win a prize in accordance with the American COMPETES Reauthorization Act of 2010.

A theme common to five of the six top ranked submissions is to use piezoelectric energy harvesting to power tracking tags attached to individual fish. Piezoelectric energy harvesting uses the swimming movement of the fish to self-power the energy needed by the tracking tag. Other submissions identified innovative or novel new approaches to track fish, but were considered more difficult or unlikely to transform into practice at this time.

The 1st place submission was awarded $11,500 for their comprehensive proposal on how to make, install, and monitor a piezoelectric tracking tag. Their proposal addressed all the technical requirements stated in the prize competition. The submission that ranked second showed how to make a fiber optic laser sensor hydrophone to better detect fish tag transmissions underwater. A $3,500 third place award and 2 honorable mentions were awarded $2,500 to alternative designs for a piezoelectric tracking tag. The 2nd place submission and an additional honorable mention submission for a piezoelectric energy tag were not issued a monetary prizes because they were not US citizens or permanent residents, as required under the law.

Reclamation's next step is to develop a plan to further test, develop, and demonstrate the effectiveness of the best ideas received. If any ideas are proven to be effective in the field, Reclamation will need to facilitate a public-private partnership to transform such technologies into manufactured supplied products.

Problem Statement: The prize competition sought new or better ways to track fish in order to improve the effectiveness of efforts to recover threatened and endangered fish species. The competition only requested white paper submission of ideas.

Proposed Goals: The competition had four goals that are listed below in priority order.

- Solve a specific problem
- Improve government service delivery
- Find and highlight innovative ideas
- Engage new people and communities

Why a Prize: A solution is being pursued through a prize competition because Reclamation and the collaborating Federal agencies view it beneficial to seek innovative solutions from those beyond the usual sources of potential solvers and experts that commonly work in the fish recovery management domain. The organizers often wonder if somebody somewhere may know

a better way of tracking and monitoring fish for the agency's purposes than the methods currently used. The prize competition approach reached a new source of potential solvers to generate new and timely solutions that would not likely be accomplished by standard contractual methods.

Participants: The agency sought good ideas from people regardless of their age, background, experience, or location. Participant eligibility requirements are consistent with the Prize Competition authorities included in the America COMPETES Reauthorization Act of 2010 (15 USC 3719).

InnoCentive, the prize competition services contractor, administered this competition on the agency's behalf. As such, the identity of only the winning solvers is revealed to the Bureau of Reclamation and judges after the judging process is complete. The competition received 22 submissions and awarded monetary prizes to 4 submissions and recognized 2 submissions for their merit. The two submissions were only recognized for merit and not issued a monetary prize because they were submitted by foreign citizens who are not eligible to win a prize under the America COMPETES Reauthorization Act of 2010.

Winning participants were highly educated experts from other technical domains that are currently practicing or retired. Technical domains included electrical engineering, biomedical engineering, physics, geophysics, and telecommunications. One participant said: *"I have to tell you that before the challenge I didn't know that much about the current state of fish tagging – it turned out to be a fascinating topic, with some surprising parallels to the technology of mobile phones. It also gave me an excuse to spend a day at the New England Aquarium, watching fish swim."*

Timeline: The submission period began on July 27, 2015, and ended on August 26, 2015. The judging period ended on October 26, 2015 and the winners were announced by November 9, 2015.

Solicitation & Outreach: In addition to posting the competition on Challenge.gov and the Federal Register, the agency relied heavily on using contracting services to reach curated communities of potential solvers. The curated communities utilized are the online InnoCentive Challenge Center, the Scientific American Citizen Science Center, and the Nature Open Innovation Pavilion. An agency press release was issued and various social media messaging capabilities were used. The organizers believe that with more deliberate efforts and time allocated to outreach, it could be more effective and strategic in reaching a broader potential solver community, including universities.

Incentives: Reclamation guaranteed to pay a total monetary prize purse of $20,000 to the best idea(s) in exchange for all solvers agreeing to grant a perpetual, no-cost, right-to-use license to the Federal government to use their idea regardless if they are selected as a winner. Reclamation also guaranteed that one award would be no smaller than $5,000 and no award would be smaller than $2,500.

Evaluation and Judging: A team of eight subject matter experts from collaborating Federal agencies judged the submissions. All judges independently evaluated all 22 submissions against the technical criteria stated in the prize competition. A final judges meeting allowed all judges to discuss their findings and develop a consensus selection of the winning submissions. The posted judging criteria are:

1. The best device/method/technique would be able to:

- Be used for freshwater fish as small as 4 inches in total length (if a physical tag is used, it must be less than 5 percent of the fish's body weight).
- Detect and identify individual fish from a minimum of 30 feet away from detector device throughout the entire water column (up to 30 feet in depth or laterally).
- Detect and identify rapidly moving individual fish with detection efficiency greater than 95 percent, even when in a school or assemblage of like or different species that may or may not be similarly tagged or marked.
- Be used on a large scale (e.g., if tags are used, should be able to tag more than 1,000 fish/day using two people) and scalable to use in a field setting where fish would be marked after capture from rafts, small boats, or from banks of water bodies in remote field locations.
- Reduce capturing or handling of fish to an original marking or tagging event.

2. The system should not modify the behavior, physiology, genetic, phenotypic, growth, survival, or edibility of the fish of interest, or other fish and aquatic animals near the fish of interest.

3. Detection devices should not be susceptible to normal electromagnetic interference, which would include overhead power lines, turbine motors such as those found at dams, water pumps, outboard and inboard motors, transformers, etc.

4. The method must have performance characteristics as good as or better than existing 12-mm existing passive, active acoustic, and radio tags. These performance characteristics are:

- Shedding rates are less than 5 percent.
- Capable of being dropped from a height of 4 feet and submersible to a water depth over 300 feet without damage.
- Longevity should be greater than 10 years under in- service conditions.

The following are not required to win an award but would be "nice to have":

1. The detection device should be portable (i.e. less than 50 pounds) and capable of being operated by one person.

2. Detection devices should not be susceptible to any electromagnetic interference.

3. If tags are used (one device per fish), they should be capable of mass production to meet demand at a reasonable cost and show promise for future miniaturization.

4. The method is capable of successfully identifying individual fish in both freshwater and seawater.

5. The method is capable of detecting and identifying individual fish from a minimum of 100 feet away from the detector device throughout the entire water column (up to 100 feet in depth or laterally).

6. The solution is capable of identifying fish as small as 2 inches in total length, and if a physical tag is used, it should be no more than 2 percent of the fish's body weight.

Partnerships: Reclamation sponsored the competition, but received significant in-kind service contributions from subject matter experts with the USGS, NOAA-National Marine Fisheries Service, and USACE. These other Federal agencies also have a strong stake in fish tracking technologies and fish recovery programs. Federal collaboration enables agencies to leverage Federal capabilities, catalyze interagency working relationships, better define and solve joint problems, avoid duplication, and find solutions that have a broader impact across the mission of multiple Federal agencies, the stakeholders USBR collectively serves, and overall public good.

Resources; Appropriations to Reclamation's Science and Technology Program specific to prize competitions funded the prize competition. Agency staff involved in the design and conduct of the competition included program managers, fish biologists, engineers, accountants, attorneys, and public affairs specialists. Prize competition contracting services from InnoCentive provided prize competition design, outreach, and administration services.

Results: The competition received 22 submissions, awarded monetary prizes to 4 submissions, and recognized 2 submissions from foreign citizens for their merit. The foreign citizens are not eligible to win a prize in accordance with the American COMPETES Reauthorization Act of 2010.

A theme common to five of the six top ranked submissions is to use piezoelectric energy harvesting to power tracking tags attached to individual fish. Piezoelectric energy harvesting uses the swimming movement of the fish to self-power the energy needed by the tracking tag. Tags are currently powered by batteries that have a short life-span, have limited signal transmission distances, and require repeated recapture of fish to change batteries or to scan the tagged fish with a signal receiver. Piezoelectric powered tags might be able to overcome both of these limitations and reduce the need to recapture tagged fish. Other submissions identified innovative or novel new approaches to track fish, but were considered more difficult or unlikely to transform into practice at this time.

The first place submission was awarded $11,500 for their comprehensive proposal on how to make, install, and monitor a piezoelectric tracking tag. Their proposal addressed all the technical requirements stated in the prize competition. The submission that ranked second showed how to make a fiber optic laser sensor hydrophone to better detect fish tag transmissions underwater. A $3,500 third place award and 2 honorable mentions were awarded $2,500 to alternative designs for a piezoelectric tracking tag. The 2nd place submission and an additional honorable mention

submission for a piezoelectric energy tag were not issued a monetary prize because they were submitted by foreign citizens who are not eligible to win a prize under the America COMPETES Reauthorization Act of 2010.

USBR's next step is to develop a plan to further test, develop, and demonstrate the effectiveness of the best ideas organizers received. If any ideas are proven to be effective in the field, USBR will need to facilitate a public-private partnership to transform such technologies into manufactured supplied products.

K. Department of Justice

a. NIC Green Corrections Challenge[71]

Summary: The Green Corrections Challenge consisted of three interwoven activities, presentations, a symposium, and innovation webinars. The program sought to bring together agencies, stakeholders, and thought leaders to share green practices, identify and solve implementation challenges, and help promote new and effective green practices both within and outside of the correctional environment. The challenge also sought to lay the foundation for future green corrections work, developing a strong community of practitioners and driving innovation through competition in the field.

The range of activities and ways to participate stimulated interest and implementation of green corrections practices, unlike previous iterations of green corrections programs. Each activity was divided into four categories: facilities, education and training, reentry, and new corrections concepts. Three of these categories (facilities, education and training, and reentry) align directly with the NIC publication The Greening of Corrections: Creating a Sustainable System. The fourth category, "new corrections concepts," was used to describe programs that had integrated the other categories in a strategic and/or systematic way.

Winners of the Green Corrections Challenge received the opportunity to present their ideas and programs in a live national webinar (Green Correction Innovation Webinars) hosted by the National Institute of Corrections. Each winner also received national recognition through a certificate of award that was shared among the entry team members.

Solution Type: Ideas

Primary Goals: Improve government service delivery; Solve a specific problem; Advance scientific research; Inform and educate the public; Engage new people and communities; Build capacity; Develop technology; Stimulate a market

Results: The Green Corrections Challenge engaged participants unlike previous iterations of NIC-supported green corrections programming. In the past, a small number of senior state

[71] http://www.nicic.gov/green-correctionschallenge; this challenge was described in the FY 2014 COMPETES report, starting on page 166.

corrections officials were engaged. The Challenge got a broader group of people involved, including city, county, state, and federal corrections staff in a range of roles in a variety of activities. Partner organizations, such as architectural firms, other federal agencies, and community-based nonprofit organizations also played a more prevalent role in the program than previous NIC-supported green corrections programs.

The three interwoven activities allowed individuals to participate in a variety of ways. The Presentation Challenge asked individuals to lead by creating a presentation about their programs, and received 21 entries. Entries were from Federal/state/local correctional agencies and community corrections agencies. A number of sectors, such as nonprofits, education, and energy, partnered with these agencies, which was a requirement of the competition.

After the presentations were submitted, the Symposium engaged individuals in person and asked them to actively solve obstacles related to implementing green corrections programs; the 5 winners by category were announced at the symposium. Four Innovation Webinars featuring five Presentation Challenge winners were held monthly between January and April of 2015. The Innovation Webinars allowed participants to learn about NIC-supported green corrections programming and go in depth about the winning presentations. Individuals engaged in the program were mostly new to NIC-supported green programming.

Problem Statement: The National Institute of Corrections (NIC) first formally supported green corrections work in 2010 through the development of The Greening of Corrections: Creating a Sustainable System.[72] This guide was published in early 2011 and has served as the foundation for all green corrections programming supported by NIC thereafter.

The Greening of Corrections: Creating a Sustainable System established four elements framing holistic green corrections programming. These elements are:

- Greening of Correctional Facilities – Developing self-sufficient facilities that consider energy use and efficiency, water and waste management, recycling programs and other facilities management that reduce the negative environmental effect of correctional facilities (and potentially reduce costs).
- Educating and Training Inmates – Developing or adapting education and training programs that provide offenders with the relevant skills, competencies, and credentials to support a continuum of learning opportunities during a transition to a greener economy.
- Correctional Industries – Adapting existing correctional industry sustainability efforts ranging from creating core business strategies for sustainable production processes and practices to developing new strategic partnerships, producing and distributing environmentally friendly products and services, and preparing offenders for the most relevant skills for the emerging green economy.

[72] This guide can be accessed at http://nicic.gov/go/greening-of-corrections.

- Green Reentry Programs – Highlighting reentry programs that are being reconfigured to integrate new green skills and competencies or creating new programs driven by an increase in demand for green goods and services.

While each of the elements may be a primary focus, they fit together to make a whole system. NIC-supported green corrections programming after The Greening of Corrections focused on dissemination of the guide through a series of events and activities including a satellite broadcast, radio interviews, and magazine articles.

NIC also supported technical assistance to three states (Maryland, Minnesota, and Washington) to implement programs through strategic action planning sessions. The three states selected for technical assistance also served as the foundation for a green corrections community of practice (COP). Members collaborate to exchange ideas, program information, and promising practices related to sustainable correctional facilities, green education, and training programs. As a result of the green corrections technical assistance projects, the Green Corrections Challenge was created as an opportunity to engage a larger number of states and stakeholders in active discussion about green corrections programming.

Proposed Goals: The goals of the challenge were threefold: (1) soliciting creative ideas about how green programs could be implemented in corrections, (2) demonstrating for stakeholders how green programs could be implemented with success, and (3) spurring conversation throughout the field of corrections about the many benefits of pursuing green corrections programming in their own area.

Additional goals included the following:

1. Improving government service delivery by means of technical assistance. The challenge helped us to identify and understand the areas where additional service is needed. DOJ can now be more strategic in the technical assistance provided to help jurisdictions start or improve their own green corrections programs.
2. Solving the specific problem of how to make correctional facilities more environmentally friendly. As microcosms of the larger communities in which they are located, jails and prisons experience the same challenges with energy usage, waste reduction, and workforce development that cities, states, and individual households experience every day. The challenge was a way to find green solutions appropriate for correctional environments.
3. Advancing scientific research in the study of green corrections. Environmental studies is a relatively new topic for the population at large, and it is especially new to the field of corrections. Research suggests that green environments can have positive effects on the people who live and work in those areas. By requiring that all submissions be supported by data attesting to the efficacy of programs, DOJ has laid the foundation for that research in future initiatives.
4. Inform and educate the public about the role of corrections as a partner in their communities. More than just the place where justice-involved individuals serve their sentences or await trial, correctional facilities are places of learning, rehabilitation, and

public service. They are good stewards of the communities they serve in many ways, including through their conscious environmental efforts.

5. Engage new people and communities by soliciting ideas from all business sectors and encouraging their partnership with corrections as a requirement for entry into the challenge. In this way, diverse stakeholders are encouraged to learn more and interact with this sector of the criminal justice system.
6. Build capacity among correctional staff of those who are aware of and have the knowledge to implement a green corrections program successfully. It is NIC's hope that these training programs empower corrections staff to learn the skills they need to engage in this type of work and then apply their skills in the workplace.
7. Develop technology and stimulate a market for business and government capabilities in green corrections. The technology and security needs of correctional facilities are necessarily unique, and through the challenge, organizers have been able to highlight the need for the development of specialized programs (and tools) that will address these needs.

Why a Prize: Following the award of cooperative agreements associated with green corrections in the past, the National Institute of Corrections awarded a prize through a Federal challenge because it was the most appropriate and cost effective method available for meeting a number of its goals (soliciting creative ideas, demonstrating implementation success for stakeholders, and spurring conversation about green corrections throughout the field of corrections). The challenge prize is non-monetary, thus achieving maximum returns in the way of participation and stakeholder interest with minimal financial investment.

Participants: Submissions were accepted from stakeholders from a variety of fields. The only requirement was that they also be sponsored by a correctional facility to participate. The challenge was conducted in this manner to account for the operational and security needs specific to corrections. The organizers anticipated that ideas that might jeopardize public safety or the welfare of correctional staff and inmates would be filtered out by having this requirement. Thus, students, volunteers, community organizations, or families with a loved one involved in the criminal justice system were all eligible with sponsorship from a jail, prison, or community corrections facility, which could have included day reporting centers, halfway houses, juvenile detention centers, and more. As a result, the challenge received entries from a broad range of sectors, including nonprofits, education, and energy.

Timeline: The challenge launched and began accepting entries April 1, 2014. The winning entry webinars were held monthly beginning in January 2015. In all, key milestones of the challenge included the following:
Promotion: April 2014 to October 2014
Entries accepted: April 1, 2014 to November 3, 2014
Judging: November 2014
Announcement of award (via Thought Leader Symposium event): November 21, 2014
Innovation webinars: January 2015 to April 2015

Solicitation & Outreach: Publicizing the prize competition successfully relied on the outreach of a network of partners and stakeholders with interests that aligned with the objectives of the

challenge. These partners shared print materials, e-mail messages, blog and forum posts, and presentation slides with their respective audiences. The National Institute of Corrections also submitted articles for publishing to trade and association journals in the field of corrections.

Upon award of the challenge in fiscal year 2015, outreach and marketing of the challenge extended to the promotion of Innovation Webinars (the award incentive for entering the challenge).

Incentives: Winners of the Green Corrections Challenge received the opportunity to present their ideas and programs in a live national webinar (Green Correction Innovation Webinars) hosted by the National Institute of Corrections. Each winner also received national recognition through a certificate of award that was shared among the entry team members.

Evaluation and Judging: The Green Corrections Challenge encouraged submission of creative presentations from state, county, and city departments of corrections and correctional facilities, including correctional contractors, and appropriate partners such as nonprofit organizations, faith-based organizations and probation and parole offices. Presentations were asked to (1) focus on innovative practices and how those practices could be replicated elsewhere and (2) highlight at least one innovative strategy.

Basic Criteria, Categories, and Winner Recognition

Presentations were judged/evaluated on the following criteria:

- Overall innovation of program or practice.
- Ability to describe an innovative program or practice.
- Ability to demonstrate success of program or practice through measurable outcomes.
- Creativity and originality.

Judging

Judging for the challenge consisted of an initial screening of all submissions to determine the eligibility of each Contest participant. There were four volunteer judging panels—one for each of the four challenge categories (reentry programs, facilities management/complex operations, training, and other innovation). Each judging panel comprised three to five volunteer judges chosen from federal agencies involved in green activities, national nonprofit stakeholders, and/or industry. Each judge was screened to ensure he or she did not have a familial relationship or a personal or financial interest in any contest participant.

Winners were selected based on an overall score against the stated criteria. All judging was at the sole discretion of NIC and all decisions were final. In the event of a tie, the Winner was selected at the discretion of NIC. In the category of Correctional Facilities where a tie did occur, NIC awarded both entries with recognition.

Partnerships: Strategic partnerships were essential to the challenge due to partners' abilities to engage external stakeholders and enhance communications. A variety of government, nonprofit, and corporate organizations participated, including the U.S. Department of Energy and the U.S. Department of Education, whose staff assisted in judging the challenge; the Correctional Education Association, U.S. Green Building Council, Center for Law and Social Policy, and The Corps Network, which represents key stakeholders; and one private architecture firm. The partnerships are most successful because the roles and responsibilities for each partner were clearly defined from the start and were respected throughout the project.

Resources: The Green Corrections Challenge was allotted with a budget of approximately $40,000 to facilitate all activities, which included Challenge Presentations, a national Symposium, and a series of Innovation Webinars. The program relied heavily on donated resources from community partners and federal agencies. These organizations volunteered significant time through their involvement in challenge judging, promotion, and symposium participation.
In partnership with NIC staff and FHI 360, the challenge included an aggressive low-budget outreach program consisting primarily of e-mail and content marketing. NIC editorial staff contributed to the design of the challenge website and the publishing and distribution of articles and blogs to key audiences, while NIC subject matter experts shared information through live presentations and the leveraging of an existing green corrections network. Challenge partners also contributed to the spread of information through word-of-mouth activities.

Partnership with FHI 360 was instrumental in the gathering and coordination of volunteer efforts for the challenge. Significant resources were applied to the survey of potential partners who could participate in the challenge, facilities for hosting the symposium, and time for coordinating the efforts of judges, speakers, challenge entries, and webinar presentations.

Results:

Overall Program Engagement

The Green Corrections Challenge engaged participants unlike previous iterations of NIC-supported green corrections programming. In the past, a small number of senior state corrections officials were engaged. The Challenge got a broader group of people involved, including city, county, state, and federal corrections staff in a range of roles in a variety of activities. Partner organizations, such as architectural firms, other federal agencies, and community-based nonprofit organizations also played a more prevalent role in the program than previous NIC-supported green corrections programs.

The three interwoven activities allowed individuals to participate in a variety of ways. The Presentation Challenge asked individuals to lead by creating a presentation about their programs. The Symposium engaged individuals in person and asked them to actively solve obstacles related to implementing green corrections programs. The Innovation Webinars allowed a wide range of individuals to learn about green corrections programming from the comfort of their own work space. Individuals engaged in the program were mostly new to NIC-supported green programming.

Presentation Challenge Overview

The Presentation Challenge, a presentation contest for city, county, state, and federal correctional entities and their partners to present their innovative practices, garnered entries from across the country and provided a snapshot of green practices in the summer of 2014. There were 21 entries from 13 states. Winners were featured in the Innovation Webinars held in 2015.
Presentation Challenge winners, by category, were:

- Correctional Facilities (tie)

Federal Correctional Complex (FCC) Victorville, Federal Bureau of Prisons (California), "Putting our Trash on Lockdown." FCC Victorville described how they implemented a program to reduce solid waste by 75 percent over a five-year period. This included the development of an in-house waste sorting facility for recycling and a composting program. Waste sold to recycling vendors provides revenue to sustain the program.
Franklin County Sheriff's Office (Ohio), "Green Taskforce." The Sheriff's Office described how a taskforce worked closely to identify areas to reduce water consumption, energy use, and solid waste entering the landfill. The taskforce has been particularly successful by leveraging partnerships with local nonprofits such as Goodwill and an animal shelter.

- Education and Training

Delaware Department of Corrections, Sussex Community Corrections Center (Sussex SCCC), "Striving to Make a Difference in Sunny Sussex County." Sussex SCCC described how inmates learned hands-on skills while contributing to a variety of center activities. These activities include raising bees and producing honey, practicing aquaculture, and growing native grasses for beach restoration, among other activities.

- Reentry

Wisconsin Department of Corrections, "The Grow Academy." The Wisconsin DOC described how The Grow Academy provides youth with basic work skills in organic farming and food production. The Grow Academy also hosts a bakery where young adults use materials from the farm and learn skills to work in the food industry. Youth participants have internships, spend time doing community service projects, and receive assistance for job placement and other supports upon reentry.

- New Corrections Concepts

Indiana Department of Corrections, "Branchville for the Green and Giving Back." Branchville described how their green programs are integrated, supporting facility operations, inmates' education and training, and helping the community. Inmates can earn a state-recognized work-readiness certificate while working in the energy-efficient laundry facility, building cabins for the state parks, and donating to local nonprofits. These activities strengthen offenders' commitment to their communities and reduce anti-social behaviors that contribute to recidivism. By developing these presentations, participants reported that working with colleagues to describe and catalogue their green practices helped strengthen their institutions' vision for green corrections.

Presentation Challenge entries were catalogued and compared to observations and findings from The Greening of Corrections: Creating a Sustainable System. In the four years since the publication was released there have been significant changes in the field of green corrections.

Green corrections programs have become more sophisticated.

Four years ago, few states and entities were implementing holistic green programing. Many facilities assessed waste, water, waste water, and energy conservation programs in isolated ways. Today, the Presentation Challenge entries suggest that facilities are taking a more integrated approach to waste, water, waste water, and energy conservation programs and leveraging community partnerships to enhance overall green programming. For example, several entries described how the facilities assess the waste stream as various points, with reduction and repurposing playing a more significant role than recycling. "Zero waste" or "designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them," was rarely mentioned by correctional professionals four years ago, but about one-third of entries in the facilities category described efforts to become zero waste facilities. Nearly half of entries, regardless of category, described composting programs.

Another significant portion of entrants highlighted the importance of community partners to repurpose waste. For example, Presentation Challenge entries cited partnerships with local entities to repurpose mattresses, clothes, and other materials to make cleaning rags, dog beds, and other products. More sophisticated recycling programs are beginning to emerge. In fact, some recycling programs are able to offset expenses as partners pay for the materials that will be recycled. For example, one program reported earning more than $65,000 in two years from recycled cans and cardboard.

Like traditional waste programs, it appears water-saving activities are also becoming more sophisticated. Presentation Challenge entries that described water saving efforts often highlighted ozone washers that reduce water and energy use while reducing the chemicals used in washing machines. A handful of entries also highlighted the use of rain barrels, both to reuse water in gardening activities and offset costs by selling rain barrels constructed from repurposed barrels.

Food production programs appear to have changed in recent years. Four years ago, food production often consisted of traditional farming and gardening with some efforts to grow food organically. Today, DOJ sees interest in aquaponics with three Presentation Challenge entries describing the practice of combining "fish and plant production using aquaculture and a hydroponics system."

Local facilities, especially city and county jails, are also leveraging community partners to expand and enhance their green corrections programs. Successful programs appear to tie specific program activities with the culture of their community and particular community needs. For example, in Delaware one project focuses on planting local grasses to restore the shoreline. In farming communities in California, correctional composting programs provide local farmers with

valuable compost. Other states and communities leverage their state departments of natural resources, parks, and forests to build programs directly tied to the values and needs of their community.

The role of staff, leadership, and community partners in implementing programs has evolved.

Four years ago, the driving forces behind green corrections programs were often federal incentives, such as accessing American Recovery and Reinvestment Act funds that supported energy retrofits, and federal and state mandates to reduce energy use and waste. About one-third of Presentation Challenge entries highlighted the role of facility leadership, especially chiefs and wardens, driving change inwardly, a marked shift from the top-down approach of previous years.

Entries also highlighted the importance of staff at many levels developing and driving programs. While this may be the result of different sources of information, it appears implementation of green programming is more embedded with staff taking increased ownership than several years ago. One winning presentation described its green task force, which aligns with the recommendation from The Greening of Corrections to create a task force. Other presentations described how staff in various positions all played important roles in implementing green programs. These roles included ranged from building partnerships with external entities to designing programs.

Presentation Challenge entries highlighted local partners, state agencies, and contracting entities, unlike previous iterations of the green corrections program when few partners were involved. Specifically, entries highlighted partners like local Goodwill organizations and animal shelters to repurpose waste, departments of natural resources for inmate job training programs, and the role of contracting entities like recycling companies and energy management companies in integrating programming. Some Presentation Challenge entries highlighted how these partnerships could generate revenue as some partners pay for repurposed and recycled goods. Reducing the waste stream also reduces waste and operating costs.

The driving forces behind green corrections programming have not changed.

Saving taxpayer dollars and ensuring safety are always of the utmost importance. Promoting pro-social behaviors and reducing recidivism among offenders have become more pronounced.

The largest number of Presentation Challenge entries were in the facilities category. It appears that facilities management received the greatest interest because the benefits of programs are most immediate and results can be most easily quantified. In short, facilities programming saves tax payer funds in ways that are easy to report when compared to programs that educate and train inmates.

More than 90 percent of facilities entries quantified financial, energy, water, or other savings, regardless of the program size or scale. For example, one small facility found a composting project would save hundreds of dollars in its first year. Another state projected savings of more than $30 million from energy performance contracts affecting every facility in the state. Whether large or small, presentations showed it is important to measure green corrections efforts.

In contrast, Presentation Challenge entries that described education, training, and reentry programs struggled to quantify the results of their efforts. For example, programs that engaged inmates in sorting waste for recycling could quantify the amount of waste reduction, but rarely quantified the number of inmate hours worked, certificates earned, job placement in related industries upon reentry, or recidivism rates. It is unclear whether this information wasn't available or simply wasn't shared in presentations.

Several presentations cited security; however, it was not a leading theme or idea. Rather security was the first consideration before implementing any new program or project.

The integration of green corrections elements into a unified system continues to evolve.

Green corrections programs seem to be evolving and the green corrections elements of facilities, education and training, reentry, and correctional industries appear to be more integrated than in the past. For example, many Presentation Challenge entries highlighted how inmate engagement in programs improved security by reducing inmate idleness and could be part of job training. In addition, many presentations highlighted how inmates were involved in recycling programs and waste sorting, which could help them obtain jobs upon reentry.

One Presentation Challenge winner provided extensive insights into this integration during an Innovation Webinar. The Branchville Correctional Facility in Indiana used inmates in major construction and carpentry projects for energy retrofits. Case managers reviewed inmate skills to place them on energy projects to use these skills. The work experience was counted toward reduced sentences.

Symposium Overview

The Green Corrections Symposium brought together agency experts, correctional professionals, and national stakeholders to share best practices and learn about innovations from the field in November 2014. Experts from the U.S. Department of Energy and U.S. Department of Education presented, Presentation Challenge winners were announced and presentations shown, and participants held structured conversations about how to implement lessons learned. Several representatives from the U.S. Department of Justice and two representatives from the U.S. Department of Labor also participated.

The Symposium was organized into three categories: (1) facilities, (2) education and training, and (3) reentry and new concepts. After opening comments, the facilities category started with a presentation from the U.S. Department of Energy, announcement and viewing of Presentation Challenge winners in the facilities category, and structured discussions. Participants were assigned to tables and each table answered the following questions during the structured discussions:

- What are the two to three most important lessons learned from expert comments and the winning presentation?
- How can you apply what you learned?

- What resources or information do you need to apply this?

Notes from the presentations and structured conversations inform the lessons learned. Conversations about facilities focused on measuring energy, waste, water, and waste water use and the role of leadership.

Jason Powers, Project Officer/State Energy Program of the U.S. Department of Energy (Energy), provided opening comments to the facilities portion of the symposium, and provided background information on green programs and guidance on how to look at data. He stated, "You can't manage what you don't measure" – a theme that resonated with participants. Several comments from participants highlighted the importance of strong measurement systems to understand energy, waste, water, and waste water use to implement program activities. Information sharing and engagement from all staff was identified as one strategy to improve outcomes.

Participants disagreed about the role of leadership. Some participants noted "top-down directives" as necessary to implement these changes; however, Presentation Challenge entries seemed to question this idea. (Presentation Challenge entries seemed to suggest that wardens and facility-specific leadership were driving changes, as opposed to several years ago when federal incentives and state energy mandates, often in the form of executive orders, appeared to drive energy programs.)

Green education and training programs require partnerships and coordination of correctional resources.

John Linton, Director of the Office of Correctional Education from the U.S. Department of Education, provided opening comments for the education and training portion of the symposium. He noted that based on Presentation Challenge entries effective green education and training programs have three commonalities:

- Green programs are often scientific, technological, engineering and mathematical (STEM) in nature and allow for a hands-on application of problem solving.
- Green programs offer some great developmental opportunities around a particular Career Pathway.
- Green programs are generally motivated by social benefit, which may combat offenders' anti-social behaviors that contribute to recidivism.

While the particular benefits of green education and training programs resonated with participants, the structured conversations focused on general challenges when educating and training inmates. Participants highlighted the need for better coordination of correctional resources with other state and local government officials (e.g., judges, politicians, waste, water, and natural resources departments). During the Presentation Challenge, several highlighted community partners and state agencies that directly contribute to the success of their programs. Participants also recognized the need to tailor education and training programs to the facility,

with a particular focus on the length of stay for inmates. Valued certifications are difficult to attain in short-term facilities.

Reentry programs must engage offenders well before release.

Mary Ellen Sprenkel, Chief Executive Officer of The Corps Network, presented in the final portion of the Symposium. In her presentation, she highlighted best practices in green reentry programming, including applying a restorative justice framework, training tailored to community needs and in-demand jobs, alignment with employers and the workforce system, and partnering with correctional facilities while offenders are still incarcerated. Like education and training, the presentation and conversations about green reentry programs highlighted the pro-social benefits of green programs, while reiterating general obstacles for any reentry program. For example, notes from the structured conversations indicate that corrections and community partners need to strengthen their partnerships and interactions with inmates prior to inmates' reentry.

Notes also suggest that green programs benefit when offenders earn skills certificates and work experience; however, these trainings must be selected in part based on the length of an offender's stay in a facility. Partnerships with local businesses, community nonprofits, and local university partnerships are also important when selecting certificates.

Innovation Webinars Overview

Four Innovation Webinars featuring five Presentation Challenge winners were held monthly between January and April of 2015. The Innovation Webinars allowed participants to learn about NIC-supported green corrections programming and go in depth about the winning presentations.

Each webinar was structured in a similar format. The webinars begin with opening comments from Joseph "Tony" Stines of NIC about the overall goals of the Challenge. This was followed by an overview of The Greening of Corrections: Creating a Sustainable System guidebook and the Challenge by Stephanie Davison of FHI 360. A viewing of the featured Presentation Challenge winner, an in-depth presentation by the winning organization, added depth to the webinar. Finally, a question and answer period concluded the webinar.

Based on survey results from a small portion of webinar participants, respondents noted that the overview of NIC-supported green corrections programs was most beneficial. In a comments section, survey respondents also stated that learning general information about green corrections programs around the country was helpful.

L. Federal Maritime Commission

a. Earth Day Award[73]

Summary: The FMC Chairman's Earth Day Award recognized members of the maritime transportation industry for innovations and successes in developing environmentally sustainable shipping practices. Specifically, this award highlighted technologies, programs, or practices of the maritime transportation industry that, through efficiency or innovation, benefit our environment.

Solution Type: Nominations

Primary Goals: Find and highlight innovative ideas

Results: The 2015 Chairman's Earth Day Award received applications from 6 organizations: Crowley Maritime Corporation (a marine solutions, transportation and logistics company); DB Schenker USA (an integrated logistics services provider); Siemens USA (a company building the world's first e-highway project); Port of Long Beach; OCCL/Long Beach Container Terminal; and Tote Maritime (a ship building company).

The award allowed the agency to publicly recognize the winner, Crowley Maritime Corporation, for increasing its corporate environmental stewardship by undertaking a number of initiatives across its lines of business. Specifically Crowley was recognized for ordering two new LNG powered ships built in Pascagoula, Mississippi; participation in the spill protection program of the State of Washington's Department of Ecology; and its membership in the Trident Alliance, a coalition of ship owners advocating robust enforcement of fuel sulfur restrictions. This recognition took place at a presentation at FMC headquarters.

Problem Statement: Eligible submissions were evaluated based on the following criteria:

1. Programs or practices that provide an environmental benefit or reduction in environmental harm, including but not limited to efforts that encourage a reduction in emissions or pollutants.

2. Programs or practices that are sustainable and also serve as models for others to follow or replicate.

3. Efforts that increase the public's awareness of the maritime transportation industry's efforts to protect the environment.

Proposed Goals: The award had two goals. First, to recognize members of the maritime transportation industry for innovations and successes in developing environmentally sustainable shipping practices. Second, to highlight technologies, programs, or practices of the maritime transportation industry that, through efficiency or innovation, benefit our environment.

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[73] http://www.fmc.gov/news/chairmans_award.aspx

Why a Prize: Utilizing a prize format was the most efficient way to recognize maritime transportation industry members' innovations and successes as well as to highlight efficient and innovative technologies, programs, or practices of the maritime transportation industry that benefit our environment.

Participants: The 2015 Chairman's Earth Day Award received applications from 6 organizations: Crowley Maritime Corporation (a marine solutions, transportation and logistics company); DB Schenker USA (an integrated logistics services provider); Siemens USA (a company building the world's first e-highway project); Port of Long Beach; OCCL/Long Beach Container Terminal; and Tote Maritime (a ship building company).

The award was open to participants who met the following requirements:

1. In the case of a private entity, shall be incorporated in and maintain a primary place of business in the United States.

2. In the case of an individual, whether participating singly or in a group, shall be a citizen or permanent resident of the United States.

3. Shall not be a Federal entity or Federal employee acting within the scope of their employment.

Timeline: The submission period was from October 8, 2014, to March 30, 2015.

Solicitation & Outreach: The agency reached out to various maritime related entities, including a limited number of maritime related press organizations to raise awareness and encourage participation.

Incentives: This was a non-monetary award and no prize money or funding was distributed to the award winner. This was an award of recognition and the winner was presented with a commemorative plaque at Commission headquarters in Washington, D.C.

Evaluation and Judging: The award was decided at the sole discretion of the Chairman, based upon the recommendation of the Maritime Environmental Committee (MEC).

Partnerships: There were no partnerships entered into in furtherance of the award.

Resources: The members of the MEC were utilized to promote the award and to participate in judging the applicants.

Results: The award allowed the agency to publicly recognize the winner, Crowley Maritime Corporation, for increasing its corporate environmental stewardship by undertaking a number of initiatives across its lines of business. Specifically Crowley was recognized for ordering two new LNG powered ships built in Pascagoula, Mississippi; participation in the spill protection program of the State of Washington's Department of Ecology; and its membership in the Trident

Alliance, a coalition of ship owners advocating robust enforcement of fuel sulfur restrictions. This recognition took place at a presentation at FMC headquarters.

M. Federal Trade Commission

a. DetectaRobo Competition[74]

Summary: As part of its ongoing campaign against illegal prerecorded telemarketing calls, the Federal Trade Commission (FTC) challenged the public to create technical solutions in two prize competitions: (1) DetectaRobo and (2) Robocalls: Humanity Strikes Back. In DetectaRobo, contestants analyzed call data from a honeypot to create algorithms to predict which calls are likely to be robocalls. (A honeypot is an information system that attracts robocalls and helps law enforcement, academics, and stakeholders in the private sector understand and combat these illegal calls.) The FTC hosted DetectaRobo in conjunction with the National Day of Civic Hacking (National Day) and offered public recognition to the winners that created the best algorithms.

The FTC's partners included Pindrop Security and the Canadian Radio-television and Telecommunications Commission (CRTC). Pindrop Security provided the honeypot data for analysis in DetectaRobo. The CRTC provided expertise and advice on crafting the contest criteria, applying its experience gained from developing its own robocall honeypot.

The Federal Communications Commission, the White House, the General Services Administration, and academic advisors also assisted in providing guidance on designing both challenges. Moreover, Code for America, National Day and DEF CON 23 organizers provided assistance with marketing and promotion.

Solution Type: Analytics, visualizations, and algorithms

Primary Goals: Solve a specific problem; Develop technology; Inform and educate the public; Engage new people and communities

Results: For the DetectaRobo challenge, 19 teams, comprising a total of 37 individuals, registered to participate in the contest. Of the 19 teams who registered, seven entered submissions. Many of the teams that participated were present at various hackathons around the U.S. and as a result, challenge winners participated from all over the U.S. – including one team from the East Coast, one team from the West Coast, and one team from the South.

The contest recruited individuals who had not previously worked on cracking robocalls, thereby enlisting segments of the technology community to tackle problems novel to them. Many of the individuals or teams who participated in DetectaRobo did not have any prior experience working on telecom-related issues.

[74] www.ftc.gov/detectarobo

The prize competition had three winners. The winning solutions allowed for improved functionality of current honeypot design, including the creation of a honeypot that can categorize and identify likely robocalls, and new insights into honeypot design that will further development of technological solutions to illegal calls.

The contest's broad media attention has continued to promote public awareness of the FTC's technical initiatives. In particular, the media's interest in the topic gave the agency an opportunity to convey its consumer education messages about illegal telemarketing calls to a broad audience.

Problem Statement: Most telephone calls that deliver a prerecorded message – or robocalls – that sell something to the recipient are illegal. Technological advancements have enabled the proliferation of robocalls, many of which are marketing scams. In 2012, the FTC launched a number of initiatives to curb illegal robocalls, including public challenges to stimulate the development of technological solutions. The FTC announced its first Robocall Challenge in October 2012, which led to the development of Nomorobo, a free product for consumers to block unwanted calls. Nomorobo has indicated that, since launching in 2013, it has garnered over 360,000 users and blocked over 50 million robocalls. Following on the success of the Robocall Challenge, the FTC held its second contest, "Zapping Rachel," in August 2014 at DEF CON 22, one of the oldest conferences for information security specialists. Zapping Rachel promoted the development of robocall honeypots, an instrument that enhances law enforcement efforts, advances technological solutions that combat robocalls, and furthers the general understanding of robocaller tactics. This year, the FTC launched two new robocall challenges: (1) DetectaRobo and (2) Robocalls: Humanity Strikes Back (Strike Back).

Testing the insights gleaned from part of Zapping Rachel's contest, DetectaRobo challenged contestants to analyze call data from a honeypot to create predictive algorithms for identifying robocalls. To be eligible to enter, contestants were required to register and submit:

- a brief text description of the solution;
- solution source code; and
- any other materials required, including robocall predictions and access to technologies needed to test the submissions, including any legal rights or licenses required to access the technologies.

Eligible submissions were judged on the following criteria:

- Uncovering the Truth: how well did the submission identify likely robocalls? (70%)
- Explaining the Scheme: what insights did the submission demonstrate? (20%)
- Innovation: how innovative was the submission? (10%)

Proposed Goals: The main goal of DetectaRobo was to develop the next-generation robocall honeypot that can help solve the robocall problem. In support of this main goal, the challenge also sought to:

- Learn new insights from information security specialists, data scientists, and others experienced with honeypots in other contexts that will augment future robocall honeypot design.
- Gain new partners — including private sector, academia, or law enforcement —from a community of information security experts.
- Drive and stimulate the development of private sector solutions that block or otherwise address illegal robocalls.
- Promote public awareness about FTC goals and initiatives around stopping illegal robocalls.

Why a Prize: A prize competition was preferred to realize the goals above for the following reasons:

- The FTC could not identify a currently available commercial product or service that fulfills the same function as the next-generation robocall honeypot. Additionally, no commercial product exists that allows consumers to report unwanted live robocalls to law enforcement.
- To create the next-generation robocall honeypot, the FTC wanted to attract a diverse array of technically savvy individuals to tackle this issue without predetermining their approaches. The agency also desired to provide an award for the development of only those solutions that would likely work.
- The FTC did not intend to procure, own, or directly develop or administer the next generation robocall honeypot. It did, however, wish to stimulate the development of a more advanced robocall honeypot that could enhance private sector solutions to robocalls and potentially assist the agency's law enforcement efforts. A prize competition created incentives for multiple innovators in the private sector to work on such solutions.
- A prize competition also had advantages in promoting awareness of the robocall problem on a large scale. Many of the more traditional methods for meeting the main goal, such as using contracted solvers or grants, would not necessarily provide the widespread problem exposure achieved through a public competition.

Participants: DetectaRobo mobilized individual or teams of technical experts – including information security specialists and data scientists - to apply their expertise to solving the robocall problem. To be eligible to win a prize, participants (individuals and all team members) for both contests had to be 18 years of age or older, be citizens or permanent residents of the United States, have no familial, business or other financial relationship with any Judge, and

never have been convicted of a felony. Corporations (including nonprofit organizations), limited liability companies, partnerships, and other legal entities were not eligible to enter.

Eligibility in DetectaRobo was limited to the first 50 individuals or teams who registered. Nineteen teams, comprising a total of thirty-seven individuals, registered to participate in the contest. Of the nineteen teams who registered, seven entered submissions. Many of the teams that participated were present at various hackathons around the U.S. and as a result, challenge winners participated from all over the U.S. – including one team from the East Coast, one team from the West Coast, and one team from the South.

Timeline: The contest opened on June 6, 2015 and closed on June 14, 2015. The winners were announced August 17, 2015.

- Contest announced: March 4, 2015
- Judging period: June 24-26, 2015

Solicitation & Outreach: he FTC held DetectaRobo in conjunction with National Day to reach a technology community that is interested in working with government to solve critical social issues but have not yet applied its skills to the robocall problem. The FTC worked with National Day and DEF CON organizers to post the contest on National Day and DEF CON's websites and social media outlets

The agency also promoted the contest to the general public through press releases announcing the contests and the Official Rules, along with multiple blog posts on the FTC's consumer and business blogs, and posting on websites such as Challenge.gov. Additionally, the FTC hosted social media "chats" about the contests on Twitter and the agency's first Reddit "Ask Me Anything" session. The FTC also conducted broad outreach via relevant email listservs and Twitter feeds. The FTC's efforts resulted in substantial media coverage, including by major print outlets (e.g., Reuters, Washington Post), technology blogs and websites (e.g., Wired, MotherBoard, Ars Technica, Yahoo! Tech), other widely read websites (e.g., eWeek, Bloomberg, MoneyTalksNews), national radio shows (e.g., NPR), and national television outlets (e.g., NBC). The FTC's contest website, press releases, and blog posts resulted in 57,488 unique page views, and its social media campaign resulted in 393,248 impressions from 76 tweets and outreach to 47,558 people from 10 Facebook posts.

Incentives: For DetectaRobo, the FTC offered public recognition in lieu of a cash award. The winning team was awarded the title of Champion RoboSleuth and the two runners-up were awarded the title of Master RoboSleuths. All three winning teams of DetectaRobo also received recognition and publicity from the FTC.

Evaluation and Judging:

DetectaRobo was judged according to the following process:

1. Submissions were reviewed and judged by an expert panel, consisting of:

   a. Dr. Mustaque Ahamad, Professor of Computer Science, Georgia Institute of Technology, Professor of Engineering at New York University Abu Dhabi;
   b. Jonathan Curtis, Director of Security Architecture for Norse Corporation;
   c. David Gibson, then-Senior Advisor of the Solutions and Intelligence Directorate within the Compliance and Enforcement Sector at the Canadian Radio-television and Telecommunications Commission (CRTC); and
   d. Dr. Matthew Blaze, Professor of Computer Science, University of Pennsylvania School of Engineering and Applied Science.
2. All Judges were required to remain fair and impartial, and the rules specified that a Judge would be recused from judging a submission if the Judge or the sponsor considered that it was inappropriate, for any reason, for the Judge to evaluate a specific submission or group of submissions.

The rules provided that eligible submissions would be judged on the following criteria:

- Uncovering the Truth (70% of total score)
  - How well did you predict whether the calls in the second honeypot data set were likely to be robocalls? To assess this, the Contest Judges will compare your predictions with actual data about which calls are likely to be a robocall in the second data set. You will receive one point for each call you successfully identified as a likely robocall, and deducted two points for each call you inaccurately identified as a likely robocall.
- Explaining the Scheme (20% of total score)
  - What insights did your submission demonstrate with respect to the analysis of honeypot call records?
- Innovation (10% of total score)
  - How innovative was your submission?

Partnerships: The FTC drew on partner relationships from a diverse array of experts as it formulated both contests. The FTC's partners included Pindrop Security and the CRTC. Pindrop Security provided the honeypot data for analysis in DetectaRobo. The CRTC provided expertise and advice on crafting the contest criteria, applying its experience gained from developing its own robocall honeypot.

The Federal Communications Commission, the White House, the General Services Administration, and academic advisors also assisted in providing guidance on designing both challenges. Moreover, Code for America, National Day and DEF CON 23 organizers provided assistance with marketing and promotion.

Resources: Resources used for the development, execution, promotion, management, and follow-up tasks related to this challenge included staff time from the FTC's Bureau of Consumer Protection, the Office of Public Affairs, the Office of the General Counsel, and the Office of the Executive Director. Costs for the contest (including the prize money) were funded from agency appropriations, pursuant to the America COMPETES Reauthorization Act.

Results: The FTC considers DetectaRobo a success on multiple levels. Stakeholders involved in the fight against robocalls obtained new insights on honeypot design that could be used to improve the functionality of current honeypots. The new insights advance law enforcement efforts and help further stakeholders' understanding of robocaller tactics.

The contest recruited individuals who had not previously worked on cracking robocalls, thereby enlisting segments of the technology community to tackle problems novel to them. Many of the individuals or teams who participated in DetectaRobo did not have any prior experience working on telecom-related issues.

The FTC engaged a new community of technologists through its participation in National Day and continued developing its relationship with information security experts within the DEF CON community. Through its contests, the FTC conducted effective outreach to thousands of National Day participants and DEF CON attendees regarding the purpose of the FTC's contests, the robocall problem, and the FTC's technological initiatives to address it. The FTC handed out 969 fact sheets covering general information about the FTC, the FTC's Do Not Call program, and the robocall problem; 710 infographics illustrating how a robocall works; and 4,988 stickers directing individuals to the Strike Back contest website.
Many National Day participants, DEF CON attendees, and other technologists who heard about the contests but were unable to compete were interested in learning more about robocalls, and offered numerous promising ideas for addressing this thorny issue. Since the contests have concluded, the FTC has gained new partners from DEF CON 23 who are now working with the FTC and other industry stakeholders through the London Action Plan International Do Not Call Forum and the Messaging, Malware and Mobile Anti-Abuse Working Group on creating solutions to illegal calls and related issue of fraudulent caller ID information.

Finally, the contests' broad media attention has continued to promote public awareness of the FTC's technical initiatives. In particular, the media's interest in the topic gave the agency an opportunity to convey its consumer education messages about illegal telemarketing calls to a broad audience.

The prize competition had 3 winning solutions. Team HaV (Ved Deshpande and M. Henry Linder) earned the top score and was named Champion RoboSleuth. Team Milbo (Sridhar Ramajrishnan and Shuping Liu) and Team RDAC (Charles Julian Knight, Taylor Kelley, Ian Moraes, Rohan Smith, Will Mavis, John Cowhig, Sean Browning, James Albert Snow, and Pablo River) were the runners-up and named Master RoboSleuths.

These solutions allowed for the following positive impacts:

- Improved functionality of current honeypot design, including creation of a honeypot that can categorize and identify likely robocalls
- New insights into honeypot design that will further development of technological solutions to illegal calls

b. Robocalls: Humanity Strikes Back Competition[75]

Summary: As part of its ongoing campaign against illegal prerecorded telemarketing calls, the Federal Trade Commission (FTC) challenged the public to create technical solutions in two prize competitions: (1) DetectaRobo and (2) Robocalls: Humanity Strikes Back. In Robocalls: Humanity Strikes Back, contestants created a consumer product that blocks and forwards robocalls to a honeypot. The FTC offered $50,000 in cash prizes for the best solutions.

The FTC's partners included Pindrop Security and the Canadian Radio-television and Telecommunications Commission (CRTC). Pindrop Security provided the means of testing the Qualifying and Final phase submissions for Strike Back. The CRTC provided expertise and advice on crafting the contest criteria, applying its experience gained from developing its own robocall honeypot.

Solution Type: Analytics, visualizations, and algorithms

Primary Goals: Solve a specific problem; Develop technology; Inform and educate the public; Engage new people and communities

Results: Strike Back received two submissions that met the requirements outlined in the contest rules. The finalists consisted of Team RoboKiller and Hemant Sengar, and each had experience with audio analytics and telecommunication technologies.

Team RoboKiller, the winner of Strike Back, launched its winning mobile app in beta form for Apple iOS users shortly after the award announcement in August 2015. The team is currently developing its product for Android users.

Stakeholders involved in the fight against robocalls obtained new insights on honeypot design that could be used to improve the functionality of current honeypots. The new insights advance law enforcement efforts and help further stakeholders' understanding of robocaller tactics.

The FTC engaged a new community of technologists through its participation in National Day and continued developing its relationship with information security experts within the DEF CON community. Through its contests, the FTC conducted effective outreach to thousands of National Day participants and DEF CON attendees regarding the purpose of the FTC's contests, the robocall problem, and the FTC's technological initiatives to address it. The FTC handed out 969 fact sheets covering general information about the FTC, the FTC's Do Not Call program, and the robocall problem; 710 infographics illustrating how a robocall works; and 4,988 stickers directing individuals to the Strike Back contest website.

Many National Day participants, DEF CON attendees, and other technologists who heard about the contests but were unable to compete were interested in learning more about robocalls, and offered numerous promising ideas for addressing this thorny issue. Since the contests have concluded, the FTC has gained new partners from DEF CON 23 who are now working with the

[75] www.ftc.gov/strikeback

FTC and other industry stakeholders through the London Action Plan International Do Not Call Forum and the Messaging, Malware and Mobile Anti-Abuse Working Group on creating solutions to illegal calls and related issue of fraudulent caller ID information.

Problem Statement: Most telephone calls that deliver a prerecorded message – or robocalls – that sell something to the recipient are illegal. Technological advancements have enabled the proliferation of robocalls, many of which are marketing scams. In 2012, the FTC launched a number of initiatives to curb illegal robocalls, including public challenges to stimulate the development of technological solutions. The FTC announced its first Robocall Challenge in October 2012, which led to the development of Nomorobo, a free product for consumers to block unwanted calls. Nomorobo has indicated that, since launching in 2013, it has garnered over 360,000 users and blocked over 50 million robocalls. Following on the success of the Robocall Challenge, the FTC held its second contest, "Zapping Rachel," in August 2014 at DEF CON 22, one of the oldest conferences for information security specialists. Zapping Rachel promoted the development of robocall honeypots, an instrument that enhances law enforcement efforts, advances technological solutions that combat robocalls, and furthers the general understanding of robocaller tactics. This year, the FTC launched two new robocall challenges: (1) DetectaRobo and (2) Robocalls: Humanity Strikes Back (Strike Back).

Strike Back, held at DEF CON 23 in Las Vegas (August 2015), challenged contestants to build a product that allows consumers to block and forward robocalls to a honeypot, effectively creating a crowd-sourced honeypot. To be eligible, contestants were required to register and submit:

- solution source code;
- a brief text description of the solution – including a version to be made publicly available that does not contain proprietary information;
- a link to a publicly available video demonstrating how the solution works; and
- any other materials required, including access to call detail records, dialing platforms, and any other technologies needed to test the solutions, including any legal rights or licenses required to access the technologies.

The FTC conducted Strike Back in 2 phases – a qualifying phase and a final phase. The top five scoring submissions from the qualifying phase were eligible to move on to the final phase. The contest judges evaluated the submissions using the following criteria for each respective phase:

Qualifying Phase:

- How well does it work: how well did the submission succeed in blocking and forwarding robocalls, and how scalable was the solution? (50%)
- How user-friendly is the solution: did the submission provide consumers with flexibility in identifying calls for blocking and forwarding and provide notice to consumers that their

forwarded calls may be disclosed to law enforcement and to carriers associated with delivering the calls? (20%)

- Explaining the Scheme: what insights did the submission provide? (20%)
- Innovation: how innovative was the submission? (10%)

Final Phase:

- How many robocalls did the solution forward to the honeypot? (70%)
- Explaining the Scheme: what insights did the submission provide? (20%)
- Innovation: how innovative was the submission? (10%)

Proposed Goals: The main goals of the competition were to develop the next-generation robocall honeypot that can help solve the robocall problem, and develop new solutions that enable consumers to block and report unwanted calls to law enforcement.

The supporting goals to these main goals, which are the same as DetectaRobo, are:

- Learn new insights from information security specialists, data scientists, and others experienced with honeypots in other contexts that will augment future robocall honeypot design.
- Gain new partners — including private sector, academia, or law enforcement —from a community of information security experts.
- Drive and stimulate the development of private sector solutions that block or otherwise address illegal robocalls.
- Promote public awareness about FTC goals and initiatives around stopping illegal robocalls.

Why a Prize: A prize competition was preferred to realize the goals above for the following reasons:

- The FTC could not identify a currently available commercial product or service that fulfills the same function as the next-generation robocall honeypot. Additionally, no commercial product exists that allows consumers to report unwanted live robocalls to law enforcement.
- To create the next-generation robocall honeypot, the FTC wanted to attract a diverse array of technically savvy individuals to tackle this issue without predetermining their approaches. The agency also desired to provide an award for the development of only those solutions that would likely work.

- The FTC did not intend to procure, own, or directly develop or administer the next generation robocall honeypot. It did, however, wish to stimulate the development of a more advanced robocall honeypot that could enhance private sector solutions to robocalls and potentially assist the agency's law enforcement efforts. A prize competition created incentives for multiple innovators in the private sector to work on such solutions.
- A prize competition also had advantages in promoting awareness of the robocall problem on a large scale. Many of the more traditional methods for meeting the main goal, such as using contracted solvers or grants, would not necessarily provide the widespread problem exposure achieved through a public competition.

Participants: Strike Back mobilized individual or teams of technical experts – including information security specialists and data scientists - to apply their expertise to solving the robocall problem.

To be eligible to win a prize, participants (individuals and all team members) for both contests had to be 18 years of age or older, be citizens or permanent residents of the United States, have no familial, business or other financial relationship with any Judge, and never have been convicted of a felony. In addition, contestants in Strike Back had to be physically present at DEF CON 23 in order to compete in the final phase. Corporations (including nonprofit organizations), limited liability companies, partnerships, and other legal entities were not eligible to enter. Strike Back received two submissions that met the requirements outlined in the contest rules. The finalists consisted of Team RoboKiller and Hemant Sengar, and each had experience with audio analytics and telecommunication technologies.

Timeline: The timeline for Strike Back was as follows:

- Contest announced: March 4, 2015
- Qualifying phase opened: March 4, 2015
- Submission deadline for Qualifying phase: June 15, 2015
- Judging period for Qualifying phase: June 24-26, 2015
- Final phase opened: August 5, 2015
- Submission deadline for Final phase: August 8, 2015
- Judging period for Final phase: August 8-9, 2015
- Winners publicly announced: August 17, 2015

Solicitation & Outreach: The FTC held Strike Back at DEF CON 23, one of the oldest conferences for information security specialists, to once again engage this particular community of experts. To promote both contests, the FTC worked with National Day and DEF CON organizers to post the contest on National Day and DEF CON's websites, social media outlets,

and to start a discussion board on Strike Back on DEF CON's contest page. The FTC also achieved significant community outreach at DEF CON 23 using a variety of promotion materials including a banner, stickers, fliers, posters, cutouts, and informational handouts regarding the FTC and its robocall initiatives. The marketing and branding approach that the FTC utilized enabled the FTC to successfully establish relationships with members of the DEF CON community.

The agency also promoted both contests to the general public through press releases announcing the contests and the Official Rules, along with multiple blog posts on the FTC's consumer and business blogs, and posting on websites such as Challenge.gov. Additionally, the FTC hosted social media "chats" about the contests on Twitter and the agency's first Reddit "Ask Me Anything" session. The FTC also conducted broad outreach via relevant email listservs and Twitter feeds. The FTC's efforts resulted in substantial media coverage, including by major print outlets (e.g., Reuters, Washington Post), technology blogs and websites (e.g., Wired, MotherBoard, Ars Technica, Yahoo! Tech), other widely read websites (e.g., eWeek, Bloomberg, MoneyTalksNews), national radio shows (e.g. NPR), and national television outlets (e.g. NBC). The FTC's contest website, press releases, and blog posts resulted in 57,488 unique page views, and its social media campaign resulted in 393,248 impressions from 76 tweets and outreach to 47,558 people from 10 Facebook posts.

Incentives: Strike Back included a monetary award; the total cash prize amount offered was $50,000. The cash prize was divided into five potential awards - $2,000 for each finalist and an additional $8,500 to two runners-up and $23,000 to the winner. The FTC awarded a total of $35,500. Two finalists of Strike Back also received recognition and publicity by the FTC. The prize money came from FTC appropriations, as authorized by the America COMPETES Reauthorization Act.

Evaluation and Judging:

Strike Back was judged according to the following process:

1. Submissions were reviewed and judged by an expert panel consisting of:
    a. Dr. Mustaque Ahamad, Professor of Computer Science, Georgia Institute of Technology, Professor of Engineering at New York University Abu Dhabi;
    b. Jonathan Curtis, Director of Security Architecture for Norse Corporation;
    c. David Gibson, then-Senior Advisor of the Solutions and Intelligence Directorate within the Compliance and Enforcement Sector at the Canadian Radio-television and Telecommunications Commission (CRTC);
    d. Yair Matas, then-Manager of the Systems and Solutions group within the Compliance and Enforcement Sector at the CRTC; and
    e. Dr. Matthew Blaze, Professor of Computer Science, University of Pennsylvania School of Engineering and Applied Science.
2. All Judges were required to remain fair and impartial, and the rules specified that a Judge would be recused from judging a submission if the Judge or the sponsor considered that it was inappropriate, for any reason, for the Judge to evaluate a specific submission or group of submissions.

The rules provided that eligible submissions for the Qualifying Phase would be judged on the following criteria:

- How Well Does it Work? (50% of total score)
    - How well did you succeed in accurately forwarding only robocalls to a honeypot? You will receive twenty points for each distinct successful method that your solution used to identify robocalls for forwarding. For each call forwarded that was not a robocall, one point will be deducted. For each robocall received that the solution failed to forward after the user identifies such robocalls for forwarding, one point will be deducted. Contestants will need to prove to the Contest Judges' satisfaction that the solution accurately forwarded only robocalls, and the necessary level of proof is within the Contest Judges' sole discretion. Furthermore, the Contest Judges have sole discretion to determine whether two successful methods are meaningfully distinct.
    - How well did your solution successfully block robocalls identified for blocking? Contestants will receive twenty points for each distinct successful method that your solution used to identify robocalls for blocking. For each call blocked that was not a robocall, one point will be deducted. For each robocall received that the solution failed to block after the user identifies such robocalls for blocking, one point will be deducted. Contestants will need to prove to the Contest Judges' satisfaction that the solution blocked only robocalls, and the necessary level of proof is within the Contest Judges' sole discretion. Furthermore, the Contest Judges have sole discretion to determine whether two successful methods are meaningfully distinct.
    - How scalable is your solution? For each distinct method that your solution uses to forward or block robocalls, Contestants will receive five points for each such method that is easily replicable and adaptable. Furthermore, the Contest Judges have sole discretion to determine whether two methods are meaningfully distinct.
- How User-Friendly is your solution? (20% of total score)
    - Does your solution adequately provide consumers with notice that calls forwarded may be disclosed to law enforcement or any carrier associated with delivering the call?
    - Does your solution provide consumers with flexibility in identifying calls for forwarding or blocking? Flexibility may include, but is not limited to, forwarding or blocking particular calls for specified hours of the day, or limited calendar days?
- Explaining the Scheme (20% of total score)
    - What insights did your Submission demonstrate with respect to identifying calls that should be forwarded?
    - What insights did your Submission demonstrate with respect to identifying calls that should be blocked?
    - What insights did your Submission demonstrate in providing consumers with the greatest control over the calls their phones receive?
- Innovation (10% of total score)
    - How innovative was your submission?

The rules provided that eligible submissions for the Final phase would be judged on the following criteria:

- How Many Robocalls Did Your Solution Forward? (70% of total score)
    - Did you succeed in accurately forwarding robocalls to a honeypot? You will receive one point for each robocall forwarded. For each call forwarded that was not a robocall, one point will be deducted. Contestants will need to prove to the Contest Judges' satisfaction that the solution accurately forwarded only robocalls, and the necessary level of proof is within the Contest Judges' sole discretion.
- Explaining the Scheme (20% of total score)
    - What insights did your Submission demonstrate with respect to seeding techniques?
- Innovation (10% of total score)
    - How innovative was your Submission?

Partnerships: The FTC drew on partner relationships from a diverse array of experts as it formulated both contests. The FTC's partners included Pindrop Security and the CRTC. Pindrop Security provided the means of testing the Qualifying and Final phase submissions for Strike Back. The CRTC provided expertise and advice on crafting the contest criteria, applying its experience gained from developing its own robocall honeypot.

The Federal Communications Commission, the White House, the General Services Administration, and academic advisors also assisted in providing guidance on designing both challenges. Moreover, Code for America, and National Day and DEF CON 23 organizers provided assistance with marketing and promotion.

Resources: Resources used for the development, execution, promotion, management, and follow-up tasks related to this challenge included staff time from the FTC's Bureau of Consumer Protection, the Office of Public Affairs, the Office of the General Counsel, and the Office of the Executive Director. Costs for the contest (including the prize money) were funded from agency appropriations, pursuant to the America COMPETES Reauthorization Act.

Results: The FTC considers Strike Back a success on multiple levels. First, Team RoboKiller, the winner of Strike Back, launched its winning mobile app in beta form for Apple iOS users shortly after the award announcement in August 2015. The team is currently developing its product for Android users. The solutions developed for this competition were the first of their kind. At the time of the contest, no other commercially available products allowed consumers to forward unwanted robocalls to a honeypot.

Second, stakeholders involved in the fight against robocalls obtained new insights on honeypot design that could be used to improve the functionality of current honeypots. The new insights advance law enforcement efforts and help further stakeholders' understanding of robocaller tactics.

Third, both contests recruited individuals who had not previously worked on cracking robocalls, thereby enlisting segments of the technology community to tackle problems novel to them. Many

of the individuals or teams who participated in DetectaRobo did not have any prior experience working on telecom-related issues.

Fourth, the FTC engaged a new community of technologists through its participation in National Day and continued developing its relationship with information security experts within the DEF CON community. Through its contests, the FTC conducted effective outreach to thousands of National Day participants and DEF CON attendees regarding the purpose of the FTC's contests, the robocall problem, and the FTC's technological initiatives to address it. The FTC handed out 969 fact sheets covering general information about the FTC, the FTC's Do Not Call program, and the robocall problem; 710 infographics illustrating how a robocall works; and 4,988 stickers directing individuals to the Strike Back contest website.

Many National Day participants, DEF CON attendees, and other technologists who heard about the contests but were unable to compete were interested in learning more about robocalls, and offered numerous promising ideas for addressing this thorny issue. Since the contests have concluded, the FTC has gained new partners from DEF CON 23 who are now working with the FTC and other industry stakeholders through the London Action Plan International Do Not Call Forum and the Messaging, Malware and Mobile Anti-Abuse Working Group on creating solutions to illegal calls and related issue of fraudulent caller ID information.

Finally, the contests' broad media attention has continued to promote public awareness of the FTC's technical initiatives. In particular, the media's interest in the topic gave the agency an opportunity to convey its consumer education messages about illegal telemarketing calls to a broad audience.

N. General Services Administration

a. Digital Innovation and Strategy Hack-a-thon[76]

Summary: The GSA Digital Innovation and Strategy Hackathon asked the public to develop a technology-driven solution using GSA data that allows an agency to identify opportunities for improvements and transparency. As such, GSA challenged the public to create a solution using GSA data that could be replicated across government to every agency, using their own data. The organizers challenged participants to create a digital interactive solution in the form of an application, Application Programming Interface (API), and/or data mashup that utilizes federal data collected by GSA. Participants were asked to submit a technology solution that was innovative and not an analysis tool that would supply known information.

Participants were presented with 4 projects from which they could choose to work on:

1. *IAE's Vendor Dashboard for Contracting Officers* – The goal of this project was to have participants develop a mashup of DUNS (Data Universal Numbering System), FPDS, and Vendor data and display it on one Webpage.

[76] http://open.gsa.gov/Digital-Innovation-Hackathon

2. *Travel Tool (existing)* – The goal of this project was to have participants enhance an existing tool procured last year through a challenge competition.
3. *Redesign of GSA's Public Data Listing (PDL)* - This goal of this project was to have participants take GSA Public Data Listing .json files and find new and interesting ways to display the data on open.gsa.gov.
4. *PBS Tenant Satisfaction* - The goal for the PBS project was to create a data mashup and visualization (e.g., webpage, portal, application, etc.) by using PBS tenant satisfaction data.

Solution Type: Software and apps; Analytics, visualizations, and algorithms

Primary Goals: Improve government service delivery; Solve a specific problem; Find and highlight innovative ideas; Develop technology; Engage new people and communities

Results: The solutions obtained exceeded GSA's expectations for the first Hackathon event. They will improve the usage of GSA's data, aid in the reviewing of datasets and ensure that they are machine readable.

The competition had a total of 65 registered participants, from organizations that included: Booz Allen Hamilton, Octo Consulting Group, Forum One, Georgia State University, NYU, Ventera Corporation, University of Maryland, Socrata, George Washington University, and Deloitte Digital. Several of the Companies sent Teams to compete in the Hackathon, but the majority of participants were not associated with a Company or pre-formed Team. Teams were naturally formed as participants arrived and chose their seats at various tables set up for the event.

A total of 12 winners from two teams were selected for a total prize amount of $12,000 ($1,000 to each winner).

Problem Statement: The Hackathon was held to accomplish the following goals:

- Increase engagement with the public,
- Seek solutions from the participants using GSA data,
- Improve/enhance GSA data, and
- Identify enhanced ways to use and share GSA data.

Participants were provided with specific guidelines in order for their solutions to be eligible for submission and judging as follows:

Any solutions submitted should accomplish the following two tasks:

1. Visually display or transmit data in a way that will enhance the way GSA works;
2. Provide solutions for improved data collection efforts.

All final solutions are to be Open Source Code and placed on GSA's GitHub site specified to all participants. The Hackathon was a single challenge and the solution being sought was Software and Apps.

Proposed Goals: The primary goals and desired outcomes from the Hackathon were to:

1. Solve a specific problem.
2. Find and highlight innovative ideas.
3. Develop technology.

The Hackathon had many objectives in addition to those shown above; GSA wanted to engage with the public, gain their insight regarding GSA data, identify areas where GSA can improve how to use its data, and establish public engagement.

Why a Prize: The competition offered prizes for the Hackathon in order to attract serious Software Developers, Designers, Data Scientists and Academia.

Participants: Working with the GSA General Counsel and reviewing other challenges posted on Challenge.gov, the organizers created the following eligibility requirements for participants.

Participants must:

- Have registered to participate in the competition and complied with the rules of the competition.
- Been incorporated in and maintain a primary place of business in the United States, and in the case of an individual, whether participating singly or in a group, the participant must be a citizen or permanent resident of the United States.

Participants may not be:

A Federal entity or Federal employee acting within the scope of employment. However, an individual or entity shall not be deemed ineligible because the individual or entity used federal facilities or consulted with federal employees during a competition if the facilities and employees are made available to all individuals and entities participating in the competition on an equitable basis.

Participants agree to assume any and all risks and waive claims against the federal government and its related entities, except in the case of willful misconduct, for any injury, death, damage, or loss of property, revenue, or profits, whether direct, indirect, or consequential, arising from participation in this competition, whether the injury, death, damage, or loss arose through negligence or otherwise. Participants also agree to obtain liability insurance or demonstrate financial responsibility, to cover a third party for death, bodily injury, property damage, or loss resulting from an activity carried out in connection with participation in this competition.

Participants are hereby advised that diligent care must be taken to avoid the appearance of government endorsement of competition participation and submission. Moreover, as is customary when doing business with the federal government, participants may not refer to

GSA's use of the participant's submission (be it product or service) in any commercial advertising or similar promotions in a manner that states or implies that the product or service being used is endorsed or preferred by GSA or any other element of the federal government, or that the federal government considers it to be superior to other products or services. The intent of this policy is to prevent the appearance of federal government bias toward any one product or service.

Participants agree that GSA's trademarks, logos, service marks, trade names, or the fact that GSA awarded a prize to a Participant, shall not be used by the Participant to imply direct GSA endorsement of the Participant or the Participant's submission. Both Participants and the GSA may list the other party's name in a publicly available customer or other list so long as the name is not displayed in a more prominent fashion than any other third party name.

The final solution should be open source code and placed on GSA's GitHub site. Open source refers to a program in which the source code is available to the general public for use and/or modification from its original design free of charge. In order to be Open Source Initiative Certified, the solution must meet the following ten criteria:

1. The author or holder of the license of the source code cannot collect royalties on the distribution of the program;
2. The distributed program must make the source code accessible to the user;
3. The author must allow modifications and derivations of the work under the program's original name;
4. No person, group, or field of endeavor can be denied access to the program;
5. The rights attached to the program must not depend on the program being part of a particular software distribution; and
6. The licensed software cannot place restrictions on other software that is distributed with it;
7. The solution must be an online, interactive solution that meets the goals and objectives provided in this document;
8. The solution must include documentation of all data sources used;
9. The solution must include a description of how the solution can be updated with additional data from other agencies;
10. The solver must provide recommendations to enhance Government insights through improvements in data collection.

The winner(s) of the competition will, in consideration of the prize(s) to be awarded, grant to GSA a perpetual, non-exclusive, royalty-free license to use any and all intellectual property to the winning entry for any governmental purpose, including the right to permit such use by any other agency or agencies of the federal government. All other rights of the winning entrant will be retained by the winner of the competition.

Participants who attended:

The competition had a total of 65 registered participants, from organizations that included: Booz Allen Hamilton, Octo Consulting Group, Forum One, Georgia State University, NYU, Ventera Corporation, University of Maryland, Socrata, George Washington University, and Deloitte

Digital. Several of the Companies sent Teams to compete in the Hackathon, but the majority of participants were not associated with a Company or pre-formed Team. Teams were naturally formed as participants arrived and chose their seats at various tables set up for the event.

Participants brought unique and varied skill sets to the competition (this list was voluntarily supplied by registrants):

Certified Scrum Master	Accounting
Business Analyst	Linux SysAdmin
Art Director	Human Factors Engineering
Node JS	APIs
Java	Open Data
JavaScript	Web Development
Database Design & Functional Programming	Analysis/Data Science
Governance	Graphics Design
Risk	Proto-typing
Compliance in the Cloud	Requirements Analyst
Front End Developer/UX Design/Content	Data Mining
Ruby	Agile Development
Rails	Content Management Systems
Data Science/Web Development	Mobile and Cloud
Data Architecture	ETL
User Experience Design	Business Intelligence
Service Delivery Innovation	Data Visualization
Taxes	Real-time 3D Video Software
Investment	Full Stack Web Development
Insurance	Digital Interactive

Timeline: Submissions for the competition opened on April 28, 2015, and the Hackathon was held on May 8, 2015.

Solicitation & Outreach: The competition used the following methods to share information for the Hackathon event:

- Created Flyers and shared with GSA colleagues and universities
- Created a GitHub Event Page
- Created a Registration Page using Eventbrite
- Posted on GSA's Twitter
- Published a notice in the Federal Register

- Posted on Challenge.gov
- Briefing presented to CIO

Incentives: The Hackathon offered a total prize amount of $15,000; non-monetary incentives were not offered to motivate participants. Private-sector or philanthropic funds were not obtained for this event. A total of 12 winners were selected for a total prize amount of $12,000.00. The entire prize amount was allocated to a single accounting line: 2015-G-00-262X-CSD1-S00W0800-CSO40-I.

Evaluation and Judging: Judges were GSA Senior Career Officials with expertise in Government-wide Policy, Travel, Information Technology, and/or Acquisition.
The criteria used to assess solutions were:

- Technical competence and capabilities – 50%
    - The solution addresses the primary goals of the Hackathon. It is a finished product that can provide insightful analysis and show GSA how to enhance/improve existing functions, share data across GSA and more efficiently utilize existing applications.
- Use of data to provide effective outcomes – 20%
    - The solution displays in a way that is easy to understand, visually appealing, and will help drive understanding of current trends as well as recommendations.
- Creativity / Innovation – 10%
    - The solution exceeds any internal capability that GSA has for analysis of data through its incorporation of creative design elements and innovative capabilities.
- Valuable information and insights regarding data – 20%
    - The solver provides recommendations for additional data elements to be collected by the Government. The solver identifies gaps in the data and utilizes external data sources and research to aid the Government in setting future data collection policies.

Partnerships: The GSA did not partner with any other Federal Agencies or Private Sector Entities.

Resources: The GSA did not work with any third-party contractor, vendor, or partner to conduct this prize competition.

The total personnel and other costs for the Hackathon were $20,037 (including 2 Federal employees, 1 contract employee, and the Federal Register Notice publication). GSA estimates that the competition provided a total dollar value to the agency of $125,152.

Total dollar value to GSA = $137,152.00 (Note: $12,000.00 in prize money yielding total value of $125,152.00).

Results: The solutions obtained exceeded GSA's expectations for the first Hackathon event. They will improve the usage of GSA's data, aid in the reviewing of datasets and ensure that they are machine readable. A total of 12 winners from two teams were selected for a total prize amount of $12,000.00 ($1,000 to each winner).

Project: IAE's Vendor Dashboard for Contracting Officers
Description: The goal of this project was to have participants develop a data mashup of DUNS, FPDS, and vendor data and display it on one webpage. Two teams chose this project and developed similar solutions.
Outcome: Team 1 developed a Drupal site that mashed the data pulled from the provided .csv files and presented it in an easy to use format. Team 10 developed an HTML/JS site while storing and pulling the data from MongoDB.
Value Explanation: Combining efforts of Team 1 and Team 10 to ideate, plan, and develop a solution with total labor hours coming to $12,384.[77] (e.g., $172 x 12 people x 6hrs).

Project: PBS Tenant Satisfaction
Description: The goal for the PBS project was to create a data mashup and visualization (e.g., webpage, portal, application, etc.) by using PBS tenant satisfaction data. Two teams chose this project and developed similar dashboards but one team also developed a prototype Android application.
Outcome: Team 4 analyzed the data and built an HTML/JS data mashup and webpage along with the Android prototype application to allow building tenants to submit requests for service within their building. Team 5 developed a data mashup and webpage using Jekyll (blog sw native to GitHub), Python, and Tableau for data analysis tools.
Value Explanation: Considering hours for ideation, planning, and development, this effort yielded $12,384 of calculated monetary effort to GSA.[78] In addition, the General Services Administration decided to cancel an acquisition planned to be $500,000 (though $400,000 had already been spent) because of the Android app developed by Team 4, saving the GSA $100,000. This project therefore yielded $112,384 in value to the GSA.

Project: Redesign of GSA's Public Data Listing
Description: The goal of this project was to have participants take GSA Public Data Listing .json files and find new and interesting ways to display the data on open.gsa.gov.
Outcome: Team 3 did not do what was asked but did something else interesting and valuable. They developed a data assessment tool to evaluate the file formats of GSA's current open data sets and evaluate them for machine readable capability. This produced glaring results that need

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[77] Assumptions: Hourly rate based on 18F blended rate for projects of $172.00/hr.; Hackathon lasted approximately 6 hours and each team consisted of 6 people; participants never left the room and gave a solid 6 hours of time; team members did not know each other or anything about the projects and data before they started; all project code is posted on GitHub.

[78] This is for the time during the Hackathon that participants worked on the challenge solutions. Combining efforts of Team 1 and Team 10 to ideate, plan, and develop a solution with total labor hours comes to $12,384 (e.g., $172 x 12 people x 6hrs).

to be addressed for future data sharing, because very few data sets are machine usable. The team developed an HTML/JS webpage and integrated the .json file. They hosted the page on a test AWS site.
Value Explanation: Considering labor hours for the project using a similar methodology, the value to GSA would be $6,192.

O. Office of Management and Budget

a. Digital Service Contracting Professional Training and Development Program Challenge[79]

Summary: The Office of Federal Procurement Policy (OFPP) and the U.S. Digital Service are working together to design a training program that will develop and produce contracting professionals who can be successful in this era of digital government. OFPP and the US Digital Service recognize the need for improving and simplifying the digital experiences that citizens and businesses have with the Federal government. Strengthening digital services buying expertise in the Federal government is a key component of being able to reduce the risk of failed acquisitions and systems, and save taxpayer dollars.

Participants in the challenge were asked to first develop concept white papers, from which three finalists were chosen (Phase I). Those three finalists were asked to further develop their designs and then present them at an oral presentation along with a one hour mock classroom training (Phase II). From the project design, one winner was selected to develop and present the five-month pilot program to 30 Federal contracting professionals (Phase III). The winner was selected based upon the overall effectiveness of the proposed program design, the overall capability to assess the effectiveness of the program, and the feasibility of implementation. The final phase, final program design and assessment, will take place in FY 2016.

Total prize money equals $360,000.

Solution Type: Ideas; Other (Pilot Program)

Primary Goals: Improve government service delivery; Stimulate a market; Find and highlight innovative ideas

Results: The challenge received 23 submissions. Five were from private citizens; twelve were from companies with expertise in agile software development; four were from companies with expertise in training; and two were from companies with expertise in training and agile software development (one of which was a partnership between a company with agile development expertise and a company with training expertise).

[79] https://www.challenge.gov/challenge/digital-service-contracting-professional-training-and-development-program-challenge-2/

In Phase I (the Technical Concept Phase), three companies were selected as finalists: GovLoop, Management Concepts, and Team ICF International & ASI Government. The key attribute that all three of the finalists shared is that they proposed a complete concept for a training and development solution that hit all of the fundamental training experiences, and they all offered innovative and creative means of delivering the training. Each received $20,000 each to create the Phase II design

In Phase II (the Detailed Design Phase), one winner, Team ICF International & ASI Government, was selected. The use of the detailed design document, the oral proposal, and the mock classroom gave the judges a complete picture and feedback from end users as to how elements of this program would be delivered. The challenge winner will receive $250,000 in 7 incremental milestone payments for the delivery of the pilot program in FY 2016. The winner of the challenge will be eligible for a final prize of $50,000 based upon the successful results of the evaluation of the final submission.

Phase III and the Final Phase will be conducted in FY 2016.

Problem Statement: On December 4, 2014, Anne Rung, Administrator for Federal Procurement Policy, issued a memorandum titled, "Transforming the Marketplace: Simplifying Federal Procurement to Improve Performance, Drive Innovation, and Increase Savings."[80] In this memorandum, Administrator Rung stated that "opening the acquisition system to greater innovation is critical to ensuring the best results from our contracts." As part of delivering results, Ms. Rung recognizes that the core capacity of the federal acquisition workforce must be strengthened, especially in the areas of IT and digital service acquisition. The U.S. Digital Service, formed in August 2014, released the Digital Service Playbook and TECHFar as guides to agencies on how to innovate and adopt flexible practices to enhance how digital service is provided to citizens.

OMB quickly realized that the Federal acquisition workforce generally does not have the skills or specialized market knowledge to buy digital services utilizing agile approaches and design-centered thinking. While there was a general recognition that building digital expertise needs to occur throughout an agency, a determination was made to start with the contracting workforce. In looking at existing training programs for contracting professionals, OMB recognized that the level of skill required to become a subject matter expert in digital service procurement cannot be obtained through classroom training alone.

Adopting digital service practices that get to working solutions through concept, design, and pilot methods, organizers used a three-phase approach for the challenge. Participants in the challenge were asked to first develop concept white papers, from which three finalists were chosen. Those three finalists were asked to further develop their designs and then present them at an oral presentation along with a one hour mock classroom training. From the project design, one winner was selected to develop and present the five-month pilot program to 30 Federal

[80] Available at http://www.whitehouse.gov/sites/default/files/omb/procurement/memo/simplifying-federal-procurement-to-improve-performance-drive-innovation-increase-savings.pdf.

contracting professionals. The winner was selected based upon the overall effectiveness of the proposed program design, the overall capability to assess the effectiveness of the program, and the feasibility of implementation.

Proposed Goals: The final goal of the challenge will be to create a core-plus digital service certification for contracting officers based upon a fully-developed training and development program concept that can be provided to Federal training institutions, such as the Federal Acquisition Institute (FAI) and Defense Acquisition University (DAU), to implement and maintain. This program will be one of many initiatives to foster transformative change in the Federal Digital Service acquisition culture. Further, OMB plans to use this model for training and development in other critical areas of acquisition, such as IT or services.

The primary outcomes of the Digital Service Contracting Professional Training and Development Program are that participating Federal contracting professionals:

- Become digital service procurement experts;
- Are equipped with the knowledge necessary to be embedded within agency Digital Service teams to serve as a business advisor to the team, its customers, and its stakeholders; and
- Have the knowledge to lead agency training, workshops, and consultations in order to expand digital service procurement expertise within their agency and the government.

Specifically, the program must teach Federal Contracting Professionals how to:
(1) Understand and procure digital services and supplies utilizing concepts such as those described in the Digital Services Playbook[81] and the TechFAR[82] (e.g., DevOps, UX, Design Services, Agile Software Development, Open Source, Cloud, Iaas, SaaS, and PaaS);
(2) Appropriately measure the success of these contracts based on industry standards;
(3) Accurately describe and define the value received; and
(4) Encourage the use of commercial practices and innovative approaches (e.g., modular contracting, broad agency announcements, challenges and prizes) to ensure procurements can capture flexible and rapidly changing technology advances.

The three primary goals for the challenge are improving government service delivery, stimulating a market, and finding innovative ideas for training and development of contracting professionals. These are considered equally important.

Why a Prize: Creating specialized knowledge in a field requires immersion and a safe space to learn and try new methods. OMB was interested in experiential training but this type of training for this subject matter does not exist in the marketplace. In order to meet the objective of developing and piloting an immersion-based training and development program as well as

[81] https://playbook.cio.gov/

[82] https://github.com/WhiteHouse/playbook/blob/gh-pages/_includes/techfar-online.md

indicating federal need in the marketplace for this style of specialized development program, OMB decided to pursue this new, innovative training through a challenge.

Additionally, organizers knew the objective and goal, but not how to start documenting the requirements of a program that would be successful. In providing guidance on how to innovate to agencies, OFPP and USDS support the Prize Challenge program and wanted to use it as a method to show how an agency can use the authority to solve a problem.

Participants: Organizers had no preconceived notion about who would participate in the challenge. Organizers were hoping to get a mix of training experts, agile software development experts, and even private citizens who had an interest in innovative agile software development training. Formal eligibility requirements were included in the details on the challenge website and are excerpted below:

To be eligible to win a prize under this Challenge, an individual or entity:

- Shall have registered to participate in the Challenge under the rules promulgated by OMB and published in this Notice;
- Shall have complied with all the requirements in this Notice;
- In the case of a private entity, shall be incorporated in and maintain a primary place of business in the United States, and in the case of an individual, whether participating singly or in a group, shall be a citizen or permanent resident of the United States. Non-U.S. citizens and non-permanent residents are not eligible to win a monetary prize (in whole or in part);
- In the case of an individual, whether participating singly or in a group, must be at least 18 years old at the time of entry;
- May not be a Federal entity;
- OMB reserves the right to disqualify and remove any submission that is deemed, in the judging panel's discretion, inappropriate, offensive, defamatory, and/or demeaning;
- May not be a Federal employee acting within the scope of his/her employment, and further, and may not work on his or her submission(s) during assigned duty hours;
- May not be an employee of the U.S. Digital Service, OFPP, a judge of the Challenge, or any other party involved with the design, production, execution, or distribution of the Challenge or the immediate family of such a party (i.e., spouse, parent, step-parent, child, or step-child).

The challenge received 23 submissions. Five were from private citizens; twelve were from companies with expertise in agile software development; four were from companies with expertise in training; and two were from companies with expertise in training and agile software development (one of which was a partnership between a company with agile software development expertise and a company with training expertise).

Timeline: The challenge was split into four phases: Phase I, Phase II, Phase III, and Final Program Design and Assessment. Phase III and the Final Phase will be conducted in FY 2016.

January 28, 2015	Reverse Industry Day
May 20, 2015	Challenge Goes Live!
June 23, 2015	Phase I Concept Paper Due
July 2, 2015	Finalist Selection by Judging Panel
July 17, 2015	Finalists for Phase I notified
August 28, 2015	Phase II Detailed Program Design Due
September 1, 2015	Oral Presentations
September 2, 2015	Mock Classroom Training
September 4, 2015	Challenge Winner Selection by Judging Panel
September 8, 2015	Challenge Winner Notified
October 16, 2015	30 federal contracting professionals selected as students
October 20-22, 2015	Digital Service Contracting Professional Training and Development Program Pilot Orientation for students
October 26, 2015	Pilot Begins
April 15, 2016	Pilot Ends
May 15, 2016	Final Program Design and Assessment Due
May 15, 2016	End of Challenge

Solicitation & Outreach: Prior to finalizing the concept of the challenge and how it would be run, the organizers needed more information about the existing market in order to understand whether the Challenge would be effective, how best to release the challenge and who the target audience should be. A Reverse Industry Day was held to obtain input from industry about what potential solutions existed.

Instead of the Federal government telling industry what it wants, in a Reverse Industry Day, the government states the problem it is trying to solve and lets industry say what they have that could meet Federal needs. Even though the formant was a challenge and not a traditional procurement, the organizers wanted to start the outreach efforts early. Nine organizations presented including Agile software development companies, FFRDCs, training organizations, and traditional federal system integrators.

Following the Reverse Industry Day, a draft version of the challenge was sent to the industry attendees to get their feedback on whether the format of the phased approach made sense and whether they would be interested in submitting a response to the challenge. An overwhelming response was received to this inquiry and the organizers were able to tweak and modify some minor points before sending out the final challenge.

As this was the first challenge OMB had promulgated, industry verified that the organizers were on the correct path with regards to the prize and the methodology. The feedback also indicated

that there was a healthy interest in the prize challenge and results could be expected, which was a major revelation because the marketplace was unclear before the challenge.

Due to time constraints, a blog post was not released with the release of the challenge. This was planned, but in order to meet mission critical timelines, the organizers had to get the prize challenge posted. That is the only outreach area that the organizers feel could have been improved.

Incentives: Chief Acquisition Officer Council funds were used to fund the challenge. Three finalists received $20,000 each to create the Phase II design. The challenge winner will receive $250,000 in 7 incremental milestone payments for the delivery of the pilot program in FY 2016. The winner of the challenge will be eligible for a final prize of $50,000 based upon the successful results of the evaluation of the final submission. Total prize money equals $360,000. A non-monetary incentive was that the three finalists' information was posted to challenge.gov.

Evaluation and Judging: A panel of five judges evaluated the Phase I program concept submissions and rated them based upon the effectiveness of the overall concept to help foster transformative change in the Federal Digital Service acquisition culture, the viability of the proposed program, the anticipated cost and its reasonableness, the effectiveness of the proposed assessment of the pilot, the innovativeness of the approach, and its potential for achieving the objectives of the program.

The same five judges evaluated the Phase II program designs and rated them on the overall effectiveness of the proposed program design, overall assessment capability (demonstrating the participants' ability to meet the program objectives), and feasibility of implementation.

The same five judges will evaluate the effectiveness of the program pilot based on the results of the assessment of the pilot and proposed program, and the expected return on investment. The evaluation was very effective. The organizers thought the mix of judges brought the right skills and perspectives to the evaluation. Having a consensus process was very effective. Each judge evaluated the submissions individually, then came together for a consensus discussion.

Partnerships: The challenge was the result of a very effective partnership between the U.S. Digital Service and the Office of Federal Procurement Policy, both housed within the Office of Management and Budget.

Resources: Agency resources used were two FTEs who developed and managed the challenge process and resulting pilot, three FTEs who were judges and used periodically, and a couple of detailees who helped with managing the program. Approximately 25 FTEs attended the day-long mock classroom training. No contractors, vendors, or partners were used.

Results: Submissions were judged as follows:

1. How effective is the solution?
2. How do we measure the knowledge gained by the contracting officers?
3. Following the pilot, how feasible is this solution?

Phase I - Technical Concept Phase: Three companies were selected as finalists: GovLoop, Management Concepts, and Team ICF International & ASI Government. The key attribute that all three of the finalists shared is that they proposed a complete concept for a training and development solution that hit all of the fundamental training experiences, and they all offered innovative and creative means of delivering the training. All of the solutions appeared to be feasible to implement at the federal level and had an element of creativity that was uniquely designed for this program.

Phase II – Detailed Design Phase: One winner: Team ICF International & ASI Government. The use of the detailed design document, the oral proposal, and the mock classroom gave the judges a complete picture and feedback from end users as to how elements of this program would be delivered. If this phase were to be improved, it would be by putting more structure around the mock classroom experience. In the delivery of the mock classroom, the companies tended to restate the information in their oral proposal instead of providing a true instructional element, or "test" of what a student would experience in the delivered program.

Each student in the mock classroom gave responses to a written survey as well as had a discussion with the judges about the overall experience. The results of these evaluations were folded into the overall Phase II discussion and helped the judges come to a decision.

Phase III – The pilot phase is still in progress. The solution being implemented is using an open source learning system, agile-based release cycle for the development of content, end user (aka student) feedback and assessment, multi-modal learning techniques including wikis, discussion boards, videos to display content, and in-person classroom sessions. The students are continually assessing and providing feedback about the content and the learning experience which will be used to inform how the final program will be developed for implementation across the government.

P. Small Business Administration

a. America's Seed Fund Logo Design Competition for the SBIR/STTR Programs[83]

Summary: The U.S. Small Business Administration (SBA) "America's Seed Fund" Logo Design Competition sought submissions from artists and designers to create a thoughtful and imaginative visual representation of the government's largest innovation effort focused on research-driven, innovative and cutting-edge small businesses through the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs.

SBA offered a $2,500 prize purse.

Solution Type: Creative (design & multimedia)

[83] https://www.challenge.gov/challenge/americas-seed-fund-logo-design-competition-for-the-sbirsttr-programs/

Primary Goals: Solve a specific problem; Engage new people and communities

Results: The prize competition received 280 entries. The submissions resulted in a logo that SBIR/STTR Federal Agency partners will use as co-branding for their respective SBIR/STTR programs. To date, approximately 80-85% of the SBIR/STTR Federal agency partners are using the new logo, and organizers expect 100% utilization by the end of 2016.

Problem Statement: The SBIR/STTR Programs are extremely competitive and encourage small businesses to engage in federally funded research and development (R&D) through eleven Federal agencies with R&D needs. SBIR/STTR awards enable small businesses to explore their technological potential, stimulate innovation to meet federal R&D needs, and potentially profit from private-sector commercialization of developed technologies. Since SBIR's inception in 1982, 150,000 awards totaling $40 billion have been awarded to the small firms that participate. The programs touch, catalyze and seed the creation of STEM-driven innovations in industries critical to the nation's long term competitiveness and growth – from nanotech to robotics to mobile communications to genetic therapies to clean energy to advanced weapons to space exploration. Many of today's technology giants – or their underlying technological components – received seed funding through SBIR or STTR awards via the eleven participating Federal agencies; the Environmental Protection Agency, the National Aeronautics and Space Administration, the National Science Foundation and the U.S. Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Homeland Security and Transportation.

Proposed Goals: The prize organizers sought to engage the creative art and design communities in helping to provide a creative marketing brand.

Why a Prize: A prize is a unique way to engage with the creative communities and solicit a variety of proposed designs from the general public be it amateur or professional-level renderings. A contract endeavor would limit the number of participants as well as not afford the ability to see what the creative landscape would be like in potential design choices for the new SBIR/STTR logo.

Participants: Participants, who submitted as individuals, were from the general public and ranged from amateur to professional graphic designers. The participants were distinctly different from people who would participate with SBA through means other than prize competitions. The prize competition received 280 entries.

Timeline: The competition was launched May 4, 2015, submissions closed May 29, 2015, and the winner was vetted thereafter and announced at the White House on June 15, 2015.

Solicitation & Outreach: Organizers used posts on the Federal Register, social media, blog posts, and Gov Delivery for outreach to potential participants.

Incentives: Competitors were incentivized with a $2,500 prize purse and the opportunity to be honored at the White House during the National SBIR/STTR Conference.

Partnerships: No partnerships were utilized in this prize competition

Resources: About 40 hours of SBA staff time was devoted to the prize competition and the prize money, which totaled $2,500, came out of the SBA budget.

Results: The submissions resulted in a logo that SBIR/STTR Federal Agency partners will use as co-branding for their respective SBIR/STTR program. To date, approximately 80-85% of the SBIR/STTR Federal agency partners are using the new logo, and organizers expect 100% utilization by the end of 2016.

b. Growth Accelerator Fund Competition – 2015[84]

Summary: In August 2015, SBA completed the second installment of the Growth Accelerator Fund competition with a total prize purse of $4.4 million in order to continue building the support structure needed to help startups become commercially viable and create more jobs quickly. This extra infusion of capital to qualified accelerators and the burgeoning ecosystem in which they play provides resources to expand the startup and entrepreneurship communities around them in order to provide a much needed and sustainable economic impact.

In running this competition, SBA hoped to support both new and existing accelerators from all over the country that were not yet familiar with the SBA's services and that were not being fully served by the traditional venture capital or angel capital community. In addition to providing funds to underserved groups and geographic areas with less access to capital, this year's competition had a new emphasis on accelerator models that include support for manufacturing.

Solution Type: Business plan; Creative (design & multimedia)

Primary Goals: Stimulate a market; Inform and educate the public

Results: SBA awarded $4.4 million of Congressionally appropriated funds to 88 accelerators located in 39 states, Washington, D.C. and Puerto Rico with 14 being in rural counties, 24 focusing on manufacturing and marketing, 39 owned by women, 21 owned by minorities, 21 focused on women, 36 focused on the underserved, and 13 focused on veterans. Since the awards are provided late in the fiscal year and data are collected during the following year through the required quarterly report submission from the winners, the organizers will continue to gather information and provide updates as requested.

Last year's accelerator winners have helped create 5000 jobs, have launched approximately 1400 startups, and have raised collectively over $600 million in additional funding.

Problem Statement: In 2015, the SBA conducted the second round of the Growth Accelerator Fund contest. SBA awarded $50,000 prizes to the winners of the contest. These funds will be used to fund operating budgets, not for investing in startups in ecosystems. The winners of this

[84] https://www.challenge.gov/challenge/2015-growth-accelerator-fund-competition/; http://www.sba.gov/accelerators

year's contest were required to demonstrate the ability to raise (or have plans to raise) a 4 to 1 match of prizes awarded. This match can be in the form of cash, in-kind donations, or sponsorships. For this contest, "accelerators" are defined as: organizations that provide networking opportunities, mentorship, space (can be physical or virtual), and sometimes capital to startups. All models are expected to have a prescribed timeline after which startups "exit" or "graduate" their organization to function independently in the small business economy.

Judges gave particular attention to applicants that filled geographic, industry, and economic gaps in the accelerator and entrepreneurial ecosystem space. Through this competition, SBA sought to support the development of accelerators and thus startups in parts of the country where there are fewer conventional sources of access to capital (e.g., venture capital and other investors).

In addition to accelerators which fill these gaps, SBA also sought accelerators that are run by or support women or other underrepresented groups. New to this year, special consideration was given to any accelerator models that will support manufacturing and the White House POWER Initiative.

To summarize, the main premise of the competition is to ensure that a diverse set of entrepreneurs from all walks of life have the opportunity to participate in the American innovation economy. The more startup ecosystems that emerge in every corner of America and that enhance opportunities for those underrepresented in entrepreneurship, the more competitive the United States will become.

Proposed Goals: The proposed goals of the challenge were to infuse capital into qualified accelerators and the burgeoning ecosystem in which they play, which, in turn, provides resources to boost the startup and entrepreneurship communities around them.

Why a Prize: A prize is the easiest vehicle to get the money to the winners and achieve results. A prize competition enabled SBA to showcase the important role accelerators are playing in the entrepreneurial ecosystem and highlight the need for increased investment in accelerators in underserved communities. Further, SBA grant authority is not available for awards to accelerators and a contract solicitation would have omitted non-profits and not have drawn in the broader accelerator/incubator community.

Participants: The participants included underserved groups, geographic areas with less access to capital and organizations focused on supporting manufacturing and making. SBA accepted entries from both existing and newly launching accelerator models. The competition received 417 applications in the first round from 39 states, Washington, D.C., and Puerto Rico

Timeline: The prize was launched April 1, 2015, accepted submissions until June 1, 2015, and awarded on August 4, 2015.

Solicitation & Outreach: The organizers solicited submissions through press release, social media, blog posts, stakeholder outreach (Growth Accelerator Network), and previous applicants.

Incentives: The competition offered a $50,000 prize for each winner, for a total $4.4 million prize purse.

Evaluation and Judging: Judging was conducted in two rounds. The first round was public sector focused (with SBA and government-wide judges). The second round was private sector focused. "Solvers" submitted a 10-slide PowerPoint for the first round and 2-minute video for the second round.

To award the prizes, several panels composed of over 40 judges considered each applicant's stated mission, impact, implementation, and success metrics. The panel gave particular attention to accelerators that filled current geographic gaps in the entrepreneurial ecosystem, those that were run by and support women or other underrepresented groups, and accelerator models that support manufacturing. For the purposes of this competition, Growth Accelerators include accelerators, incubators, co-working startup communities, shared tinker-spaces or other models to accomplish similar goals.

Partnerships: No partnerships were utilized for this prize competition.

Resources: SBA staff time and the $4,400,000 prize money composed the resources expended.

Results: The winning 88 accelerators were located in 39 states, Washington, DC and Puerto Rico with 14 being in rural counties, 24 focusing on manufacturing and marketing, 39 owned by women, 21 owned by minorities, 21 focused on women, 36 focused on the underserved, and 13 focused on veterans. Since the awards are provided late in the fiscal year and data is collected during the following year through the required quarterly report submission from the winners, the organizers will continue to gather information and provide updates as requested.

Last year's accelerator winners have helped create 5000 jobs, have launched approximately 1400 startups, and have collectively secured over $600 million in additional funding.

c. Startup in a Day Competition - Start Small Model[85]

Summary: The Startup in a Day - Start Small prize competition challenged cities and Native American communities across the United States to make the startup process easier for entrepreneurs. In the United States, 28 million small businesses created nearly two out of three jobs in the country's economy. By streamlining the information and process for starting a business, the competition aimed to encourage entrepreneurs to bring their businesses to market and help the economy grow.

The White House and the National League of Cities were partners with SBA in the implementation of this challenge.

Solution Type: Ideas; Software and apps

[85] https://www.challenge.gov/challenge/startup-in-a-day-competition-start-small-model/

Primary Goals: Improve government service delivery; Find and highlight innovative ideas; Other (encourage entrepreneurs to bring their businesses to market and help the economy grow)

Results: There were 81 applicants to the Startup in a Day – Start Small Model prize competition. The applicants represented cities and Native American communities across the United States and its territories. Nineteen (19) applicants were from communities with populations less than 50,000. Forty-two (42) applicants were communities with 20 percent or more of residents are below the poverty level. Eight (8) applicants were designated Veteran Economic Communities and four (4) were designated Promise Zones.

27 winners were be awarded $50,000 each to spur development, implementation, and improvement of online tools that allow entrepreneurs to learn about the business startup process in their area, including ways to register and apply for all required local licenses and permits, in one day or less. The full prize of $50,000 will be disbursed to each winner after the completion of two milestones. The first payment of $40,000, 80 percent of the prize, was disbursed once all the initial requirements of the challenge were met. The remaining 20 percent, $10,000, will be distributed after the winner submits a written assessment that includes the outcomes and outputs of its Startup in a Day activities as measured by the metrics outlined in the initial proposal, a summary of any lessons learned and best practices, and suggestions for any improvements to the design or implementation of similar competitions in the future. This milestone must be completed within 15 months of the first payment and must be based on an assessment period lasting between 6 and 12 months.

The winners of the Startup in a Day competition are still developing their solutions. However, as the cities and Native American communities exchange ideas and best practices it is clear the competition has spurred new interest in exploring ways to help entrepreneurs. The SBA is committed to supporting the Startup in a Day winners and pledges and transforming the ideas and practices into innovative resources for small businesses. The SBA continues to recruit cities to take the pledge. As of today, there are 77 cities and two Native American communities that have taken the pledge.

Problem Statement: The SBA was seeking to support entrepreneurs who were navigating the requirements to start a business. Many of these requirements were in multiple locations and a streamlined approach would help entrepreneurs startup more easily. The Startup in a Day Competition – Start Small Model was designed to spur the development, implementation, and improvement of online tools that would let entrepreneurs learn about the business startup process in their area, including how to register and apply for all required local licenses and permits, in one day or less.

Proposed Goals: The primary objectives of the prize competition are to develop, improve, and implement online tools and other innovations to streamline the business startup process. The primary goals of the prize competition were to improve government service delivery, to find and highlight innovative ideas, and to encourage entrepreneurs to bring their businesses to market and help the economy grow.

Participants: SBA hoped to mobilize and the competition was only open to local governments of United States cities (referred to as municipalities and townships by the U.S. Census Bureau) or American Indian, Alaska Native, or Native Hawaiian communities, or their constituent agencies and subdivisions. No city or Native American community that was suspended or debarred by the Federal government at the time of application was eligible to take part in the competition. In addition, no city or Native American community was allowed to submit more than one entry to the competition.

There were 81 applicants to the Startup in a Day – Start Small Model prize competition. The applicants represented cities and Native American communities across the United States and its territories. Nineteen (19) applicants were from communities with populations less than 50,000. Forty-two (42) applicants were communities with 20 percent or more of residents are below the poverty level. Eight (8) applicants were designated Veteran Economic Communities and four (4) were designated Promise Zones.

Timeline: The competition launched on June 11, 2015 and concluded on July 13, 2015. There were no phases or other submission deadlines associated with the competition. Winners were announced on August, 4, 2015 at the White House Demo Day.

Solicitation & Outreach: The methods used by the Small Business Administration to market the competition, mobilize participants, and ensure high quality submissions included:

- Utilizing the SBA's regional and district networks to promote the competition
- Emailing and calling local government officials and Native American community leaders
- Conducting Q&A conference calls with potential applicants
- Creating a webpage on the SBA website and marketing materials that were distributed online
- Announcing the competition at press events and the National League of Cities national conference.

To announce the winners of the Startup in a Day competition, the SBA and White House showcased the competition during the White House Demo Day. President Obama mentioned the competition during his remarks highlighting the day's events and participants. Demo Day and the Startup in a Day competition were reported by several news agencies across the country, including the winner's local markets, resulting in a wide range of press coverage.

Incentives: The total amount of the cash prize offered as part of the challenge was $1,350,000. Each prize will be disbursed to the winners via two payments once milestones are reached. The first payment equal to 80 percent of the $50,000 individual prize was disbursed once the initial requirements are met. The remaining 20 percent will be distributed after a winner submits a follow-up written assessment about the outcomes and outputs of its Startup in a Day activities. All milestones must be completed within 15 months of the initial award.

As part of the Startup in a Day competition, applicants had the option to take the Startup in a Day Pledge. If a city or Native American community took the pledge, they could participate in the community of practice organized and managed by the SBA and the National League of Cities. The community of practice would help the pledges by serving as a forum for exchanging ideas and best practices on how to make the startup process easier for entrepreneurs.

Evaluation and Judging: To judge the Startup in a Day submissions, individuals from SBA were assigned to a review committee. Each committee evaluated a randomly assigned group of applications. The applications were reviewed independently, not as a group, based on set criteria and a scoring system. The independent scores were assessed for anomalies. If there was an anomaly amongst the scores, an additional review was conducted. The most consistent scores were averaged. If an applicant qualified, priority points were applied to the average score. The final scores were ranked against the scores of all reviewed applications. The top scoring applications were awarded prizes.

Competition submissions were evaluated on the applicant's description of its community, the problem and related solution, and the plan for implementing the solution. Cities received Priority Points if the city qualified based on population size, average income level, designation as a Veteran Economic Community or Promise Zone, and/or if the city committed to the Startup in a Day pledge.

Priority points were awarded based on census information or a defined list. The process for determining if a city qualified for the points was made easier by using the objective, third-party sources.

Partnerships: The White House and the National League of Cities were partners with SBA in the implementation of this challenge.

Resources: The Small Business Administration provided the funding for the prizes awarded. To manage the competition, one full-time employee was assigned to the project for approximately five months. The SBA did not work with a third-party contractor, vendor, or partner to conduct the competition.

Results: The winners of the Startup in a Day competition are still developing their solutions. Each of the 27 city and community winners has identified the top five (5) metrics relevant to outputs and outcomes that would measure their individual success in solving the stated problems/obstacles.

27 winners will be awarded $50,000 each to spur development, implementation, and improvement of online tools that allow entrepreneurs to learn about the business startup process in their area, including ways to register and apply for all required local licenses and permits, in one day or less. The full prize of $50,000 will be disbursed to each winner after the completion of two milestones. The first payment of $40,000, 80 percent of the prize, was disbursed once all the initial requirements of the challenge were met. The remaining 20 percent, $10,000, will be distributed after the winner submits a written assessment that includes the outcomes and outputs

of its Startup in a Day activities as measured by the metrics outlined in the initial proposal, a summary of any lessons learned and best practices, and suggestions for any improvements to the design or implementation of similar competitions in the future. This milestone must be completed within 15 months of the first payment and must be based on an assessment period lasting between 6 and 12 months.

However, as the cities and Native American communities exchange ideas and best practices it is clear the competition has spurred new interest in exploring ways to help entrepreneurs. The SBA is committed to supporting the Startup in a Day winners and pledges and transforming the ideas and practices into innovative resources for small businesses. The SBA continues to recruit cities to take the pledge. As of today, there are 77 cities and two Native American communities that have taken the pledge.

d. Startup in a Day Competition - Dream Big Model[86]

Summary: The Startup in a Day – Dream Big prize competition challenged cities and Native American communities across the United States to make the startup process easier for entrepreneurs. For this competition, one winner would be awarded the prize purse of $250,000 to spur the development, implementation, and improvement of an open source, online tool that would let entrepreneurs learn about the business startup process in their area, including how to register and apply for all required local licenses and permits, in one day or less. Distinguishing it from the Start Small Model, the Dream Big Model produced open source solutions which could be used by the public.

In the United States, 28 million small businesses created nearly two out of three jobs in the country's economy. By streamlining the information and process for starting a business, the competition aimed to encourage entrepreneurs to bring their businesses to market and help the economy grow.

The Small Business Administration worked with the White House and the National League of Cities to promote the Startup in a Day competition.

Solution Type: Software and apps

Primary Goals: Improve government service delivery; Find and highlight innovative ideas; Other (encourage entrepreneurs to bring their businesses to market and help the economy grow)

Results: There were 14 applicants to the Startup in a Day – Dream Big Model prize competition. The applicants represented cities and Native American communities across the United States. Two (2) applicants were from communities with populations less than 50,000. Nine (9) applicants were communities with 20 percent or more of residents are below the poverty level. Two (2) applicants were designated Veteran Economic Communities and one (1) was designated a Promise Zone.

[86] https://www.challenge.gov/challenge/startup-in-a-day-competition-dream-big-model/

The winner of the Startup in a Day competition (the city of Los Angeles, California) is still developing its solution, and will receive the full prize of $250,000 after successfully completing three milestones. The first payment, equal to 60 percent of the total prize amount, was disbursed once all initial requirements were met. The second payment, equal to 20 percent of the prize, will be distributed once the winner presents a demonstration of its open source solution to SBA and agency staff have deemed that the solution is satisfactory. This demonstration must be presented within 6 months of the date of the initial award.

The remaining 20 percent of the prize amount will be disbursed once the winner submits a written assessment that includes the outcomes and outputs of its Startup in a Day activities as measured by the metrics outlined in its proposal, a summary of any lessons learned and best practices, and suggestions for improvements to the design or implementation of similar competitions in the future. Winners must base this assessment on a period of live operation of their Startup in a Day Web tools that is at least six months and no more than 12 months in length. The written assessment must be submitted to SBA no later than 15 months after the first prize payment.

The winning city has identified the top five (5) metrics relevant to outputs and outcomes that would measure success in solving the stated problems/obstacles. The metrics identified evaluate the design and responsiveness of the software; utilization of the website and business registration tool, particularly by non-English speakers; and, extent of outreach and civic engagement.

As the cities and Native American communities exchange ideas and best practices it is clear the competition has spurred new interest in exploring ways to help entrepreneurs. The SBA is committed to supporting the Startup in a Day winners and pledges and transforming ideas and practices into innovative resources for small businesses.

Problem Statement: The SBA was seeking to support entrepreneurs who were navigating the requirements to start a business. Many of these requirements were in multiple locations and a streamlined approach would help entrepreneurs startup more easily. The Startup in a Day Competition – Dream Big Model was designed to spur the development, implementation, and improvement of an open source, online tool that would let entrepreneurs learn about the business startup process in their area, including how to register and apply for all required local licenses and permits, in one day or less.

Proposed Goals: The primary objectives of the prize competition are to develop, improve, and implement an open source, online tool and other innovations to streamline the business startup process. With this improvement in government service delivery, the SBA anticipates that entrepreneurs will be more encouraged to bring their businesses to market.

Participants: The contest was only open to local governments of United States cities (referred to as municipalities and townships by the U.S. Census Bureau) or American Indian, Alaska Native, or Native Hawaiian communities, or their constituent agencies and subdivisions. No city or Native American community that was suspended or debarred by the Federal government at the

time of application was eligible to take part in the competition. In addition, no city or Native American community was allowed to submit more than one entry to the competition.

There were 14 applicants to the Startup in a Day – Dream Big Model prize competition. The applicants represented cities and Native American communities across the United States. Two (2) applicants were from communities with populations less than 50,000. Nine (9) applicants were communities with 20 percent or more of residents are below the poverty level. Two (2) applicants were designated Veteran Economic Communities and one (1) was designated a Promise Zone.

Timeline: The competition was launched on June 11, 2015 and concluded on July 13, 2015. Winners were announced on August 4, 2015 at the White House Demo Day.

Solicitation & Outreach: The methods used by the Small Business Administration to market the competition, mobilize participants, and ensure high quality submissions included:

- Utilizing the SBA's regional and district networks to promote the competition
- Emailing and calling local government officials and Native American community leaders
- Conducting Q&A conference calls with potential applicants
- Creating a webpage on the SBA website and marketing materials that were distributed online
- Announcing the competition at press events and the National League of Cities national conference.

To announce the winners of the Startup in a Day competition, the SBA and White House showcased the competition during the White House Demo Day. President Barack Obama mentioned the competition during his remarks highlighting the day's events and participants. Demo Day and the Startup in a Day competition were reported on by several news agencies across the country, including the winner's local markets, resulting in a wide range of press coverage.

Incentives: The total amount of the cash prize offered as part of the challenge was $250,000, and will be disbursed in three payments (equal to 60 percent, 20 percent, and 20 percent of the total prize, respectively) after three milestones are reached.

As part of the Startup in a Day competition, applicants had the option to take the Startup in a Day Pledge. If a city or Native American community took the pledge, they could participate in the community of practice organized and managed by the Small Business Administration and the National League of Cities. The community of practice would help the pledges by serving as a forum for exchanging ideas and best practices on how to make the startup process easier for entrepreneurs. The winners would be joined by other cities and communities that took the Startup in a Day Pledge.

Evaluation and Judging: To judge the Startup in a Day submissions, individuals from SBA were assigned to a review committee. The committee evaluated the group of applications. The applications were reviewed independently, not as a group, based on set criteria and a scoring system. The scores were averaged. If an applicant qualified, priority points were applied to the average score. After the applications were scored, the applications were reviewed as part of a group discuss by the committee. Committee members were allowed to change their scores after the discussion. However, no members changed their scores. The final scores were ranked against the scores of all reviewed applications. The top scoring application was awarded the prize.

Competition submissions were evaluated on the applicant's description of its community, the problem and related solution, and the plan for implementing the solution. Cities received Priority Points if the city qualified based on population size, average income level, designation as a Veteran Economic Community or Promise Zone, and/or if the city committed to the Startup in a Day pledge.

Priority points were awarded based on census information or a defined list. The process for determining if a city qualified for the points was made easier by using the objective, third-party sources.

Partnerships: The Small Business Administration worked with the White House and the National League of Cities to promote the Startup in a Day competition.

Resources: The Small Business Administration provided the funding for the prizes awarded. To manage the competition, one full-time employee was assigned to the project for approximately five months. The SBA did not work with a third-party contractor, vendor, or partner to conduct the competition.

Results: The winner of the Startup in a Day competition is still developing its solution, and will receive the full prize of $250,000 after successfully completing three milestones. The first payment, equal to 60 percent of the total prize amount, was disbursed once all initial requirements were met. The second payment, equal to 20 percent of the prize, will be distributed once the winner presents a demonstration of its open source solution to SBA and agency staff have deemed that the solution is satisfactory. This demonstration must be presented within 6 months of the date of the initial award.

The remaining 20 percent of the prize amount will be disbursed once the winner submits a written assessment that includes the outcomes and outputs of its Startup in a Day activities as measured by the metrics outlined in its proposal, a summary of any lessons learned and best practices, and suggestions for improvements to the design or implementation of similar competitions in the future. Winners must base this assessment on a period of live operation of their Startup in a Day Web tools that is at least six months and no more than 12 months in length. The written assessment must be submitted to SBA no later than 15 months after the first prize payment.

As the cities and Native American communities exchange ideas and best practices it is clear the competition has spurred new interest in exploring ways to help entrepreneurs. The SBA is

committed to supporting the Startup in a Day winners and pledges and transforming ideas and practices into innovative resources for small businesses.

e. InnovateHER Competition[87]

Summary: The American workforce looks different from 50 years ago. Women make up nearly half of the labor force and play a critical role in the nation's economic prosperity. Most children live in households where all parents work. As the population ages, families are increasingly caring for aging parents while balancing the needs of work and home. As the demands on women and families grow, the need for products and services that address these unique challenges increases.

The U.S. Small Business Administration (SBA) conducted InnovateHER for entrepreneurs to create a product or service that has a measurable impact on the lives of women and families, has the potential for commercialization, and fills a need in the marketplace.

SBA partnered with Microsoft Corporation to provide prize money and support for the event. The *Washington Post* provided space and digital support for live broadcasting online.

Solution Type: Ideas; Business plan

Primary Goals: Develop technology; Inform and educate the public

Results: The first InnovateHER Challenge ran on a short timeline, from February 2015 through May, 2015, with the InnovateHER Finals held in Washington, D.C. on May 8, 2015. Despite the compressed schedule, the SBA engaged more than 100 local host organizations and reached nearly 1,000 entrepreneurs across the nation during year one, awarding $30,000 in prize money provided by Microsoft to the top three winners. 74 applications were submitted to the SBA from local competitions.

The three winners of the InnovateHER 2015 Challenge, selected by a panel of expert judges were:

1. LIA Diagnostics: Bethany Edwards and her team at LIA Diagnostics in Philadelphia, PA designed a pregnancy test to provide a better experience for women at a stressful moment in their lives. The LIA test is discreet, easy to use and is environmentally friendly. Unlike current tests, LIA is flushable, ergonomically designed for women to hold and use, and displays a result that is easy to understand.

2. The Shower Shirt: Lisa Crites, owner of The SHOWER SHIRT™ in Cocoa Beach, FL designed a post-surgical, patented, water-resistant garment designed to prevent post-surgical mastectomy drain sites from coming into contact with water while showering. With the creation of The SHOWER SHIRT, women now have the option to shower safely, while also reducing their risk of post-surgical infections.

[87] https://www.sba.gov/content/sba-launches-innovate-her-business-challenge-innovations-empower-womens-lives

3. TRUSST Lingerie: Sophia Berman, designer at Trusst Lingerie in Pittsburgh, PA developed effective and attractive products aimed at eliminating the pain and discomforts experienced by the underserved U.S. market of larger busted woman with cup size DDD+. Current bra technology supports larger breasts from the shoulder straps. Trusst's cantilevered system places the majority of the support from underneath the bust, encompassing up to 80 percent of breast weight.

Problem Statement: The InnovateHER Challenge provides an opportunity for entrepreneurs to showcase products and services that:

- Have a measurable impact on the lives of women and families (30%);
- Have the potential for commercialization (40%), and,
- Fill a need in the marketplace (30%).

Proposed Goals: The American workforce looks different from 50 years ago. Women make up nearly half of the labor force and play a critical role in the nation's economic prosperity. Most children live in households where all parents work. As the population ages, families are increasingly caring for aging parents while balancing the needs of work and home.

As the demands on women and families grow, the need for products and services that address these unique challenges increases. The InnovateHER Challenge provides that platform.

Why a Prize: By leveraging the resources of the private sector, through cash prizes and local competitions, and having the business and investor community serve as judges and mentors, the competition brings together the communities across the country in a way that could not be done through a grant or contract alone. Additionally, the competition itself showcased the need for these types of products and services in the marketplace and the opportunity for increased investment in them.

Participants: Over 100 local organizations held InnovateHER competitions across the country. 74 applications were submitted to the SBA from these local competitions.

This Challenge was open only to:

1. Citizens or permanent residents of the United States who were at least eighteen (18) years of age at the time of their submission of an entry (or teams of such individuals); and

2. Private entities, such as corporations or other organizations that were incorporated in and maintained a primary place of business in the United States. Individuals submitting on behalf of corporations, nonprofits, or groups of individuals (such as an academic class or other team) had to meet the eligibility requirements for individual contestants.

An individual could belong to more than one team submitting an entry in this Challenge.

Individuals or organizations that were currently suspended or disbarred by the federal government were not eligible for this competition.

Timeline: The initial round of the InnovateHER Challenge took the form of local competitions that began March 1, 2015 and ended March 31, 2015. The host organizations running the local competitions selected and submitted one winner from each local competition to SBA, along with a Nomination package, by April 1, 2015. Winners were announced during a live pitch competition on May 8, 2015.

Solicitation & Outreach: The first round of InnovateHER consisted of local business competitions hosted by SBA Resource Partners, universities, accelerators, clusters, scale-up communities and other organizations that have been approved by SBA to host as part of InnovateHER.

With the help of SBA resource partners and Regional Administrators, the SBA made a concerted push to secure a diverse range of organizations, as reflected in hosts such as the National Latina Business Women Association-Los Angeles, Cosmo Latina, Go Africa Network Inc. in New York, and many others

The organizers heard from participants and stakeholders that with more lead time, more local organizations and entrepreneurs could be engaged and spur greater conversation, collaboration, and cooperation at all levels to support women, families, and entrepreneurs.

Incentives: Cash prizes totaling $30,000, funded by the private sector, were awarded to the three highest-rated contestants in the final round of the competition; first place received $15,000, second place $10,000, and third place $5,000.

For winning entries submitted by teams of competitors, prize money was awarded to the self-identified project leaders for distribution to the rest of the teams at their discretion and independently from SBA.

There were no non-monetary incentives involved and supported by SBA at the local level. Host locations had the autonomy to provide local prize incentives at their discretion.

Evaluation and Judging: SBA selected four judges with experience and expertise in product innovation and venture capital. The judges participated pro bono and SBA greatly appreciates their contributions to this contest and advancing consumer awareness of product safety recalls. Contestants must have demonstrated to the satisfaction of the judges that their product or service met the criteria of the Challenge. The full judging criteria were advertised in the Challenge Rules openly posted to the event website:

1. Have a measurable impact on the lives of women and families (30%)
2. Have the potential for commercialization (40%), and
3. Fill a need in the marketplace (30%).

Partnerships: SBA partnered with Microsoft Corporation to provide prize money and support for the event. The *Washington Post* provided space and digital support for live broadcasting online.

Resources: SBA provided staff time; Microsoft funded the competition prize money; and the *Washington Post* provided the space and digital support.

Results: The first InnovateHER Challenge ran on a short timeline, from February 2015 through May, 2015, with the InnovateHER Finals held in Washington, D.C. on May 8, 2015. Despite the compressed schedule, the SBA engaged more than 100 local host organizations and reached nearly 1,000 entrepreneurs across the nation during year one, awarding $30,000 in prize money provided by Microsoft to the top three winners.

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