Implementation of Federal Prize Authority: Fiscal Year 2013 Progress Report

A Report from the
Office of Science and Technology Policy

In Response to the America COMPETES Reauthorization Act of 2010 and the Requirements of Section 24 of the Stevenson-Wydler Technology Innovation Act of 1980

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About the Office of Science and Technology Policy

The Office of Science and Technology Policy (OSTP) advises the President on the effects of science and technology on domestic and international affairs. The office serves as a source of scientific and technological analysis and judgment for the President with respect to major policies, plans, and programs of the Federal government. OSTP leads an interagency effort to develop and implement sound science and technology policies and budgets. The office works with the private sector to ensure that Federal investments in science and technology contribute to economic prosperity, environmental quality, and national security. For more information, visit http://www.whitehouse.gov/ostp.

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Department, Agency, Office, and Division Abbreviations

AFRL	Air Force Research Laboratory (part of Air Force/DOD)
ARL	Army Research Laboratory (part of Army/DOD)
ASPR	Office of the Assistant Secretary for Preparedness and Response (part of HHS)
CDC	Centers for Disease Control and Prevention (part of HHS)
CMS	Centers for Medicare & Medicaid Services (part of HHS)
DARPA	Defense Advanced Research Projects Agency (part of DOD)
DOD	Department of Defense
DOE	Department of Energy
DOJ	Department of Justice
DTRA	Defense Threats Reduction Agency (part of DOD)
EPA	Environmental Protection Agency
EERE	Office of Energy Efficiency and Renewable Energy (part of DOE)
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
NASA	National Aeronautics and Space Administration
NCI	National Cancer Institute (part of NIH/HHS)
NCIPC	National Center for Injury Prevention and Control (part of CDC/HHS)
NEA	National Endowment for the Arts
NEH	National Endowment for the Humanities

NEI	National Eye Institute (part of NIH/HHS)
NIBIB	National Institute of Biomedical Imaging and Bioengineering (part of NIH/HHS)
NIDA	National Institute on Drug Abuse (part of NIH/HHS)
NIEHS	National Institute of Environmental Health Sciences (part of NIH/HHS)
NIH	National Institutes of Health (part of HHS)
NIJ	National Institute of Justice (part of DOJ)
NSF	National Science Foundation
ODPHP	Office of Disease Prevention and Health Promotion (part of HHS)
OMB	Office of Management and Budget (part of the Executive Office of the President)
OMH	Office of Minority Health (part of HHS)
ONC	Office of the National Coordinator for Health Information Technology (part of HHS)
ONDCP	Office of National Drug Control Policy (part of the Executive Office of the President)
OPM	Office of Personnel Management
OSTP	Office of Science and Technology Policy (part of the Executive Office of the President)
SAMHSA	Substance Abuse and Mental Health Administration (part of HHS)
State	Department of State
USAID	United States Agency for International Development
USGS	United States Geological Survey (part of the Department of Interior)

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EXECUTIVE SUMMARY

On January 4, 2011, President Obama signed into the law the America COMPETES Reauthorization Act of 2010 (COMPETES). Section 105 of COMPETES added Section 24 (Prize Competitions) to the Stevenson-Wydler Technology Innovation Act of 1980 (Stevenson-Wydler), granting all agencies broad authority to conduct prize competitions to spur innovation, solve tough problems, and advance their core missions.

Prizes have an established record of spurring innovation in the private and philanthropic sectors. This report details examples of how, under the right circumstances, well-designed prizes, integrated into a broader innovation strategy, have enabled Federal agencies to:

- Pay only for success and establish an ambitious goal without having to predict which team or approach is most likely to succeed;
- Reach beyond the "usual suspects" to increase the number of solvers tackling a problem and to identify novel approaches, without bearing high-levels of risk;
- Bring out-of-discipline perspectives to bear; and
- Increase cost-effectiveness to maximize the return on taxpayer dollars.

The Obama Administration has taken important steps to make prizes a standard tool in every agency's innovation toolbox. The September 2009 *Strategy for American Innovation*[1] recognized the potential for prizes to mobilize America's ingenuity to solve some of the Nation's most pressing challenges. In March 2010, the Office of Management and Budget (OMB) issued a formal policy framework[2] to guide agency leaders in using prizes to advance their core missions. In September 2010, the Administration launched Challenge.gov[3], a one-stop shop where entrepreneurs and citizen solvers can find public-sector prizes. By September 2013, Challenge.gov had featured more than 280 competitions from over 45 Federal agencies, departments, and bureaus.

The prize authority provided by COMPETES supports this effort. By giving agencies a clear legal path, the legislation has made it dramatically easier for agencies to use prizes, subject to the availability of appropriations or other allowed sources of funds. By significantly expanding the authority of all Federal agencies to conduct prize competitions, the legislation enables agencies to pursue more ambitious prizes with robust incentives.

Since the signing of COMPETES in January 2011, the Administration has laid the policy and legal groundwork to take maximum advantage of the new prize authority in the years to come. Policy and legal staff in the Office of Science and Technology Policy (OSTP) and Office of Management and Budget (OMB) jointly developed a Fact Sheet and Frequently Asked Questions

[1] http://www.whitehouse.gov/innovation/strategy and http://www.whitehouse.gov/sites/default/files/microsites/ostp/innovationstrategy-prizes.pdf
[2] http://www.whitehouse.gov/sites/default/files/omb/assets/memoranda_2010/m10-11.pdf
[3] http://www.challenge.gov/

memorandum,[4] issued in August 2011, which provided guidance to assist with implementation of the new, government-wide authority.

Agencies including the Department of Health and Human Services (HHS) and the Environmental Protection Agency (EPA) have established strategies and policies to accelerate widespread use of the new prize authority granted to them through COMPETES. Some agencies, such as the National Aeronautics and Space Administration (NASA), HHS, and the U.S. Agency for International Development (USAID), have personnel dedicated to lead prize design and administration efforts at their agencies and to provide internal support to program managers interested in making use of prizes.

As many agencies expand their use of the prize authority provided to them under COMPETES, some agencies have continued to administer prizes and challenges developed under other pre-existing authorities, including agency-specific authorities, grant-making authority, and procurement authority, such as that provided by the Federal Acquisition Regulation (FAR), adding additional lessons learned and best practices regarding the use of prizes and challenges.

In addition, as called for in Section 24(n) of Stevenson-Wydler, in July 2011, the General Services Administration (GSA) launched a contract vehicle[5] to dramatically decrease the amount of time required for agencies to tap the private-sector expertise that is so critical to early success. In addition, a government-wide Center of Excellence, led by NASA, provided support to multiple agencies for the full lifecycle of their pilot prize competitions: from design, through implementation, to post-prize evaluation.

The authority provided in COMPETES has led to significant new efforts, applying prizes to national priority areas including energy, climate change resilience, health, and employment. Since its creation, 68 prize competitions have been offered through the authority provided by COMPETES. The number of prizes conducted under this authority increased significantly in FY 2013 to 41, up over 50% compared to FY 2012 and a nearly six-fold increase compared to FY 2011. Eleven of these prizes had prize purses of $100,000 or greater.

Seventeen agencies offered prizes in FY 2013 enabled by the prize authority provided by COMPETES – including EPA, the Department of Energy (DOE), the Department of Housing and Urban Development (HUD), the Department of State (State), the Federal Trade Commission (FTC), the National Endowment for the Arts (NEA), the National Endowment for the Humanities (NEH), the National Science Foundation (NSF), and nine component agencies of HHS.

A review of these prize competitions shows several trends in public-sector prizes:

- Growth in the number of competitions and the size of prize purses
- Increased focus on using prizes to identify novel solutions

[4] https://cio.gov/wp-content/uploads/downloads/2012/09/Prize_Authority_in_the_America_COMPETES_Reauthorization_Act.pdf
[5] http://www.gsaelibrary.gsa.gov/ElibMain/sinDetails.do?scheduleNumber=541&specialItemNumber=541+4G

- Emphasis on creating a post-competition path to success for new solutions
- More prizes for effective and low-cost software and information technology solutions
- New models for engaging the public and building communities during competitions

This look at the expanded use in FY 2013 of the prize authority provided by COMPETES in FY 2013,[6] indicates the ways this authority will continue to help agencies across the Federal government reap the benefits of high-impact prizes.

INTRODUCTION

From the 1714 Longitude Prize that led to the world's first practical method to determine a ship's longitude, to the Orteig Prize that inspired Charles Lindbergh to fly nonstop from New York to Paris, to the 2011 Oil Cleanup XChallenge[7] that rewarded a company from Illinois for demonstrating more than four times the previous best tested recovery rate for cleaning oil from the ocean's surface, prizes have an established record of spurring innovation. A 2009 McKinsey report found that philanthropic and private-sector investment in prizes has increased significantly in recent years, including $250 million in new prize money between 2000 and 2007.[8] Some of these incentive prizes included the GoldCorp Challenge[9], the Ansari X Prize[10], the Netflix Prize[11], and the Heritage Health Prize Competition[12].

Inspired by the success of philanthropic and private-sector prizes, the Obama Administration has taken important steps to accelerate public-sector adoption of these innovative tools. The *Strategy for American Innovation* recognized the potential for prizes and challenges to harness America's ingenuity to solve some of the Nation's most pressing challenges.[13] In March 2010, OMB issued a memorandum that provided a policy framework to guide agency leaders in using prizes to advance core missions.[14] In September 2010, the Administration launched Challenge.gov, a one-stop shop where entrepreneurs and citizen solvers can find and engage with public-sector prizes. By September 2013, the site had hosted over 280 challenges posted by more than 45 departments and agencies. Tens of thousands of citizen "solvers" have participated in these competitions directly on Challenge.gov, with additional entrants joining the competitions through other means.

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[6] Fiscal Year 2011 was a partial year of implementation of prizes under the authority provided by COMPETES (January-September 2011).
[7] http://www.iprizecleanoceans.org/
[8] McKinsey & Company, "*And the Winner Is…"; Capturing the promise of philanthropic prizes,* 2009, http://www.mckinseyonsociety.com/downloads/reports/Social-Innovation/And_the_winner_is.pdf
[9] Fast Company, http://www.fastcompany.com/magazine/59/mcewen.html
[10] http://space.xprize.org/ansari-x-prize
[11] http://www.netflixprize.com/
[12] http://www.heritagehealthprize.com/c/hhp
[13] http://www.whitehouse.gov/innovation/strategy
http://www.whitehouse.gov/sites/default/files/microsites/ostp/innovationstrategy-prizes.pdf
[14] http://www.whitehouse.gov/sites/default/files/omb/assets/memoranda_2010/m10-11.pdf

On January 4, 2011, President Obama signed COMPETES into law.[15] Section 105 of this Act added Section 24 (Prize Competitions) to Stevenson-Wydler, providing all agencies with broad authority to conduct prize competitions in order to spur innovation, solve tough problems, and advance their core missions. By giving agencies a simple and clear legal path, the authority provided by COMPETES supports the Administration's effort to make prizes a standard tool in every Federal agency's toolbox.

Section 24 of Stevenson-Wydler requires OSTP to annually submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science and Technology of the House of Representatives a report on the activities carried out under this prize authority during the preceding fiscal year.

This report documents the benefits the Federal government has already reaped from using incentive prizes, the steps the Administration has taken to establish a lasting foundation for use of the prize authority provided by COMPETES, and detailed examples from FY 2013 of how this authority is increasing the number of agencies that use prizes to achieve their missions more efficiently and effectively.

This scope of this report includes an overview of every prize conducted in FY 2013 under the prize authority provided by COMPETES (as reported by Federal agencies to OSTP) and only selectively covers prizes conducted under other authorities.

1. Benefits of Prizes in the Public Sector

The unique benefits of prizes have been well documented in the private and philanthropic sectors.[16] Early adopters in the public sector have begun to reap the rewards of well-designed prizes over the last several years. For example, NASA's Acting Chief Technologist reports that "NASA recognizes the extraordinary opportunity that prize competitions represent: that they can inspire the development of transformative technologies by offering a means to engage with non-traditional sources of innovative ideas, all in a remarkably cost-effective way."[17] Specifically, prizes have enabled the Federal government to:

- **Establish an ambitious goal and pay only for success, without having to predict which team or approach is most likely to succeed**

Contracts and grants are awarded based on proposals for future work, forcing agencies to assess merit based on expert review of potential impact or on past performance, at the

[15] Public Law 111-358

[16] *See e.g.*, McKinsey & Company, "*And the Winner Is…"; Capturing the promise of philanthropic prizes,* 2009, http://www.mckinseyonsociety.com/downloads/reports/Social-Innovation/And_the_winner_is.pdf

[17] NASA Report to Office of Science and Technology Policy on Prize Competitions for Fiscal Year 2013, submitted by Jim Adams, NASA Acting Chief Technologist, to the Office of Science and Technology Policy, February 17, 2014

expense of disruptive innovation. With a focus on proven results, prizes empower new, untapped talent to deliver unexpected solutions to tough problems.

DTRA Algorithm Challenge: The goal of the Defense Threat Reduction Agency's (DTRA) $1,000,000 DTRA Algorithm Challenge[18] was to develop algorithms capable of both quickly and accurately characterizing complex genomic samples by using only raw DNA sequence data and identifying each organism present in a mixed sample – a very difficult algorithmic challenge. Such an algorithm would help to quickly detect potential bioterror threats, establish human health status, and better determine effective treatment options. Over 2,700 potential respondents from around the world reviewed the challenge, 65 solutions were submitted, 24 solutions were able to pass the threshold for 90% accuracy on at least one test dataset, and one team was awarded the $1,000,000 prize. The MetaScope metagenomic algorithm submitted by Team Huson, a team of two bioinformaticians and one computer scientist, was selected as the winning algorithm and represents a dramatic performance improvement over existing tools. The challenge manager stated that "Team Huson's solution to the challenge will lead to an enhancement of DTRA's capability to diagnose and treat biothreats to the U.S. Armed Forces by giving [the Department of Defense (DOD)] the ability to process and analyze biological sequence data rapidly in a realistic, moderate-to-low resource setting."

- **Reach beyond the "usual suspects" to increase the number of solvers tackling a problem and identify novel approaches, without bearing high levels of risk**

As Sun Microsystems co-founder Bill Joy once famously said, "No matter who you are, most of the smartest people work for someone else." Prizes are one tool to tap the top talent and best ideas wherever they lie, sourcing breakthroughs from a broad pool of both known and unknown sources of innovation in a given industry. As solutions are delivered prior to payment, the government can benefit from these novel approaches without bearing high levels of risk.

NASA ISS Longeron Challenge. In a survey of the nearly 3,000 solvers that competed in seven NASA prizes, 81% reported that they had never before responded to a government request for proposals, let alone worked with NASA[19]. For example, NASA's International Space Station (ISS) Longeron Challenge[20] received over 2000 proposed solutions from more than 450 competitors who worked to develop a complex algorithm to position the solar collectors on the ISS to generate as much power as possible during the difficult orbital positions. The ISS is powered by the energy captured by the Station solar panels – simply put, solar panel positioning affects the amount of science and other operations that can be conducted on orbit. The top solutions identified in the challenge confirmed that NASA is running near-optimal solutions today and also gave NASA new ideas and options if certain issues arise in the future with the ISS solar array – approaches that were not in NASA's toolkit prior to the challenge. The NASA challenge lead was impressed that a three-week challenge could result in the near-optimal solutions that

[18] https://www.innocentive.com/ar/challenge/9933138
[19] http://www.nasa.gov/pdf/572344main_InnoCentive_NASA_PublicReport_2011-0422.pdf
[20] http://www.topcoder.com/iss/longeron

NASA has today, and stated: "NASA is one of many organizations that follow a strict procedural approach to solutions. This is valuable, but has the potential to blind problem solvers to alternative solutions. I saw value in reaching out to solvers who could look at the problem from a completely new perspective as long as the challenge requirements were well developed. It was refreshing to see the different viewpoints and the enthusiasm of the solver community."[21]

ARL Pilot Open Innovation Program. In another example, the Army Research Laboratory (ARL) ran a pilot open innovation program[22] in FY 2013 through which ARL ran five ideation competitions to determine if this approach to innovation should be added to their research strategy on an ongoing basis. Through the five competitions, ARL received novel ideas for technologies ranging from ways to harvest energy generated by a walking hiker, to innovative methods for producing drinking water for humanitarian missions, to novel high-energy materials. The winning solutions came from individual engineers, scientists, researchers, and students from around the country (from New Hampshire to Texas) and around the globe (from India to Sweden, and beyond) – most of whom were unlikely to have worked directly with the Army through other means. ARL is now developing these ideas further through direct evaluation, testing facilities, and future funding solicitations. ARL reports that this pilot program has proven to be "a real thinking force multiplier… [ARL] was able to multiply the people thinking about this problem over 100 fold, and received workable solutions within a very short amount of time. The quality of the various solutions has been outstanding and this approach has energized the workforce teams that participated to quickly test and deliver solutions to our warfighters…This approach has proven to be cost effective and rapid, and has enabled systems to be developed for test and evaluation in time to meet…urgent needs as well as adding new insight to existing research efforts."[23]

- **Bring out-of-discipline perspectives to bear**

Empirical research conducted at the Harvard Business School has found that breakthrough solutions are most likely to come from outside the scientific discipline or at the intersection of two fields of study.[24]

NASA Climate Modeling Challenge. NASA's Climate Modeling Challenge[25] was a call to identify new sources of high-quality observational data for climate modeling to obtain solutions needed to augment NASA's efforts to assemble climate analysis data from daily observations collected by satellites, surface devices, buoys, and other devices from 1979 to today. For a total prize purse of less than $7,000[26], NASA obtained solutions and learned about a highly applicable and

[21] NASA Report to Office of Science and Technology Policy on Prize Competitions for Fiscal Year 2013, submitted by Jim Adams, NASA Acting Chief Technologist, to the Office of Science and Technology Policy, February 17, 2014
[22] Summary report of the ARL pilot open innovation program.
[23] U.S. Army Report on Prizes for Advanced Technology Achievements, FY 2013, Army Research Office
[24] Jeppesen, Lars Bo, and Karim R. Lakhani. "Marginality and Problem-Solving Effectiveness in Broadcast Search." *Organization Science* 21 (September - October 2010): 1016-1033.
[25] http://studio.topcoder.com/?module=ViewContestDetails&ct=30032756; run by a NASA contractor
[26] Prize purse paid out by NASA's contractor

relevant climate data source formerly completely unknown to NASA climate scientists, as well as novel suggestions for the use of previously examined datasets. This challenge demonstrated the capacity of out-of-discipline perspectives to yield outstanding and unique results.

- **Increase cost-effectiveness to maximize the return on taxpayer dollars**

Prizes can be more efficient and cost-effective approaches to identifying solutions from the private sector than other procurement mechanisms. For example, challenge managers can run series of discrete competitions, allowing the agency to learn from earlier challenges and redefine requirements for subsequent challenges if desired. NASA challenge managers describe this serial challenge process as "more nimble and flexible" than traditional procurement methods. [27]

In addition, in prize competitions teams compete not just for the cash purse, but also for the associated validation, prestige, and satisfaction that result from solving important problems. Therefore, prizes can incentivize significant additional private-sector and philanthropic investment, leveraging the prize purse's impact. In the Orteig Prize won by Charles Lindbergh in 1927, nine teams spent a cumulative $400,000 to win the $25,000 prize purse.[28] More recently, the $10 Million Ansari X PRIZE was won in 2004 by Burt Rutan and SpaceShipOne, after the 26 competing teams spent more than $100 million to win the prize.[29]

CMS Medicaid Provider Screening Challenge. One example of a cost-effective prize program is the Medicaid Provider Screening Challenge that was offered by the Centers for Medicare & Medicaid Services (CMS) as part of a pilot designed in partnership with states and other stakeholders.[30] This prize program was a series of software development challenges designed to improve capabilities for streamlining operations and screening Medicaid providers to reduce fraud and abuse. With a total prize purse of $500,000, the challenge series is leading to the development of an open source multi-state, multi-program provider screening shared-service software program capable of risk scoring, credential validation, identity authentication, and sanction checks, while lowering the burden on providers and reducing administrative and infrastructure expenses for states and Federal programs. CMS partnered with the NASA Center of Excellence for Collaborative Innovation (COECI),[31] NASA's contractor Harvard Business School, Harvard's subcontractor TopCoder, and the State of Minnesota. The State of Minnesota is working on full deployment of the software, and CMS is initiating a campaign to encourage

[27] Calandrelli, Emily. "An evaluation of short innovation contest implementation in the federal context". Massachusetts Institute of Technology Libraries. 2013. Page 79.
[28] http://www.innovationinthecrowd.com/examples/orteig-prize.pdf
[29] http://space.xprize.org/ansari-x-prize
[30] http://www.topcoder.com/cms/medicaid-enrollment-portal/ This project was funded through OMB's Partnership Fund and was launched in response to a proposal by a Collaborative Forum of states and other stakeholders as a cost-effective way to address a shared Federal-State problem.
[31] NOTE: This challenge was executed through an interagency agreement between CMS and NASA's COECI. To conduct this challenge, NASA entered into a services contract with Harvard Business School in accordance with the Federal Acquisition Regulation. Harvard entered into a subcontract with TopCoder, which then conducted challenges and delivered the winning result to NASA.

other states to leverage the software. COECI estimates that the cost of designing and building the portal through crowdsourcing was one-sixth of what the effort would have cost using traditional software development methods. Through the success of this and subsequent challenges, CMS is attempting to establish a new paradigm for crowdsourcing state and Federal information technology (IT) systems in a low-cost, agile manner by opening challenges to new players, small companies, and talented individual developers to build solutions which can "plug and play" with existing legacy systems or can operate in a shared, cloud-based environment.

Agency use of inducement prizes offer these benefits, as well as numerous other advantages, such as the ability for prizes to: inspire risk-taking by offering a level playing field, credible rules, and robust judging mechanisms; give entrepreneurs and innovators license to pursue an endorsed stretch goal that otherwise may have been considered overly audacious; and establish clear success metrics and validation protocols that themselves become defining tools and standards for the subject industry or field.

Prizes are not the right tool for every problem but, if aligned with a broader strategy and used systematically within an agency, they can be a powerful mechanism for spurring innovation. The prize authority provided by COMPETES has been instrumental in unleashing that potential.

2. Support for Scaling the Use of Prizes

Since 2009, the Obama Administration has taken important steps that are helping scale the successful use of prizes and challenges across the entire Executive Branch. COMPETES plays a key role in the Administration's work to make prizes a standard tool in every agency's toolbox by granting clear, broad authority to all Federal agencies.

In FY 2013, Federal agencies were heterogeneous in their adoption of prizes as an open innovation tool. Some agencies, such as NASA (which offered nearly 20 prizes in FY 2013 under various authorities),[32] DOE, and DOD have a long track record of using prizes due to pre-existing agency authorities. Other agencies were early adopters of the new prize authority in FY 2011 and have scaled these activities since. For example, HHS scaled its prize activity from two prize programs under the COMPETES-provided authority in FY 2011, to 18 prizes in FY 2012, to 28 prizes in FY 2013 (with additional prizes run under other authorities).[33] Some agencies, such as FTC, HUD, NEA, and NEH, offered their first prize in FY 2013. Other agencies have yet to conduct a prize and are planning for prizes in future years.

[32] NASA Report to Office of Science and Technology Policy on Prize Competitions for Fiscal Year 2013, submitted by Jim Adams, NASA Acting Chief Technologist, to the Office of Science and Technology Policy, February 17, 2014

[33] HHS Reports on Prize Competition Activities Conducted in Fiscal Year 2012, submitted by Bryan Sivak, HHS Chief Technology Officer, and E.J. Holland Jr., HHS Assistant Secretary for Administration, to Dr. John P. Holdren, Director, Office of Science and Technology Policy, December 31, 2012

The Administration has laid the policy and legal groundwork to take maximum advantage of the new authority in the years to come. Support for agencies includes:

- **Fact Sheet and Frequently Asked Questions**

Policy and legal staff in OSTP and OMB jointly developed a Fact Sheet and Frequently Asked Questions (FAQ) memorandum, which was issued in August 2011.[34] The fact sheet offered policy and programmatic staff a concise summary of the legislation's authorities and requirements and provided informal guidance to agencies in their implementation of the prize authority found in this legislation. To streamline and accelerate implementation of the new, government-wide authority, the FAQ addressed the questions most frequently raised by agency personnel, including general counsels, and thereby helped empower agencies to take advantage of the authorities provided by COMPETES, including: the authority to conduct prizes of up to $50 million with existing appropriations; to accept private-sector funds for the design, administration, or prize purse of a competition; to partner for successful implementation; and to co-sponsor with other agencies.

- **Agency-specific guidance for the implementation of the prize authority provided by COMPETES**

Following on the August 2011 Fact Sheet and FAQ, and through OSTP's support, agencies have begun to establish strategies and policies to further accelerate widespread use of the new prize authority granted to them under COMPETES. HHS has been at the forefront of agency implementation efforts. On October 12, 2011, Secretary Sebelius issued a memorandum notifying HHS of the new prize authority, outlining the strategy to optimize the use of prize competitions, and calling on the heads of operating and staff divisions to forecast their future use of prize competitions to stimulate innovation in advancing the agency's mission. The memorandum highlighted an implementation framework established to accelerate the use of well-designed prizes. Secretary Sebelius delegated the authority to conduct prize competitions to the heads of all operating and staff divisions. HHS also developed judging guidelines, governing principles outlining responsibilities for prize managers, a financial management policy for prize competitions, and a vehicle to share best practices across the Department. The full set of policy statements, guidance, and resources are available online.[35]

Following HHS's example, other agencies, such as EPA in FY 2013, established agency-wide guidance for prizes conducted under the authority provided by COMPETES. In FY 2013, NASA developed a new NASA Policy Directive (published in February 2014)[36] encouraging the use of

[34] *Prize Authority in the America COMPETES Reauthorization Act*: http://www.cio.gov/documents/Prize%20Authority%20in%20the%20America%20COMPETES%20Reauthorization%20Act.pdf

[35] http://www.hhs.gov/open/initiatives/challenges/

[36] http://nodis3.gsfc.nasa.gov/npg_img/N_PD_1090_0001_/N_PD_1090_0001__main.pdf

challenges, prizes, and crowdsourcing for problem solving at NASA and articulating a commitment to engaging the public through open innovation in NASA's updated strategic plan (published in April 2014).[37]

In addition, some agencies, such as NASA, HHS, and USAID, have dedicated personnel available to assist with prize design and implementation. Additional agencies are engaging actively in similar internal review and planning related to the prize authority granted under COMPETES.

- **Assistance and support from GSA**

Section 24(n) of Stevenson-Wydler called on the GSA to "develop a contract vehicle to provide agencies relevant products and services, including technical assistance in structuring and conducting prize competitions to take maximum benefit of the marketplace as they identify and pursue prize competitions to further the policy objectives of the Federal Government." In response, GSA launched Sub-Schedule 541 4G, "Challenges and Competitions Services"[38] in July of 2011, which dramatically decreased the amount of time required for agencies to tap the private sector expertise that is so critical to early success. Seventeen contractors have joined this schedule to date, offering agencies options for technical assistance, prize platforms, and communities of individuals and teams interested in entering prize competitions. GSA continues to assist agencies in taking advantage of the available services and to inform private-sector vendors and agencies about the schedule and its benefits.

- **Government-wide Center of Excellence for Collaborative Innovation**

In 2011, the Administration launched the COECI, a NASA-led, government-wide center of excellence to provide agencies guidance on all aspects of implementing prize competitions: from effective problem definition, to the design of incentives that attract solvers, to evaluation of submitted solutions. From the Centennial Challenges Program, to the NASA Open Innovation Pavilion, to the NASA Tournament Lab, NASA is a public-sector leader with breadth and depth of experience and experimentation with prizes and challenges. Through COECI, NASA helps other Federal agencies follow in its footsteps. For select agency pilots conducted through inter-agency agreements or through informal support, COECI leverages existing NASA open innovation infrastructure to provide a full suite of services, allowing agencies to rapidly experiment with these new methods before standing up their own capabilities. During FY 2013, COECI helped numerous agencies implement challenges, including CMS,[39] the Office of Personnel Management (OPM), USAID,[40] DOE, and EPA.[41]

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[37] http://www.nasa.gov/sites/default/files/files/FY2014_NASA_SP_508c.pdf
[38] http://www.gsaelibrary.gsa.gov/ElibMain/sinDetails.do?scheduleNumber=541&specialItemNumber=541+4G
[39] Summary report on the CMS Medicaid Provider Screening Challenge designed and run in collaboration with NASA COECI
[40] Summary report on the USAID Tech Challenge for Atrocity Prevention run in collaboration with NASA COECI
[41] Summary report on the EPA ToxCast Challenge run in collaboration with NASA COECI

In addition, COECI captures and communicates best practices, case studies, and successful methodologies. COECI has partnered with Harvard University to provide research, as well as operational guidance and consultation, which enhanced overall success of the NASA COECI challenges run on the TopCoder Platform.[42] In addition to supporting NASA challenge development and execution, Harvard published four peer-reviewed papers, four working papers, and made over 25 academic presentations in FY 2013 based on COECI's efforts. COECI, in coordination with Harvard, conducted a highly successful training workshop at Georgetown University in August 2013 which helped spread best practices to solidify the benefit of challenges across the Federal government and assisted agencies in need of guidance on authorities and legal considerations.[43]

As agencies expanded their use of the clear and broad authorities provided to them under COMPETES in FY 2013, numerous public-sector prizes continued to be administered under other pre-existing authorities, including: agency-specific authorities; procurement authority such as that provided by the Federal Acquisition Regulation (FAR); the authority to award grants, participate in cooperative agreements, or both; and authority related to "necessary expense" doctrine, among others. These prizes add additional lessons learned and best practices to the growing community of practice engaged in public-sector prizes and challenges.

In FY 2014, the use of the prize authority provided under COMPETES will continue to increase as agencies complete internal policies and strategies related to the implementation; as more resources for training of agency personnel and for the development, implementation, and promotion of challenges become available to agencies through GSA; and as COECI continues to provide support for pilot programs at other agencies. These activities are expected to result in highly leveraged, open innovation programs that help agencies address grand challenges[44] and meet their agency mission.

Section 3, Section 4, and Appendix 1 of this report focus on the prizes developed under the specific prize authority provided by COMPETES. Appendix 2 provides a brief summary of prizes conducted under authorities, though this report is not comprehensive since agency reporting to OSTP on prizes under authorities other than that provided by COMPETES is voluntary.

3. Highlights and Trends from Prizes Conducted Under COMPETES in FY 2013

Aided by the support described in Section 2, agencies have expanded their use of prizes conducted under that authority, with 41 prizes offered by 17 agencies in FY 2013. These competitions provide evidence for how the authority provided by COMPETES is helping agencies across the Federal government reap the benefits discussed in Section 1. A review of

[42] NOTE: To conduct the NASA CoECI challenges with TopCoder outlined herein, NASA entered into a services contract with Harvard Business School in accordance with the Federal Acquisition Regulation. Harvard entered into a subcontract with TopCoder, which then conducted challenges and delivered the winning result to NASA.
[43] http://www.nasa.gov/sites/default/files/lessonslearnedfinal_0.pdf
[44] http://www.whitehouse.gov/grand-challenges

prizes conducted in FY 2013 reveals the following trends and best practices in using public-sector prizes to drive innovation:

- **Growth in the number of competitions and size of prize purses**

In FY 2013, the number of competitions and the size of prize purses increased over prior years. The number of prizes conducted under the authority provided by COMPETES increased by over 50 percent compared to FY 2012 and by nearly six-fold compared to FY 2011. Eleven of these prizes had prize purses of $100,000 or greater. Since COMPETES was signed into law, 68 prizes from 23 agencies have been offered under the prize authority provided by the Act.

The use of prizes under all available authorities increased as well. Twenty-five agencies self-reported a total of 87 prizes conducted under all authorities (including that provided by COMPETES) in FY 2013, compared to 47 prizes reported in FY 2012 – an 85 percent overall increase year-to-year.

	Number of prizes under COMPETES authority	Number of Agencies offering prizes under COMPETES authority[45]	Number of prizes under all prize authorities[46]	Number of agencies offering prizes under all authorities[47]
FY 2011	7	7	*Use of other authorities not reported*	
FY 2012	27	10	49	15
FY 2013	41	17	87	25

As an example of the growth in the use of prizes at one agency, HHS continued to be a leader in implementing prize programs under the authority in FY 2013, offering 28 prizes and challenges in FY 2012, a 50% increase over the prior year. HHS has "utilized this authority to promote and advance innovation across the agency."[48] Nine HHS component agencies offered prizes in FY 2013, compared to four in FY 2012. These challenges offered a total of over $1,200,000 in prize purses, with an average purse of over $46,000 per prize, a 150% increase over the prior year.

[45] Including three HHS component agencies in FY 2011, four HHS component agencies in FY 2012, and nine HHS component agencies in FY 2013.
[46] Including prizes under authority provided by COMPETES; note that reporting of prizes under other authorities is optional for agencies and therefore may be incomplete.
[47] Including count of DOD and HHS component agencies.
[48] HHS Reports on Prize Competition Activities Conducted in Fiscal Year 2013, submitted by Bryan Sivak, HHS Chief Technology Officer, and E.J. Holland Jr., HHS Assistant Secretary for Administration, to Dr. John P. Holdren, Director, Office of Science and Technology Policy, January 17, 2014

- **Increased focus on using prizes to identify novel solutions**

Agencies use incentive prizes for a variety of reasons, such as: identifying novel solutions; engaging in public education and outreach; attracting new and non-standard solvers; and encouraging behavior change and adoption of proven practices. Of these goals and others, in FY 2013 agencies showed an increasing emphasis on using prizes to identify novel solutions from innovators and entrepreneurs and a decreasing emphasis on using prizes for public education and outreach. For example, HHS increasingly used prizes and challenges to identify health solutions – in FY 2013, the most common prize goal at HHS was to solve a health problem, a shift compared to in prior years when public education had been the most common goal for HHS prizes.[49] Examples of prizes designed to identify novel solutions include:

EPA and HHS's My Air, My Health Challenge. Environmental and public health are closely related and complementary fields. New portable sensors have the potential to transform the measurement and interpretation of the influence of pollution on health and will impact health care, air quality oversight, and individuals' control over their own environments and health. The My Air, My Health Challenge was a multidisciplinary call to innovators and developers to enable near real time, location-specific monitoring and reporting of air pollutants and potentially related physiological parameters, using a personal and portable integrated system to assess connections between the two. The system needed to link air-pollutant concentrations with physiological data, provide geo-coded and time-stamped files in an easy-to-use format, and transmit this data to a central data repository provided by EPA and HHS.

Thirty-two teams competed to win awards from a total $160,000 prize purse in a two-phase competition. Four finalist teams demonstrated prototypes to the competition organizers and conducted pilot tests of their solutions in their communities. Judges unanimously awarded the $100,000 prize to the team of David Kuller, Gabrielle Dockterman, and Dot Kelly for their Conscious Clothing prototype. Built to scale, this system could cost as little as $20. Its low price, comfort, and near-invisibility make it attractive not only to researchers and communities, but to individuals looking to take charge of their own health.

FTC Robocall Challenge. The vast majority of telephone calls that deliver a prerecorded solicitation are illegal. The FTC receives between 125,000 to 200,000 complaints each month regarding these harassing calls. With a $50,000 prize purse, the Federal Trade Commission challenged the public to create innovative solutions to block illegal commercial robocalls on landlines and mobile phones. FTC received 798 eligible submissions from individual solvers and teams. The winners designed products capable of helping consumers block robocalls. "Nomorobo" is one of the winning solutions – developed by citizen solver Aaron Foss, this service allows incoming calls to be routed to a second telephone line that can identify and hang up on illegal robocalls. As of March 2014, Nomorobo has over 86,000 users and has blocked

[49] HHS Reports on Prize Competition Activities Conducted in Fiscal Year 2013, submitted by Bryan Sivak, HHS Chief Technology Officer, and E.J. Holland Jr., HHS Assistant Secretary for Administration, to Dr. John P. Holdren, Director, Office of Science and Technology Policy, January 17, 2014

over 2 million robocalls. The challenge engaged solvers who were not focused previously on helping consumers block illegal robocalls – none of the developers and engineers who created the winning solutions had been engaged with the problem before.

- **Emphasis on creating a post-competition path to success for new solutions**

In FY 2013, prize managers increasingly experimented with ways to increase the likelihood that solutions generated during a challenge would be implemented after the conclusion of a competition. Pathways for future development of winning solutions included: integration into an agency's existing research and development pipeline; targeting the solutions for scaled deployment or further development through other funding mechanisms such as grants or SBIR funding; forming partnerships to promote or deploy winning solutions; and tying an agency's future strategic plan to the lessons learned during the competition. Examples of prizes that created a pathway for post-competition success include:

HUD's Rebuild by Design. In June 2013, the Hurricane Sandy Task Force launched Rebuild by Design, a multi-stage regional design competition to promote resilience for the Sandy-affected region. The goal of the competition is to attract world-class talent, promote innovation, and develop projects that will actually be built. As a member of the Hurricane Sandy Rebuilding Task Force, the competition is sponsored by HUD. Approximately 148 teams from more than 15 countries submitted proposals, representing the top engineering, architecture, design, landscape architecture and planning firms, as well as highly regarded research institutes and universities from around the world. Ten teams were selected as finalists, receiving $200,000 in awards and the opportunity to interface with community leaders and stakeholder groups to provide their unique insights and understanding of the region to the teams through public meetings, facilitated field visits, and one-one-one discussions.

The $2,000,000 prize purse was funded entirely by HUD's philanthropic partners, led by the Rockefeller Foundation. To date, the selected design teams have contributed much more time and resources than the value of the cash prize awards. Another major incentive for the design teams is the potential for future involvement with the development and implementation of their ideas through state or local jurisdictions. HUD will incentivize the implementation of winning designs by using funds made available through the Community Development Block Grant Disaster Recovery (CDBG–DR) program to leverage other public and private funds.

Rebuild by Design has been named number one of ten on the "CNN 10: Ideas"[50] list of the most innovative ideas of 2013. Final design submissions will be evaluated in 2014 by a diverse competition jury, chaired by HUD Secretary Donovan. HUD expects that the advancement of its mission will be realized in helping to redefine not only how communities rebuild but also how they build, incorporating resilience as a fundamental planning and design element.

[50] http://www.cnn.com/interactive/2013/12/tech/cnn10-ideas/

NEI Challenge to Identify Audacious Goals in Vision Research and Blindness Rehabilitation. This ideation competition offered a $30,000 prize purse for the identification of audacious goals relevant to the National Institutes of Health's (NIH) National Eye Institute (NEI) mission to stimulate innovation in national vision research. The proposed audacious goals needed to: be a bold, innovative idea that would fundamentally change vision research or vision care; have a broad impact; address the NEI mission; require collaboration between multiple disciplines; and be achievable in about 10 years. Previous NEI strategic planning efforts relied primarily on the expertise of NEI funded scientists to review the state of the science and describe current specific research needs and opportunities. This challenge opened up the NEI strategic planning process to the public.

The winners were invited to present their ideas to more than 200 experts at a 2013 NEI meeting called to develop a set of bold goals to guide future vision research priorities. NEI received 476 entries in the competition from across the country, almost half from people who had never received NIH research funding. The NEI director stated: "the buzz that surrounded the challenge was very effective in attracting input from leading researchers, engineers, philanthropists, patient advocates, and venture capitalists, many of whom had not previously received NIH funding. The competition allowed us to reach out to everyone in the Nation—even those not engaged in vision research."[51] This challenge generated valuable contributions from varied stakeholders to inform the Institute's strategic plan, energize the Institute's research efforts, increase public awareness of vision research, and enhance the national effort to reduce the burden of ocular disorders and diseases worldwide.

- **More prizes for effective and low-cost software and IT solutions**

Nearly half of the 41 prizes conducted in FY 2013 under the authority provided by COMPETES sought software solutions such as applications (apps), data visualization tools, and predictive models and algorithms. Many of these 18 software and IT challenges sought to build value from open government data for both citizens and the Federal government.

DOE's Apps for Vehicles Challenge. For years, only mechanics and emissions inspectors using expensive equipment could access the non-proprietary information streams on a vehicle's on-board diagnostic port, which include parameters like vehicle and engine speed, throttle and brake position, and engine fault status. Today, new hardware technologies, GPS, smart consumer electronics, and the advent of cloud computing are making the on-board diagnostic port increasingly accessible to vehicle owners. The two-stage Apps for Vehicles challenge[52] asked application developers and entrepreneurs to demonstrate how the open data available on most vehicles can be used to improve vehicle safety, fuel efficiency, and comfort. DOE offered a total prize purse of $50,000, including an initial ideation phase that awarded $2,000 to the top eight software developers and a second development phase that culminated in the

[51] http://www.whitehouse.gov/blog/2013/05/15/audacious-goals-eye-research

[52] http://vehicles.challengepost.com/

award of $17,000 each to the top two winning apps. The competition, a partnership with Ford Motor Company and OSISoft, received 37 eligible submissions. DOE awarded New York-based Dash[53] the Judges' Prize and Michigan-based MyCarma[54] the Popular Choice prize. The two grand prize winning apps were featured on Energy.gov and the teams were invited to present their work at a "Vehicle Data Jam" hosted by the OSTP at the Society of Automotive Engineers World Congress. Dash started a company with their winning app and MyCarma has since been acquired by another company; both are now available to consumers.

NSF's Mozilla Ignite Challenge. The Administration-supported US Ignite initiative[55] seeks to spark the development of next generation applications in areas of national priority – health, education, energy, advanced manufacturing, transportation, and public safety – for a future network which is ultra high-speed (roughly 250 times faster than today's internet), deeply programmable (allow new internet architectures which do not require use of Internet protocols), and sliceable (have isolated resources running in parallel). In a $500,000 multi-stage competition,[56] Mozilla and NSF invited designers, developers, and the public to brainstorm and build applications for this faster, smarter Internet of the future. The two-stage competition was composed of an ideation competition seeking ideas for novel gigabit applications in service to society and a multi-round application development competition that challenged developers, over a period of several months and a number of community events, to develop these ideas and to demonstrate their novelty, feasibility, and societal benefit. The ideation phase received 300 submissions. Twenty-two apps won the development competition, including apps that would aid emergency responders, enable three-dimensional video conferencing, provide real-time health monitoring, and inform connected traffic control systems, among other ideas.

- **New models for engaging the public and building communities during competitions**

In FY 2013, challenge managers experimented with new ways to engage the public and develop new communities focused on challenge topics during prize competitions. These approaches included: new methods for public voting; using "co-design" platforms to integrate user needs and opinions into the design of solutions; publication of winning solutions as open source resources; using crowdfunding to support entrants; and hosting physical and virtual forums that allowed entrants and stakeholders to discuss, develop, and improve solutions. Examples of prizes that included unique approaches to engaging the public include:

Crowds Care 4 Cancer: Supporting Survivors Challenge. To address the needs of cancer survivors, the HHS Office of the National Coordinator for Health IT (ONC) and the National Cancer Institute (NCI) launched a challenge[57] to incentivize the development of information management tools and apps that are able to coordinate follow-up care for cancer survivors by facilitating recommendations, appointments, and resources from patient support networks and

[53] http://vehicles.challenge.gov/submissions/14008-dash-labs-inc
[54] http://vehicles.challenge.gov/submissions/14025-mycarma-personal-fuel-economy-label-mobile-app
[55] http://www.us-ignite.org
[56] https://mozillaignite.org
[57] http://www.health2con.com/devchallenge/crowds-care-for-cancer-challenge-supporting-survivors-2/

healthcare providers. The estimated 14 million cancer survivors in the U.S. may experience a host of long-term and late effects after completion of primary treatment for cancer, and the complex, often fragmented state of end-of-treatment care may lead to harmful breakdowns in patient-provider communication and follow-up care. Innovative new approaches are needed to enable better communication, exchange of data, and care coordination. The challenge offered a $40,000 prize purse and allowed challenge entrants to use the MedStartr.com crowdfunding online platform to pursue additional seed funding from the public. The three semi-finalists raised over $16,000 in additional seed-funding from the crowdfunding phase of the challenge. ONC and NCI utilized a partnership with the LIVESTRONG Foundation to disseminate news about the challenge. The final grand prize winning team "Medable" created a mobile phone app called "Together" and demonstrated their app at the 2013 Rock Health Summit where they interacted with various industry and research leaders.

Health Design Challenge. The ability to access one's health information on demand can be lifesaving in an emergency situation, help prevent medication errors, and improve care coordination. However, too often health information is presented in an unwieldy and unintelligible way that is hard for patients, their caregivers, and their physicians to use. The purpose of the Health Design Challenge[58] offered by ONC was to improve the design of a Continuity of Care medical record to be more usable by patients, their families, and others who take care of them. Designers were challenged to enrich the plain-text Blue Button file with visuals and layouts to create a better patient experience. Innovators were to submit designs for a medical record that could be printed and viewed digitally. Over 230 submissions were received from a wide mix of solvers including individuals, teams from design firms, and small teams from health-related businesses. The U.S. Department of Veterans Affairs and the California Healthcare Foundation contributed engineering resources to further develop the winning entry into a usable open source framework on GitHub.[59]

These five trends suggest that the increasing use of public-sector prizes will continue to engage citizen solvers, drive cost effectiveness, leverage public-private partnerships, and provide new pathways to successful implementation of resulting solutions.

[58] http://healthdesignchallenge.com/
[59] http://blue-button.github.io/bbClear/

4. Summary of Prizes Conducted Under COMPETES in FY 2013

Prize names are linked to detailed challenge reports found in Appendix 1.[60]

Agency	Prize Name	Outcome Type	Opened	Completed	Entries	Winners	Total Prize Purse	Non-Monetary Incentives
1. EPA and HHS	1.1 My Air, My Health Challenge	• Ideas/Designs • Prototypes	6/6/2012	6/4/2013	32	1	$100,000	• Invitation to an event • Public recognition • Feedback/training from experts
2. DOE	2.1 Apps for Vehicles	• Ideas • Apps	12/5/2012	4/1/2013	37	Phase 1: 8 Phase 2: 2	$50,000	• Invitation to an event • Public recognition
	2.2 National Clean Energy Business Plan Competition	• Business Plans	Annual (2012-2014)	Annual (June) (2012-2014)	600	Regional: 6 National: 1	$650,000	• Scholarships • Feedback/training from experts • Invitation to an event • Public recognition • Other in-kind prizes
	2.3 SunShot Prize	• Market stimulation	9/12/2012	*Ongoing at time of report (through spring 2016)*	*Registration still open*	*Not yet announced*	$10,000,000	• Public recognition • License to use a brand/mark
3. HHS (including nine HHS component agencies)	3.1 "Be Heads Up About Concussion Safety" Poster Design Competition	• Posters	6/12/2013	11/7/2013	15	4	$1,000	
	3.2 "I VetoViolence Because…": Teen Dating Violence Public Service Announcement Competition	• Videos	7/15/2013	8/30/2013	22	3	$1,500	• Public recognition
	3.3 "Stay Covered" & "Churn Marketing Research and Methodology"	• Marketing materials	7/16/2013	9/27/2013	4	1	$50,000	• Public recognition

[60] See Appendix 1 for a detailed account of all FY 2013 prize activities under the authority provided by COMPETES.

Agency	Prize Name	Outcome Type	Opened	Completed	Entries	Winners	Total Prize Purse	Non-Monetary Incentives
		• Research methodologies						
	3.4 Apps4Tots Health Challenge	• Apps	4/15/2013	6/4/2013	12	3	$25,000	• Public recognition
	3.5 Behavioral Health Patient Empowerment Challenge	• Apps	8/26/2013	9/16/2013	29	3	$0	• Invitation to an event • Public recognition
	3.6 Blue Button Co-Design Challenge	• Ideas • Apps • Developer tools	6/3/2013	8/21/2013	80	6	$55,000	• Co-design with the public • Public recognition
	3.7 Crowds Care for Cancer: Supporting Survivors Challenge	• Apps	4/20/2013	8/30/2013	30	Phase 1: 3 Phase 2: 1	$40,000	• Public recognition • Listing on a crowd-funding platform
	3.8 Data Rx: Prescription Drug Abuse Infographic	• Infographics	5/16/2013	7/29/2013	12	3	$6,000	• Public recognition
	3.9 Design by Biomedical Undergraduate Teams Challenge	• Ideas/Designs	1/28/2013	8/12/2013	31 (from 136 students)	9	$30,000	• Invitation to an event • Public recognition
	3.10 Health Data Platform Metadata Challenge	• Apps	6/5/2012	1/28/2013	3	3	$35,000	
	3.11 Health Data Platform Simple Sign-On Challenge	• IT solutions	6/5/2012	1/28/2013	3	3	$35,000	
	3.12 Health Design Challenge	• Designs	10/23/2012	1/15/2013	232	12	$50,000	• Public recognition • Resources to develop winning design
	3.13 healthfinder.gov Mobile App Challenge	• Apps	2/1/2013	3/15/2013	26	4	$80,000	• Co-design with the public • Public recognition
	3.14 Managing Meds Video Challenge	• Videos	8/10/2013	10/19/2013	*Submissions still open*	*Not yet announced*	$7,500	• Public recognition

Agency	Prize Name	Outcome Type	Opened	Completed	Entries	Winners	Total Prize Purse	Non-Monetary Incentives
	3.15 Million Hearts Caregiver Video Challenge	• Videos	7/16/2013	10/8/2013	3	2	$1,000	
	3.16 Million Hearts® Hypertension Control Challenge	• Recognition of excellence	8/9/2013	*Ongoing at time of report*	61	*Not yet announced*	$70,000	• Public recognition • License to use a brand/mark
	3.17 Million Hearts Risk Check Challenge	• Apps	7/27/2013	1/30/2013	35	Phase 1: 5 Phase 2: 1	$125,000	• Public recognition
	3.18 Mobilizing Data for Pressure Ulcer Prevention	• Apps	12/5/2012	7/19/2013	14	3	$80,000	• Public recognition
	3.19 NEI Challenge to Identify Audacious Goals in Vision Research and Blindness Rehabilitation	• Ideas	8/13/2012	1/14/2013	476	10	$30,000	• Invitation and paid travel to an event • Feedback from experts • Public recognition
	3.20 Ocular Imaging Challenge	• Apps	5/14/2012	11/27/2012	13	3	$150,000	• Invitation to an event • Public recognition
	3.21 Propose new ideas for prescription drugs oral overdose protection	• Ideas	5/13/2013	6/14/2013	0	0	$15,000 (not awarded)	
	3.22 Reducing Cancer Among Women of Color Challenge	• Apps	8/23/2012	4/26/2013	16	3	$100,000	• Invitation to an event • Public recognition
	3.23 SMART-Indivo Challenge	• Apps	7/9/2012	11/30/2012	5	3	$13,000	
	3.24 Stop Bullying Video Challenge	• Videos	8/7/2012	12/31/2012	879	3	$3,000	• Public recognition
	3.25 Suicide Prevention: Continuity of Care and Follow-Up App Challenge	• Apps	6/6/2013	9/13/2013	25	3	$100,000	
	3.26 System for Locating People Using Electricity Dependent Medical Equipment During Public Health Emergencies Ideation Challenge	• Ideas	9/20/2013	*Ongoing at time of report*	*Submissions still open*	*Not yet announced*	$10,000	

Agency	Prize Name	Outcome Type	Opened	Completed	Entries	Winners	Total Prize Purse	Non-Monetary Incentives
	3.27 Technology Based Products to Reduce High Risk Drinking Among College Students	• Apps and other technology-based solutions	5/24/2013	9/13/2013	29	3	$100,000	
4. HUD	4.1 Rebuild by Design	• Designs	6/20/2013	*Ongoing at time of report (winners to be announced April 2014)*	148	*Not yet announced*	$2,000,000	• Resources to develop winning design(s) • Public recognition • Feedback/training from experts • Co-design with the public • Invitation to events
5. State	5.1 2012 Innovations in Arms Control Challenge	• Ideas	8/28/2012	10/26/2012	67	3	$10,000	
	5.2 2013 Innovations in Arms Control Challenge	• Ideas	7/22/2013	10/20/2013	24	*Not yet announced*	$10,000	
6. FTC	6.1 FTC Robocall Challenge	• Ideas/Designs	10/25/2012	4/2/2013	798	3	$50,000	• Public recognition
7. NEA	7.1 Presenting Arts Data Artfully	• Data visualizations	9/26/2013	3/10/2014	*Submissions still open*	*Not yet announced*	$60,000	
8. NEH	8.1 National Humanities Medal Design Competition	• Designs	10/1/2012	6/4/2013	131	1	$3,000	• Public recognition • Resources to develop winning design(s)
9. NSF	9.1 Basic Research to Enable Agricultural Development Ideas Challenge	• Ideas	4/1/2013	7/30/2013	801	13	$130,000	• Resources to develop winning ideas • Public recognition
	9.2 Graduate Research Fellowship Program "Creating the Future" Video Competition	• Videos	7/9/2012	11/14/2012	63	3	$5,500	• Invitation and paid travel to an event • Public recognition
	9.3 Innovation in Graduate Education Challenge	• Ideas	2/15/2013	6/13/2013	534 teams (totaling	8	$14,000	

Agency	Prize Name	Outcome Type	Opened	Completed	Entries	Winners	Total Prize Purse	Non-Monetary Incentives
					724 individuals)			
	9.4 Mozilla Ignite	• Ideas • Apps	6/4/2012	6/25/2013	300 Ideas 22 Apps	22	$500,000	• Co-design with the public • Public recognition

CONCLUSION

Prizes have an impressive record of spurring innovation in the private and philanthropic sectors. More than 45 Federal agencies, departments, and bureaus had conducted over 280 prizes as of September 2013, including 41 competitions conducted by seventeen agencies in FY 2013 under the prize authority provided by COMPETES. In support of their missions, these agencies have reaped the rewards of well-designed prizes integrated into a broader innovation strategy, and has shown what can be expected as Federal agencies continue to develop the expertise and capacity to use prizes strategically and systematically to advance their core missions.

The prize authority provided by COMPETES has been a critical step toward making prizes a standard tool in every agency's toolbox. By expanding the authority of all Federal agencies to conduct prize competitions, and by giving agencies a clear legal path, the legislation has made it easier for agencies to use prizes and enabled ambitious prizes with robust incentives.

The Administration has laid the policy and legal groundwork for agencies to continue to take advantage of the new prize authority in the years to come and has created support infrastructure for agencies, such as: training events and resources; a GSA contract vehicle that decreases the amount of time required for agencies to tap private sector expertise; and the government-wide Center of Excellence for Collaborative Innovation through which NASA supports the design and implementation of pilot prize programs for other Federal agencies. A number of agencies have begun to establish intra-agency strategies and policies to accelerate the use of the prize authority provided by COMPETES throughout their organization.

As the Administration has expanded this foundation of support, prizes conducted under the authority unleashed significant new activity in national priority areas such as energy, resilience, health, and employment. Increased use of the authority in the years to come is expected to allow the public and agencies across the Federal government to reap the benefits of high-impact prizes for open innovation. The use of the prize authority provided by COMPETES will continue to engage citizen solvers, drive cost effectiveness, leverage public-private partnerships, and provide new pathways to successful implementation of innovative solutions.

APPENDIX 1: AGENCY PROGRAMS CONDUCTED UNDER THE PRIZE AUTHORITY PROVIDED BY COMPETES

This Appendix provides a complete summary of all prizes and challenges conducted in FY 2013 under the prize authority provided to agencies in COMPETES and does not include any of the multiple prize competitions conducted under other authorities.

LIST OF CHALLENGES BY AGENCY

1. **Environmental Protection Agency and Department of Health and Human Services**
   - 1.1. My Air, My Health Challenge

2. **Department of Energy**
   - 2.1. Apps for Vehicles
   - 2.2. National Clean Energy Business Plan Competition
   - 2.3. SunShot Prize

3. **Department of Health and Human Services**
   - 3.1. "Be Heads Up About Concussion Safety" Poster Design Competition
   - 3.2. "I VetoViolence Because…": Teen Dating Violence Public Service Announcement Competition
   - 3.3. "Stay Covered" & "Churn Marketing Research and Methodology"
   - 3.4. Apps4Tots Health Challenge
   - 3.5. Behavioral Health Patient Empowerment Challenge
   - 3.6. Blue Button Co-Design Challenge
   - 3.7. Crowds Care for Cancer: Supporting Survivors Challenge
   - 3.8. Data Rx: Prescription Drug Abuse Infographic
   - 3.9. Design by Biomedical Undergraduate Teams Challenge
   - 3.10. Health Data Platform Metadata Challenge
   - 3.11. Health Data Platform Simple Sign-On Challenge
   - 3.12. Health Design Challenge
   - 3.13. healthfinder.gov Mobile App Challenge
   - 3.14. Managing Meds Video Challenge
   - 3.15. Million Hearts Caregiver Video Challenge
   - 3.16. Million Hearts® Hypertension Control Challenge
   - 3.17. Million Hearts Risk Check Challenge
   - 3.18. Mobilizing Data for Pressure Ulcer Prevention
   - 3.19. NEI Challenge to Identify Audacious Goals in Vision Research and Blindness Rehabilitation
   - 3.20. Ocular Imaging Challenge
   - 3.21. Propose new ideas for prescription drugs oral overdose protection
   - 3.22. Reducing Cancer Among Women of Color Challenge
   - 3.23. SMART-Indivo Challenge

DETAILED CHALLENGE REPORTS

1. ENVIRONMENTAL PROTECTION AGENCY AND DEPARTMENT OF HEALTH AND HUMAN SERVICES

1.1. My Air, My Health Challenge

Overview: Environment and public health are closely related and complementary fields—and their future depends on a closer understanding of those connections. New portable sensors have the potential to transform the measurement and interpretation of the influence of pollution on health. These technologies can provide a picture that is more detailed and more personal, with dramatic implications for health care, air quality oversight, and individuals' control over their own environments and health. The EPA and HHS — including the NIH

National Institute of Environmental Health Sciences (NIEHS) and ONC — envision a future in which powerful, affordable, and portable sensors provide a rich awareness of environmental quality, moment-to-moment physiological changes, and long-term health outcomes. Healthcare will be connected to the whole environment, improving diagnosis, treatment, and prevention at all levels. Many of the first steps toward this future have already been taken. Prototype projects have developed portable air quality and physiologic sensors, and experimental analysis tools for handling data that is higher in quantity, but often lower in quality, than more traditional monitoring techniques. The "My Air, My Health Challenge" was designed to build on this foundation and catalyze useful solutions that meaningfully integrate data from portable physiological and air quality monitors.

Website:
https://www.innocentive.com/ar/challenge/9932947

Problem Statement: The challenge was a multidisciplinary call to innovators and software developers to enable near real time, location-specific monitoring and reporting of air pollutants and potentially related physiological parameters, using a personal/ portable integrated system to assess connections between the two. The system needed to link air-pollutant concentrations with physiological data, provide geo-coded and time-stamped files in an easy-to-use format, and transmit this data to a central data repository provided by EPA and HHS. The challenge was structured in 2 phases:

Phase 1 – Project Plan
In Phase 1, entrants needed to:

- Propose a plausible link between health outcomes and airborne pollutants (chemical species and/or particulates), and provide evidence to support a plausible relationship between airborne pollutants and physiological metrics in a defined population
- Propose a prototype design and development plan for an integrated multi-sensor and data management system that may be easily worn or carried
- Conceptualize data generation, management (may include processing & on-board storage), and transmission functionality of the device.
- Propose a small-scale proof-of-concept study to validate the proposed prototype
- Study design process must include input from the target community/population

Phase 2 – Proof-of-Concept Pilot Project

- Four finalists attended an event for feedback, questions, and business/entrepreneurial resources prepared by Challenge sponsors (EPA, HHS/ONC, and HHS/NIEHS)
- Solvers developed prototypes and executed experimental validation of the system to bring together data from personal air quality and physiological monitors, showing how these types of data and sensors can be integrated for practical use by health and environmental agencies and individual citizens and illustrating the accuracy and precision of the raw data and of any processed data produced by the system.

Goal: The challenge was an integral part of the joint effort by HHS and EPA to find next-generation solutions in the area of environmental and health sensor technologies and exploring the interaction of environment and health through granular, near-real-time data collection.

Why a Prize as Preferred Method: Grants or contracts were not appropriate because the agencies sought a variety of different ideas rather than having to select one approach based only on a proposal. In addition, the challenge afforded opportunities to communicate both agencies' interest in this topic for the purpose of encouraging private-sector development.

Participants: The challenge had 32 final entrants. Most were small teams, and four teams were from foreign countries despite clear messaging that only U.S. citizens or U.S.-based businesses were eligible to win the competition.
Total entries: 32

Timeline:
Phase 1 – 06/6/12 – 10/5/12
Phase 2 – 10/5/12 – 6/4/13

Solicitation and Outreach Methods and Results: Social media, promotions at conferences, and outreach to developer community were used. HHS's partner Health 2.0 and the EPA contractor for this challenge, InnoCentive, coordinated these outreach efforts. In addition, EPA and NIEHS both engaged the public with press releases, blog posts, and announcements, including the launch announcement at the 2012 HDI event in Washington, DC. The combination of all these efforts led to significant interest in the challenge – the primary registration and submission site, run by InnoCentive, saw the creation of over 500 project rooms, a proxy for the number of people interested enough to register to enter the challenge. The challenge was also published on the Popular Science Innovation Pavilion run by InnoCentive, generating 40% of page views of the challenge. While the Pavilion attracted the science and academic community, the restriction of the eligibility requirements in the COMPETES-provided prize authority to U.S. citizens and businesses mitigated the usefulness of the Pavilion, as the Pavilion reaches an international audience.

Incentives: Finalists were invited to an event providing feedback, presentations from subject matter experts, and networking. $60,000 for the Phase 1 cash prize purse came from EPA funds. $75,000 for the Phase 2 cash prize purse was drawn from ONC's Investing in Innovation (i2) contract with Capital Consulting Corporation. The remaining $25,000 for the Phase 2 cash prize purse came from NIEHS.

Evaluation:
The following criteria used to review the Phase 1 submissions:

- Strength of evidence regarding link between air pollutant and physiological effect
- Viability of proposed sensor technologies to detect and quantify pollutants and their effects and to provide physiologically relevant health and air quality data
- Viability of the proposed project plan for producing a prototype

- Viability of the proposed instrument design as a wearable/portable device
- Potential significance of technology and eventual benefit to target population(s)
- Viability of the proposed proof-of-concept study (low complexity was preferred)
- Appropriate use of community input in designing proof-of-concept study

The following criteria used to review the Phase 2 finalist's submissions:

- Sensors: Successful technical collection of both health and environmental data
- Data reporting: Successful formatting and transmission of data
- Data processing and evaluation
- Community involvement and interaction

Partnerships: ONC partnered with EPA and NIEHS to manage the challenge; EPA contracted with InnoCentive to provide challenge management services.

Resources: In addition to the cash prize purse, $550 in ONC travel funds were used for transport to the finalist event held in Research Triangle Park, NC. One ONC employee managed the challenge as a part of his overall challenge portfolio. NIEHS and EPA staff also participated.

Results: Of the four finalists, three successfully built their prototypes based upon their original proposals – the teams from Carnegie Mellon/NYU, Phillips, and Conscious Clothing. Each prototype was demonstrated to the reviewers in a recorded video and in a live demo/Q&A webinar; each team also conducted experiments in their areas that ranged from small-scale tests to short community studies, and these experiments were described in a report with technical results. All three prototypes would have served as strong winners. The fourth finalist dropped out because as an individual, he was unable to recruit sufficient help and resources to help him build his prototype, and the prize for being selected as a finalist was not sufficient to fund the prototype development. Judges unanimously awarded the $100,000 prize to the team of David Kuller, Gabrielle Dockterman, and Dot Kelly for their Conscious Clothing prototype. Built to scale, this system could cost as little as $20. Its low price, comfort, and near-invisibility make it attractive not only to researchers and communities, but to individuals looking to take charge of their own health.

2. DEPARTMENT OF ENERGY

2.1. **Apps for Vehicles**

Overview: Apps for Vehicles asked application developers and entrepreneurs to demonstrate how the open data available on most vehicles can be used to improve vehicle safety, fuel efficiency, and comfort. DOE's Apps for Vehicles offered a total prize purse of $50,000, including an initial ideation phase that awarded $2,000 to the top eight software developers to develop new apps that help the public make the most of their vehicle's operational data to

improve efficiency and safety and a second development phase that culminated in the award of $17,000 each to the top two winning apps.

Website:
Phase 1: http://appsforvehicles.challengepost.com/
Phase 2: http://vehicles.challengepost.com/

Problem Statement: The non-proprietary information streams on a vehicle's on-board diagnostic port vary slightly by manufacturer but generally include parameters like vehicle and engine speed, throttle and brake position, and engine fault status. For years, only mechanics and emissions inspectors using expensive equipment could access this data, but new hardware technologies, GPS, smart consumer electronics, and the advent of cloud computing are making the on-board diagnostic port increasingly accessible to vehicle owners.

Goal: The Challenge sought to spur development of new apps and highlight innovations from vehicle-generated data. By applying open data principles and providing consumers with access to on-board data from their vehicles, authorized third-party developers can create and deliver new apps, products, and services, including ones focused on helping drivers improve their vehicle fuel economy. Not only can these third-party developers help Americans save money on fuel, they can also create jobs.

Why a Prize as Preferred Method: This competition sought to inspire innovative use of on-board vehicle data, and a prize allowed DOE to leverage private-sector effort without predefining the types of apps proposed. Additionally, this competition provided an opportunity to engage the software developer community in energy issues and raise awareness of the existence and value of on-board vehicle data.

Participants: The primary target audiences were: (1) developers not already engaged in the energy or vehicle sector; and (2) developers engaged in the energy or vehicle sector, but who were unfamiliar with the vehicle data format. The competition received 37 eligible submissions from individuals, small teams, and large organizations. Small teams were the most common, followed by individual entries.
Total Entries: 37

Timeline:
Phase 1 Submissions – 12/5/2012 - 1/15/2013
Phase 1 Winners Announced – 2/1/2013
Phase 2 Submissions – 2/1/2013 - 3/15/2013
Phase 2 Winners Announced – 4/1/2013

Solicitation and Outreach Methods and Results: DOE used an extensive public engagement campaign focused on targeted outreach to prominent tech and energy influencers on Twitter, as well as on Facebook. The challenge was announced at the 2012 Energy Datapalooza in October 2012, and a 24 hour Hackathon was held as a promotional event during the

Datapalooza. Challenge organizers worked with media to publish stories about the competition in online technology and energy press. Energy.gov and Challenge.gov were used as hubs for frequent competition updates and active support to help competition followers submit high-quality work. Finally, challenge organizers worked with a number of professional organizations to alert their memberships.

Incentives: Incentives included: (1) cash awards from a $50,000 total prize purse; (2) an opportunity to work directly with industry leaders; and (3) an opportunity to be recognized at a public announcement of the final winners. The prize purse was provided by the DOE Vehicle Technologies Office. In addition, all participants were granted exclusive access to vehicle experts and automakers to enhance their knowledge of on-board data streams. The two grand prize winners were also invited to present their work at an exclusive "Vehicle Data Jam" event with automotive manufacturers in Detroit, hosted by the White House Office of Science and Technology Policy and coinciding with the Society of Automotive Engineers World Congress. The participants also had their apps featured on Energy.gov.

Evaluation: Submissions were judged by an expert panel as well as the public. The judging panel included both Federal and non-Federal personnel. The Popular Choice Product was determined by public vote on Challenge.gov. Public votes were displayed on the Challenge.gov website, on a real-time basis, before being verified for integrity.

During both competition phases, judges assessed the apps for:

- Potential to help individuals, organizations, and communities make informed decisions to improve their fuel efficiency
- Creativity and innovation
- Depth and breadth of usage for each open data stream

For the initial ideation phase, plan viability was assessed. During the second development phase of the competition, judges assessed the apps' ability to be used immediately by consumers and the apps' user experience and interactive capabilities. Preference was given to apps/products accessible to a range of consumers, including those with disabilities.

Partnerships: Challenge organizers partnered formally with Ford Motor Company and OSISoft to sponsor the challenge. These companies provided sample data and technical support for on-board vehicle data accessibility. Challenge organizers partnered informally with a number of organizations, including CleanWeb, Greenstart, DOT, NHTSA, SXSW, and Oak Ridge National Laboratory, to improve outreach to possible entrants.

Resources: In addition to the prize purse, DOE personnel time was used to customize the website and DOE engaged ChallengePost to vet users in the Popular Choice Award vote.

Results: The competition resulted in a large number of submissions and the discussion boards on Challenge.gov were used heavily during the competition, both of which are indications of the beginning of an active developer community. The winning apps from phase 1 showed

diverse and valuable approaches to using open vehicle data. DOE awarded New York-based Dash[61] the Judges' Prize and Michigan-based MyCarma[62] the Popular Choice prize. Green Button Gamer,[63] based in Massachusetts, won the Safety Innovation award and Fuel Economy Coach[64] from Georgia received the Fuel Efficiency Innovation award. Dash started a company with their winning app and MyCarma has since been acquired by another company; both are now available to consumers.

2.2. **National Clean Energy Business Plan Competition**

Overview: The DOE's National Clean Energy Business Plan Competition (NCEBPC) is designed to build a network of student-focused business creation competitions across the country. Six regional DOE-funded business plan competitions send a finalist to Washington, D.C. to compete for the National Grand Prize and a suite of prizes sponsored by private-sector organizations in the national competition.

Website:
http://techportal.eere.energy.gov/commercialization/natlbizplan.html

Problem Statement: Start-ups and innovative technologies are critical to the growth of the clean energy economy in the United States and abroad, but there can be a gap between technology developers and entrepreneurs. University student business creation competitions have been an active source of new startups and a training ground for entrepreneurs. The DOE 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. All business plan proposals should fall within DOE's Office of Energy Efficiency and Renewable Energy (EERE) mission and technology portfolio. DOE established guidelines that defined regional NCEBPC competitions. 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. 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 or national labs. To ensure a level playing field among business plan teams nationwide, all entrants must be early stage venture investments.

Goal: The DOE has created the NCEBPC with several goals in mind:

- Inspire students to engage in clean energy entrepreneurship.
- Build regional networks that create linkages between technologists, academics, and investors.

[61] http://vehicles.challenge.gov/submissions/14008-dash-labs-inc
[62] http://vehicles.challenge.gov/submissions/14025-mycarma-personal-fuel-economy-label-mobile-app
[63] http://vehicles.challenge.gov/submissions/13988-green-button-gamer-driver-challenge
[64] http://vehicles.challenge.gov/submissions/13966-fuel-economy-coach

- Enable the launch of innovative cleantech startups by providing seed funding and in-kind services to young entrepreneurs.
- Advance clean energy technologies by engaging students, innovators, and technologists to bring innovative technologies to market.

Why a Prize as Preferred Method: 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 direct grants alone. This is the only national clean energy business plan competition in the nation.

Participants: The NCEBPC's primary target audience is graduate and undergraduate students in U.S. universities and colleges. The competition, through its six regions, received approximately 600 entries for the first two years. The six regional winners competed in the National Grand Prize of the competition in 2012 and 2013; runner-up teams from each region were also invited to attend the National Grand Prize events.
Total Entries: 600

Timeline: The NCEBPC was launched in 2011, with the inaugural competition taking place in June of 2012. A grant for three years is provided to the regions. Each region must make their competition sustainable beyond the grant period. Application period openings and closings are set by the individual regions. Each region must have their finals events by early-May. The National Competition is held in June.

Solicitation and Outreach Methods and Results: The NCEBPC utilized many forms of media to disseminate information about the prize. This included social media, traditional press, the DOE website, the Energy Secretary's blog, and Challenge.gov. Each of the regions has their own outreach strategy as well. The DOE will be pairing up with more associations and other groups to disseminate information about the National and regional competitions.

Incentives: Each region receives $100,000 from the DOE for their regional winner. In addition to the DOE prize, each region had several private-sector prizes.

Evaluation: The regions determine their own judging criteria. The National Competition assesses the following criteria to select a winner: value proposition; market differentiation; barriers to competition; technical feasibility; feasibility of go-to-market plan; customer access; scalability; quality; team commitment and chemistry; gaps and action plans; and impact on EERE mission.

Partnerships: While the regional competitions are supported by competitive grant solicitation funding from DOE, the national event is supported entirely through private-sector partnership. This includes all grand prizes for the winner of the national competition, any in-kind prizes,

funding for the venue, and any catering provided at the two-day event. Private-sector partners provided the following support:

- Wells Fargo provided the winning team with a $50,000 cash prize.
- Mintz Levin sponsored the Cleantech Forum, provided space, catering, and the reception for the first day of the event, and awarded 30 hours of free legal service to the winner of the National Prize.
- Battelle sponsored the morning break of the Grand Prize event.
- Ernst & Young provided the lunch and afternoon break of the Grand Prize event.
- George Washington University's Sustainability Initiative hosted the Grand Prize event, providing space and on-site assistance for the event.
- Google provided the technical equipment for livestreaming the 2013 Grand Prize.
- Invenergy sponsored the breakfast for the 2013 Grand Prize.
- Bloomberg New Energy Finance provided access to their database for the regional winners prior to the Grand Prize Event and awarded the National winner a year license to their data and analytical news resources.
- Cleantech Open awarded scholarships to the six regional finalists and assistance for all semi-finalists in the National Clean Energy Business Plan Competition.
- Edelman provided a full-day seminar on PR and marketing for the Grand Prize winner
- National Renewable Energy Laboratory was also a partner for the competition
- Media and outreach partners included: Advanced Energy Economy, National Venture Capital Association, Pew Charitable Trusts, Silicon Valley Leadership Group, and Solar Energy Industry Association.

Resources: The regional competitions are a $2.1 million 3-year competition grant program. Each region receives $120,000. Of those funds, $100,000 is directly provided to the winner of the prize, and $20,000 is provided for administrative costs. Additionally, each competition fundraises for additional prizes from the private sector.

Results: The NCEBPC engaged multiple stakeholders at both the national and the regional level. The National Competition has attracted 600 teams across the country to compete for millions of dollars in prizes, resulting in 55 startups that have generated more than 90 full-time jobs and attracted more than $20 million in follow-on funding. Follow-on opportunities for the start-ups have included everything from angel investment, VC funding, government grants, crowdfunding, and acquisition.

2.3. **SunShot Prize**

Overview: In September 2012, DOE launched a significant market stimulation prize in support of the goals of its SunShot Grand Challenge, which aims to make solar energy competitive with fossil fuels by the end of the decade. The $10 million SunShot Prize[65] challenges the ingenuity of America's businesses and communities to make it faster, easier, and cheaper to install rooftop

[65] http://challenge.gov/DOE/410-sunshot-prize

solar energy systems. Winning teams will successfully deploy 5,000 small-scale (2-15 kilowatt) rooftop photovoltaic (PV) systems with non-hardware costs averaging $1/W during Phase I of the competition. Phase II, which is intended to assess the business sustainability of the winning teams, calls for the installation of an additional 1,000 qualifying systems. Successful competitors will deploy at least 6,000 total new rooftop PV installations in the U.S. at an average pre-subsidy, non-hardware cost of $1 per watt. Winners will break this significant price barrier, considered to be unachievable a decade ago, and prove that they can repeatedly achieve a $1 per watt non-hardware cost using innovative, verifiable processes and business practices.

Website:
http://challenge.gov/DOE/410-sunshot-prize

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.

Goal: DOE has three main goals for the SunShot Prize:

- *Affordability*: Though hardware costs have fallen more than 75% since 2008, the non-hardware costs have not made as significant of an advance. This prize aims to help the community achieve lower costs to the consumer by streamlining processes associated with installation.
- *Solar Market Maturity*: Inspire U.S. businesses and communities to create the right market conditions for growth and job creation.
- *Subsidy Independence*: Help the private sector transition to post-subsidy market while maintaining strong growth and resilience.

Why a Prize as Preferred Method: The SunShot Prize not only rewards for results in cost effective ways, it increases the number and the diversity of individuals, organizations, and teams that are addressing this problem. DOE expects the industry overall to invent and deploy new business concepts and models, during a period of two years. This will help all market players to participate and improve while focusing on value propositions 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/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 nonprofit organization, that maintains the U.S. as a primary place of business. As of the time of this report, registration is still open and an update will be provided in the FY 2014 report on the use of the prize authority provided by COMPETES.

Timeline:
Submissions and Registration – 9/12/2012 - 10/31/2014
Phase I Prize submission close – 12/31/2014
Phase II Prize submission close – 12 months after Phase I submission
Anticipated date for announcing Phase I winners – summer 2015
Anticipated date for awarding Phase II cash awards – spring 2016

Solicitation and Outreach Methods and Results: DOE and the College of Nanoscale Science and Engineering (CNSE) at State University of New York at Albany, a DOE partner organization have applied a targeted engagement campaign using webinars, email blasts, blog posts, and web updates that target tens of thousands of people and organizations. Challenge organizers also managed to get a number of press releases about the competition in technology, media, and energy press online. The SunShot Initiative website, Energy.gov, and Challenge.gov were used as hubs for frequent competition updates and active support to potential contenders. During the past 12 months, the SunShot organizing team hosted two 1-day workshops in April (Albany) and July (San Francisco during Intersolar North America) to promote the Prize and increase interest in competing. The team has also hosted 4 webinars and 2 podcasts in addition to multiple blog posts on the SunShot website. Workshops and webinars were attended by 75 people on average. CNSEhas also utilized the Google Ads platform to promote participation in the SunShot Prize online. The Prize was promoted more than 2.5 million times online and more than 25,000 people have visited the SunShot Prize webpage.

Incentives: The primary incentive is a $10,000,000 total cash award given to three winning teams. Winners will have rights to use the title "SunShot Prize Winner." The first place team will have the rights to the title "*SunShot Prize Winner of America's Most Affordable Rooftop Solar*".

Evaluation: DOE will establish, by 2014, 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 will use a third-party auditing firm to conduct extensive technical and financial evaluations in order to assist the ERC in making its selections. There are three main criteria in judging entries:

- *Technical Field Assessment*: Examiners will review evidence of installation qualification and compliance with requirements.
- *Financial and Accounting Assessment*: Examiners will perform a complete audit to determine financial propriety of submissions.
- *Business Sustainability*: Examiners will evaluate the sustainability of teams' business models to deploy solar in subsidy-free U.S. markets. Future installations must be feasible without subsidies or rebates at average non-hardware costs of $1/W or less.

Partnerships: Challenge organizers partnered with CNSE for promotion and outreach activities.

Resources: In addition to the $10,000,000 prize money, the competition requires roughly $50,000 annually to fund and support outreach activities.

Results: This prize competition is still underway, so final results are not available. However, based on the feedback, inquires, and comments received through formal communication channels (e.g. workshops and webinars), there is evidence of great interest in the Prize, despite operational and scalability challenges facing potential competing teams.

3. DEPARTMENT OF HEALTH AND HUMAN SERVICES

3.1. **"Be Heads Up About Concussion Safety" Poster Design Competition [CDC/NCIPC]**

Overview: HHS Centers for Disease Control and Prevention (CDC) National Center for Injury Prevention and Control (NCIPC) hosted the "Be Heads Up About Concussion Safety" Poster Design Competition to reach out to children and their parents to solicit submissions of poster designs focused on concussion prevention, recognition, and response at school, home or play.

Website:
http://beheadsup.challengepost.com

Problem Statement: CDC/NCIPC asked children and adolescents to send in posters they created on concussion safety. Using concussion safety key messages created by CDC/NCIPC, children and adolescents could draw, paint, or use a computer to design a poster. The entrants were asked to design a poster to help educate other children and adolescents about how to identify a concussion or other serious brain injury, what to do if someone may have a concussion or other serious brain injury, and how to help keep safe from these injuries at school, home, or play.

Goal: Public education

Why a Prize as Preferred Method: CDC/NCIPC wanted to reach out directly to children and adolescents in order to raise awareness that there are things they can do to recognize, respond to, and help prevent concussions and other serious brain injuries.

Participants: CDC/NCIPC engaged children and adolescents in four age categories. The competition was open to any individual or permanent resident of the United States who is 13 years of age or older (with the permission of a parent/ guardian if under 18 years of age). Entrants between five and 12 years of age were eligible with the assistance of a parent/guardian (assistance was limited to the online registration process and submission of entries; all submissions only included original artwork were created solely by children and adolescents). CDC received 15 eligible submissions: one in the 5-8 age category, two in the 9-12 age category, five in the 13-15 age category, and seven in the 16-18 age category.
Total entries: 15

Timeline:
Submissions – 6/12/2013 - 9/15/2013
Winners Announced – 11/7/2013

Solicitation and Outreach Methods and Results: CDC/NCIPC promoted the competition through email announcements to existing partner organizations, including sports, health, school, and youth-serving organizations. The competition was also promoted on Facebook.

Incentives: $250 was awarded to the winner in each of the four categories, for a total of $1,000.

Evaluation: Submissions to the competition were assessed by an informed panel of nine judges comprised of CDC/NCIPC staff who are experts in brain injury, health communication and education, and injury prevention. Judges assessed each poster using the four judging criteria fields: creativity and innovation; use of messages on concussion safety; use positive message and images in the poster design; and originality.

Partnerships: None

Resources: CDC/NCIPC personnel time: $1,000; contract time: $3,000; and $1,000 prize purse

Results: Information about the "Be Heads Up About Concussion Safety" Poster Design Competition reached over 85 sports, school, youth, and health organizations with information to help raise awareness about how to recognize, respond to, and help prevent concussions and other serious brain injuries.

3.2. **"I VetoViolence Because…" Teen Dating Violence Public Service Announcement Competition [CDC]**

Overview: The "I VetoViolence Because..." Teen Dating Violence Prevention Public Service Announcement Competition encouraged the development of video public service announcements (PSAs) that increased public awareness that teen dating violence is a public health problem, and prevention efforts can stop it before it starts. Participants were asked to film and submit a PSA, 60 seconds or less in length, that showed how they work to end teen dating violence; prevention efforts in their community, school, or business; or effective responses when a teen experiences or witnesses intimate partner violence.

Website:
vetoviolence.challenge.gov

Problem Statement: Of those who have ever experienced rape, physical violence, and/or stalking by an intimate partner, one in five women and nearly one in seven men experienced some form of partner violence between 11 and 17 years of age. Moreover, in a nationwide survey, over 9% of high school students reported being purposefully hit, slapped, or physically hurt by their boyfriend or girlfriend in the prior 12 months. Victims of teen dating violence are more likely to do poorly in school and report binge drinking, suicide attempts, and physical fighting. They may also carry the patterns of violence into future relationships. Teen dating violence can be stopped before it starts when young people, families, organizations, and

communities work together to implement effective prevention strategies. Additionally, healthy relationship behaviors can have a positive effect on a teen's emotional development.

Goal: Public education

Why a Prize as Preferred Method: The monetary award provided an incentive to inspire the target audience to invest the time and effort needed to create high-quality PSAs that were compelling and effective. In addition, the opportunity for promotion on the VetoViolence Facebook page (www.facebook.com/VetoViolence) promised promotion to a wide community of potential viewers engaged in violence prevention.

Participants: CDC targeted three groups to create PSAs informed by their unique perspectives and efforts in preventing teen dating violence: violence prevention professionals, students, and prevention allies from the general public. A total of 22 entries were submitted, of which 21 met all competition eligibility requirements. Of those, the Violence Prevention Professional Category received 11 entries; Student Category, 9; and General Public Category, 1.
Total entries: 22

Timeline:
Submissions – 7/15/2013 - 8/15/2013
Judging concluded – 8/30/2013

Solicitation and Outreach Methods and Results: CDC conducted digital marketing outreach comprising a Facebook promotion campaign and earned publisher outreach. Ads using relevant keyword clusters reached users engaged in violence prevention, working in healthcare, serving as educators and counselors, as well as those who are parents of teenage children.

Incentives: PSAs of 3 winners and 5 finalists were posted to the VetoViolence Facebook page (www.facebook.com/VetoViolence); a total of $1,500 was distributed in $500 debit cards to three category winners. $1,500 in prizes was allocated from contract with Westat Health Communications for competition support.

Evaluation: PSAs were evaluated by seven judges drawn from partners and grantees of the CDC Injury Center's Division of Violence Prevention, as well as communication professionals in the private sector. Participants were required to demonstrate excellence across five key criteria for their PSAs to achieve top scores. These included: creativity; content relevance; length; video and audio quality; and fulfillment of competition purpose.

Partnerships: Westat Health Communications provided promotional support for the competition through a contract with CDC Injury Center's Division of Violence Prevention. CDC also leveraged existing alliances with partners and grantees focused on intimate partner violence prevention to provide expertise in judging the submitted PSAs. The judging panel comprised representatives from The California Partnership to End Domestic Violence, National

Resource Center on Domestic Violence, California Coalition Against Sexual Assault, and Family Violence and Prevention Services within the U.S. Department of Health and Human Services.

Resources: Resources used included $15,000 for the Facebook promotional campaign, $1,500 for three $500 American Express gift cards for winners, and personnel hours.

Results: PSA winners and finalists in three categories were showcased on the VetoViolence Facebook page, highlighting teen dating violence as a preventable public health issue.

3.3. **"Stay Covered" & "Churn Marketing Research and Methodology" Challenges [SAMHSA]**

Overview: The Substance Abuse and Mental Health Services Administration (SAMHSA) asked the public to develop innovative communications strategies to target individuals who experience high levels of involuntary breaks ("churn") in health insurance coverage.

Website:
http://staycovered.challengepost.com/

Problem Statement: The "Stay Covered Challenge" called for the development of a marketing/outreach campaign designed for use by providers and community-based organizations in targeting individuals in Medicaid due to disability. Competitors could consider developing marketing materials communicating the importance of maintaining eligibility by responding to communications from the Medicaid agency and by communicating to the agency about housing changes or other changes of circumstance that might impact program eligibility.

The "Churn Marketing Research Methodology Development Challenge" asked competitors to develop a research methodology to identify the marketing and communications profile of uninsured individuals who have been unenrolled from coverage affordability programs but remain eligible for enrollment. The challenge did not involve the development of communications materials targeting these individuals.

Goal: Solve a health problem

Why a Prize as Preferred Method: SAMHSA chose to use two prize competitions because the problems of communicating to populations who are currently enrolled based on a disability determination had not previously been explored. Further, the challenge was an efficient and cost-effective way to raise the profile of this policy issue.

Participants: SAMHSA sought to engage marketing communications and marketing research professionals in the health and public education fields. No participants entered the Churn Marketing Research Methodology Challenge. Four competitors entered the Stay Covered Challenge. The winning solution was from two marketing professionals.
Total entries: 4

Timeline:
Submissions – 7/16/2013 - 8/31/2013
Winners Announced – 9/27/2013

Solicitation and Outreach Methods and Results: SAMHSA posted information about the challenge on SAMHSA's website and social media, distributed an announcement as an e-blast to SAMHSA stakeholders, presented to national stakeholder groups on the project, distributed through SAMHSA's grantees, and engaged in direct solicitation to research and marketing communication firms as well as to business and public health graduate schools.

Incentives: Recognition on Challenge.gov and on SAMHSA's distribution channels as winners; $100,000 in total award funds for both challenges, with $30,000 for first prizes, $15,000 for second prizes, and $5,000 for third prizes. SAMHSA disbursed only $50,000 in awards.

Evaluation: The submissions were evaluated as to how useful they would be in targeting individuals experiencing or at risk of churn and in fostering the use of the materials by providers and community-based organizations that serve Medicaid populations.

Partnerships: None

Resources: In addition to the $50,000 used for the awards, SAMHSA staff time. The $50,000 was obligated from the CCB from FY 2012.

Results: The challenges successfully raised the profile of coverage continuity as an issue for populations with behavioral health problems and the solutions presented three unique and valuable approaches to effectively communicating with currently covered Medicaid beneficiaries whose eligibility determination is based on a psychiatric disability.

3.4. **Apps4Tots Health Challenge [HRSA and ONC]**

Overview: The Health Resources and Services Administration (HRSA), the ONC, and Healthdata.gov joined forces to offer the "Apps4TotsHealth Challenge" as a call for developers and innovators to make use of the Healthdata.gov data Application Programming Interfaces (API) and integrate the TXT4Tots message library into a new or existing platform to improve children's nutrition and health. TXT4Tots is a newly released library of short, evidence-based messages focused on nutrition and physical activity, targeted to parents and caregivers of 1-5 year old children; and available in English and Spanish. Content for the messages was derived from American Academy of Pediatrics Bright Futures: Guidelines for Health Supervision of Infants, Children and Adolescents, which uses a developmentally-based approach to address children's health needs in the context of family and community. Delivered via SMS/text, these messages are a new open resource that developers can implement in children's health apps.

Website:
http://www.health2con.com/devchallenge/apps4tots-health-challenge/

Problem Statement: Submissions were required to follow several basic guidelines, including using the Healthdata.gov data API to integrate the TXT4Tots message library into an existing platform or new platform aimed at providing interactions between the data source and an existing function; using the information to augment messaging aimed toward consumer or health care providers; utilizing a creative user interface that optimizes the user's understanding of the messages; and demonstrating how the original services of the app were enhanced by the integration of the new content. The content could be integrated into an existing web, mobile, voice, electronic health record, or other platform for supporting interactions of the content provided with other capabilities. Examples provided included query-based prompts that generate messages using the library, visualization methods that graphically display messages, delivery of information with other platforms with calendar functions, and uses of gaming approaches aimed at enhancing consumer actions directed from the text library.

Goal: Solve a health problem; Public education

Why a Prize as Preferred Method: Unlike most contracts, grants, or cooperative agreements, challenges are an opportunity to shine a spotlight on an area of interest for an agency, in this case spreading awareness of the data API and the Text4Tots message library. The prize challenge mechanism can be more cost-efficient than other procurement methods. Also, ONC preferred to stimulate the market around these apps via a challenge model, rather than attempt to develop a full app internally.

Participants: ONC intended to mobilize developers who had already created apps that addressed the target community of parents and caregivers of children aged 1-5. This was also reflected in the short submission period, which made it difficult to create a new app from the ground up. 12 submissions were received, some more responsive to the challenge than others. Total entries: 12

Timeline:
Submissions – 4/15/2013 - 5/20/2013
Winners Announced – 6/3-4/2013

Solicitation and Outreach Methods and Results: The challenge was announced via a post about the challenge on the ONC Buzz Blog, followed by a webinar describing the challenge and answering questions from the audience. Challenge announcements were included in the regularly-scheduled marketing emails of the challenge's contract subcontractor Health 2.0. The winners of the challenge were announced on the main stage at Health Datapalooza 2013.

Incentives: $25,000

Evaluation: This challenge used a four-member review panel to evaluate the challenge submissions. The review criteria, weighted equally, were:

- Usability and intuitiveness of the user interface
- Completeness

- Creativity in solving specific health problem(s)
- Innovative integration into a larger platform

Partnerships: HRSA provided subject matter expertise with regard to the content and development of the Text4Tots messages. The HHS HealthData.gov team brought technical expertise around the data API and implementation aspects of the message library.

Resources: Funding, outside of FTE time, came from the ONC's i2 contract.

Results: Three winning apps integrated in-depth content, enhanced messages with pictures, and allowed users to access the full library of messages.

3.5. **Behavioral Health Patient Empowerment Challenge [ONC]**

Overview: Health IT has potential to assist individuals with managing behavioral health disorders (including both mental health and substance use disorders), as well as to act as a treatment extender for patients with limited access to other care. ONC – in partnership with SAMHSA, the Office of National Drug Control Policy (ONDCP), and NIH – organized a Technology Innovations for Substance Abuse and Mental Health Disorders Conference at the White House. This conference highlighted how technology can be used to improve treatment for behavioral health disorders. In conjunction with this conference, ONC issued the Behavioral Health Patient Empowerment Challenge to identify and highlight existing technologies that empower consumers to manage their mental health or substance use disorders. The top three entries were invited to the conference, where the winner demonstrated the winning tool. The challenge sought to identify and serve as a showcase for apps that already existed, rather than to catalyze new apps.

Website:
http://behavioralhealth.challengepost.com/

Problem Statement: The challenge was limited to existing and available apps and did not have specific functionality requirements other than empowering consumers to manage their mental health and/or substance use disorders and using evidence-based strategies. Submissions were required to be available for use by consumers on a widely-used platform for mobile devices by the submission end date. Participants were also required to submit a video demo and a write-up that provided an overview of the app's target audience and evidence that the app's functionality addressed the needs of that target audience; discussed how the target population could use the technology to better manage their symptoms or their recovery process; discussed how the app was designed to keep the user engaged over time to promote consistent use; and described the app's ability to be integrated with electronic health records or other tools.

Goal: Solve a health problem

Why a Prize as Preferred Method: The motivations and goals of this challenge were not addressable via contract, grant, or cooperative agreement.

Participants: ONC and its partners were interested in apps that met the desired criteria, rather than seeking a specific type of participant. Given the requirement for evidence-based findings in the submissions, most participant teams included researchers. While the submission window was short, the submission requirements were not complex and led to 29 entries.
Total entries: 29

Timeline:
Submissions – 8/26/2013 - 9/3/2013
Winners Announced – 9/16/2013

Solicitation and Outreach Methods and Results: The challenge was announced with a post on the ONC Buzz Blog and promoted by ONC and SAMHSA, primarily over Twitter. In addition, a webinar shortly followed the announcement, describing the background and purpose of the challenge, what the requirements are, basic parameters including timeline and award amounts, and answering questions from the audience.

Incentives: Attendance and recognition at a conference was the primary incentive; No prize purse was offered.

Evaluation: This challenge used a three-member review panel of behavioral health subject matter experts in SAMHSA to evaluate the challenge submissions.

Submissions were evaluated by the following criteria:

- Evidence base for the functionality included in the app
- Usability, including intuitiveness, capacity to engage the user, and user interface
- Comprehensiveness of the technology for addressing the behavioral health needs of the target population
- Existing ability to be integrated with electronic health records or other tools

Partnerships: ONC primarily collaborated with SAMHSA on this challenge. SAMHSA provided the challenge administration personnel and submission reviewers.

Resources: OMC/SAMHSA personnel time.

Results: The challenge successfully identified several high-quality apps, beyond just the winning submissions, that met the qualifying criteria. This was the first ONC challenge that specifically asked entrants to cite the research used and many of the challenge participants successfully addressed these requirements.

3.6. **Blue Button Co-Design Challenge [ONC]**

Overview: The Blue Button Co-Design Challenge was a multi-stage, multi-part challenge intended to build support for Blue Button Plus; expand ONC's understanding of how patients want to use their clinical data and what products they want to see developed; and increase the number of fully enabled Blue Button Plus tools and apps in areas of high priority for patients. Blue Button is the symbol for a patient's access to their own data, and Blue Button Plus is the ability to get these records via a human-readable and machine-readable format, enabling consumers to do everything from printing a physical copy of their health records to sharing data with a third-party app. The challenge awarded winners in two categories, Patient Applications and Developer Tools. The Blue Button Co-Design Challenge built upon previous ONC activities to support consumer health and patient access to their data.

Website:
http://www.health2con.com/devchallenge/blue-button-co-design-challenge/

Problem Statement: The Patient Applications category employed open innovation tactics of crowdsourcing and co-design to leverage the opinions and views of everyday patients. Instead of describing use cases at the outset of the challenge, ONC crowdsourced app ideas on an online platform run by Health Tech Hatch, where anyone could post an idea. App ideas were voted on for a two-week period. The top ideas were refined to four possible areas of focus for developers. Entrants into the challenge were then required to post their designs or in-development applications on the Health Tech Hatch website to participate in the co-design process by incorporating public input and feedback from potential end users, patients, and patient advocates. To be eligible to win, entrants needed to demonstrate use of Blue Button Plus by receiving and integrating patient clinical or financial data into an existing or new app; display the Blue Button logo; and include a slide deck to describe how the app could be used, which of the crowdsourced product ideas inspired this application, and how patient co-design impacted the final product. The Open Source Developer Tools category was intended to ease the implementation of Blue Button Plus for future applications and engage developers around standards such as consolidated CDA and DIRECT.

Goal: Improve service delivery

Why a Prize as Preferred Method: A prize was a low-cost way to encourage the adoption of Blue Button Plus by providers, developers, and consumers.

Participants: ONC engaged several communities through the challenge. Patients provided use case ideas for applications in the initial crowdsourcing phase; commented on and voted for those ideas; participated in the co-design process with developers; and voted for the winners after the submission period. Companies and app developers were allowed to submit applications, although the majority of entrants were health-oriented companies.
Total entries: 80 ideas, 13 apps, 3 developer tools

Timeline:
Patient Application Idea Submissions – 6/3-7/2103
Patient Application Idea Winners Announced – 6/12/2013
Patient Application Submissions – 6/12/2013 - 8/5/2013
Patient Application Review Period Closed – 8/21/2013
Developer Tools Submissions – 6/12/2013 - 7/8/2013
Developer Tools Winners Announced – 7/22-26/2013

Solicitation and Outreach Methods and Results: The challenge was announced via a post about the challenge on the ONC Buzz Blog, followed by a webinar describing the challenge and answering questions from the audience. Outreach support, especially via social media, was also provided by Health Tech Hatch. ONC hosted two Blue Button developer forums in July, where the challenge was further marketed. The crowdsourcing and public voting aspects of the challenge resulted in a high amount of social media activity, particularly Twitter.

Incentives: $55,000 total prize purse

Evaluation: Entries in the Patient Applications category were reviewed using these criteria:

- Innovative use and integration of Blue Button Plus
- Innovative use of Blue Button Plus patient data
- Application design and ease-of-use
- Relevance to crowdsourced ideas and participation in co-design
- For the first time in an ONC challenge, public voting contributed to the selection of the challenge winners, with a one-third weighting compared to the review panel.

Developer Tools were reviewed using the following criteria: code readability, maintainability, and extensibility; quality of code documentation; and value added by the tool.

Partnerships: ONC subcontracted with the crowdsourcing platform Health Tech Hatch to host the ideation, co-design, and public voting aspects of the challenge.

Resources: Funding, outside of ONC personnel time, came from the i2 challenge program contract with Health 2.0, as did additional labor.

Results: This challenge was successful in achieving one of its primary goals, to engage patients and spread the word about Blue Button. For the Patient Application category, 80 ideas were submitted during the ideation process. During the co-design process, 27 testers provided 131 comments to developers. The final public voting period lasted two weeks and received 4,857 votes (individuals could vote three times). 13 apps were submitted, increasing to 14 the number of apps available that have Blue Button Plus functionality implemented. A new tool that allows developers to test their Blue Button Plus implementations was developed specifically for this challenge and is now available for anyone to use.

For the Developer Tool category, three winners received awards and were added to the Blue Button repository on GitHub.[66] The open source tools created through the challenge will make it easier for developers to write applications using Blue Button Plus going forward. The Developer Tools side of the challenge could have stood on its own rather than being directly associated and run concurrently with the Patient Applications category – date and timeline confusion may have depressed participation in the Developer Tools category.

3.7. **Crowds Care for Cancer: Supporting Survivors Challenge [ONC/NCI]**

Overview: To address the needs of cancer survivors, ONC launched the Crowds Care for Cancer: Supporting Survivors Challenge in conjunction with NCI. This challenge aimed to incentivize the development of innovative information management tools and apps that help cancer survivors by facilitating activities such as coordinating recommendations, appointments, and resources from patient support networks and healthcare providers involved in their care.

Website:
http://www.health2con.com/devchallenge/crowds-care-for-cancer-challenge-supporting-survivors-2/

Problem Statement: The number of cancer survivors in the United States is currently estimated at 14 million and is expected to increase significantly with the aging of the United States population. Cancer survivors may experience a host of long-term and late effects that require coordinated follow-up care after completion of primary treatment for cancer. Despite significant progress in cancer treatment, the complex, often fragmented state of end-of-treatment care may lead to harmful breakdowns in patient-provider communication and follow-up care for cancer survivors. Enabling better communication, exchange of data, and care coordination can help improve end-of-treatment consultations and care planning for cancer survivors. Innovative new approaches are needed to assist patients and their support networks.

Goal: Improve service delivery

Why a Prize as Preferred Method: The successes of other prize competitions demonstrated that this was a viable method for creating tools that incorporate co-design from cancer survivors and survivorship stakeholders. An open innovation challenge allowed for participation from diverse populations and widened the potential for quality and novel contributions beyond the academic or corporate sectors. In addition, the challenge mechanism provided for faster development and iteration of potential solutions.

Participants: Desired participants for the competition were individuals and teams with the capability to create a tool that addresses the needs of cancer survivors. There were 30 entrants to the competition. Three of the entrants were selected to participate in the second phase.
Total entries: 30

[66] https://github.com/blue-button

Timeline:
Phase I Submissions – 4/20/2013 - 5/28/2013
Phase II Submissions – 6/3/2013 - 6/12/2013
Winner Announced – August 2013

Solicitation and Outreach Methods and Results: Outreach was made through various listservs, online posting of the Federal Registrar's Notice, a number of blog posts (e.g. Crowds Care for Cancer Challenge: A Survivorship Toolkit-LIVESTRONG Foundation[67]), participation on a blogtalk radio show (This Week in Health Innovation), a webinar, social media, radio, and online media.

Incentives: Non-monetary incentives include recognition and media exposure. Monetary incentives include: $5,000 awarded to 3 finalists from Phase I and a $25,000 grand prize to the Phase II finalist. More than $16,000 in additional seed funding was received by the three finalists came from the public through the use of the MedStartr.com crowdfunding portal.

Evaluation: A panel of experts and stakeholders in survivorship research, care, and health information technology were chosen as judges to evaluate submissions against these criteria:

- The submission is an innovative information management tool or app deployable on any personal computing platform widely available to consumers
- The tool or app addresses the needs of cancer survivors managing their transition from specialty to primary care
- Usability and design
- Evidence of co-design with and support from users of the proposed tool or app (e.g., patients, families, primary/specialty caregivers, insurers, or hospitals)
- Innovation and differentiation from existing technologies and products
- Functionality, accuracy, integration with electronic care platforms, and use of Blue Button Plus standards (bluebuttonplus.org)
- Customizability and ability to adapt to evolving survivorship care needs including primary/specialist care interactions

Partnerships: ONC and NCI utilized a partnership with the LIVESTRONG Foundation to help disseminate news about the challenge, crowdfunding phase, and grand prize winner. The MedStartr crowdfunding platform supported the competition through a consulting agreement.

Resources: ONC and NCI personnel time. Contractor support included Health 2.0 and the sub-contractor MedStarter group. Funds were allocated using the i2 contract.

Results: This prize competition succeeded in the production of multiple tools for cancer survivors. The final grand prize winning team "Medable" created the mobile phone app called "Together". Because of the competition, the Medable team was able to demonstrate their app at the 2013 Rock Health Summit where they interacted and connected with various industry

[67] https://blog.livestrong.org/2013/05/20/crowds-care-for-cancer-challenge-a-survivorship-toolkit/

and research leaders. The three semi-finalists raised over $16,000 in additional seed-funding from the crowdfunding phase of the challenge.

3.8. **Data Rx: Prescription Drug Abuse Infographic [NIH/NIDA]**

Overview: The NIH National Institute on Drug Abuse (NIDA) offered the "Data Rx: Prescription Drug Abuse Infographic Challenge" to encourage the general public to create infographics that present information based on current research concerning the growing trend of prescription drug abuse. The infographic needed to inform and educate about the dangers involved with the abuse of prescription drugs in interesting, novel, and creative ways.

Website:
http://data-rx.challengepost.com/

Problem Statement: Infographics are frequently used to communicate complex information in a clear, concise, and visually appealing manner to the public. The use of infographics in health science is extremely limited, and infographics relevant to substance use and abuse rarely are based on primary data sources. The infographic submissions in response to this challenge were intended to increase awareness about the dangers of prescription drug abuse based on latest research. Entrants needed to submit:

- An infographic that increases awareness and clearly outlines the associated dangers of prescription drug abuse
- A one-page summary to accompany the infographic that summarizes the main points, selected approach, and what conclusions the data visualization helps to make.

Goal: Public education

Why a Prize as Preferred Method: This was a problem that could be solved by the general public with innovative approaches and a small resource commitment.

Participants: This competition was open to the general public.
Total entries: 12

Timeline:
Submissions – 5/16/2013 - 7/14/2013
Winners Announced – 7/29/2013

Solicitation and Outreach Methods and Results: NIH/NIDA submitted the announcement to current NIDA grantees, scientific listservs and conducted outreach to data visualization institutions, blogs, societies, etc.

Incentives: NIDA website showcased winners; 1st prize: $3,000; 2nd: $2,000; 3rd: $1,000

Evaluation: Submissions were evaluated on three criteria: creativity and aesthetics; clarity in articulating the problem; and success in translating data sets into relevant visual information.

Partnerships: None

Resources: NIDA personnel time. The $5,000 used for the cash prizes were from unconditional gift funds which are donations to NIDA's research from private citizens.

Results: This challenge was in accordance with the mission of the National Institute on Drug Abuse (NIDA) to bring the power of science to bear on drug abuse and addiction and one of its strategic goals to prevent the initiation of drug use and the escalation to addiction in those who have already initiated use. Infographics identified the characteristics and patterns of prescription drug misuse and abuse. Though the quantity of submissions was low, the quality of the submissions was good and 3 awards were given.

3.9. **Design by Biomedical Undergraduate Teams (DEBUT) Challenge [NIH/NIBIB]**

Overview: The NIH National Institute of Biomedical Imaging and Bioengineering (NIBIB) challenged teams of undergraduate students to design and build innovative solutions to unmet health and clinical problems.

Website:
http://debut2013.challenge.gov/
http://www.nibib.nih.gov/training-careers/undergraduate-graduate/design-biomedical-undergraduate-teams-debut-challenge

Problem Statement: The problem addressed by the challenge was the design of innovative solutions to unmet health and clinical problems in three categories: (1) diagnostic devices and methods; (2) therapeutic devices and methods; and (3) technology to aid underserved populations and individuals with disabilities.

Goal: Engage undergraduate students in the design of innovative solutions to unmet health and clinical problems by:

- Providing undergraduate students with valuable experiences such as working in teams, identifying unmet clinical needs, and designing, building, and debugging solutions for such open-ended problems
- Generating novel, innovative tools to improve healthcare, consistent with NIBIB's purpose
- Highlighting and acknowledging the contributions and accomplishments of undergraduate students

Why a Prize as Preferred Method: The prize mechanism complemented other mechanisms already used by NIH/NIBIB and directly engaged students and incentivized them to participate through a monetary prize and an award ceremony.

Participants: The targeted participants were teams of undergraduate students in biomedical engineering and related fields. We received 31 entries from 19 different universities in 14 states, with a total of 136 students involved in the projects submitted.
Total entries: 31

Timeline:
Submissions – 1/28/2013 - 6/10/2013
Winners Announced – 8/12/2013

Solicitation and Outreach Methods and Results: NIBIB and challenge.gov websites, direct e-mails to university biomedical engineering departments, listserv, press release, and word of mouth were used for solicitation of entries. Direct e-mails to university biomedical engineering departments, website postings, and word of mouth were the most effective outreach methods.

Incentives: The winning team in each category received a $10,000 prize and was honored at an award ceremony (up to $2,000 reimbursement to travel to award ceremony) during the 2013 Annual Meeting of the Biomedical Engineering Society in Seattle, WA. In each category, NIBIB also identified 2 honorable mentions (6 total) with no accompanying monetary prize.

Evaluation: A panel made up of representatives from different NIH Institutes evaluated the entries. Winners were selected by the NIBIB leadership based on the judges' evaluations. Since the competition covered a wide range of areas, it was helpful to have experts with varying backgrounds on the judging panel.

Partnerships: NIH/NIBIB collaborated with the Biomedical Engineering Society on an award ceremony for the challenge within their annual meeting and with the National Collegiate Inventors and Innovators Alliance to announce DEBUT to their stakeholders.

Resources: $30,000 cash prize purse and personnel time. Funding for execution of the challenge was allocated under NIBIB's appropriation account.

Results: DEBUT generated a lot of excitement among university biomedical engineering departments and students, as well as those in life sciences and other areas of engineering and computer science. Most entries were high quality and responsive to the challenge. In addition to engaging students in increasingly sophisticated design projects, the challenge served to introduce the next generation of biomedical engineers to the NIBIB and to familiarize them with the activities and opportunities it offers.

3.10. **Health Data Platform Metadata Challenge [ONC]**

Overview: A part of the HHS Open Government Plan, the HealthData.gov Platform (HDP) is a flagship initiative helping to establish communities that collaboratively evolve and mature the usability of a broad range of health and human service datasets. HDP leverages web-oriented and cloud-based architecture frameworks and standards and runs on open-source software

components to deliver enhanced health IT infrastructure capabilities. HDP facilitates better integration, analysis, and interpretation of HHS datasets, helping meet the growing demand for more public- and private-sector value added information services.

To augment the HDP effort, two complementary challenges were released to encourage innovation around initial platform- and domain-specific priority areas, fostering opportunities to tap the creativity and productivity of developers. The challenge sought applications of existing voluntary consensus standards and invited designs for health domain-specific metadata to classify datasets in HDP's growing catalog, creating entities, attributes, and relations.

Website:
http://www.health2con.com/devchallenge/health-data-platform-metadata-challenge/

Problem Statement: Metadata indicates characteristics of the data as opposed to the content of the information (e.g., geospatial information, authors, data structure, etc…). Standards organizations such as the World Wide Web Consortium have a number of standard vocabulary recommendations for semantic metadata of open government data, notably the Resource Description Framework (RDF) Schemas. The challenge winner would need to demonstrate the application of these standards, using as many of the HHS datasets available on HealthData.gov as possible. There are two objectives:

- Apply existing standards from the voluntary consensus standards organizations as RDF Schemas for expressing cross domain metadata common to open government data
- Design new HHS domain specific metadata based on the data made available on HealthData.gov where no RDF Schema was otherwise given or available.

When designing new metadata expressed as RDF Schemas, designers were expected to:

- Leverage existing data dictionaries expressed as natural language in the creation of new conceptual schemas, as provided by domain authorities
- Observe best practices for URI schemes consistent with existing healthdata.gov work
- Organize related concepts into small component vocabularies

Goal: Create new technology tools that expand the use of APIs and the incorporation of new data element identification and metadata tagging methodologies, in order to improve the liquidity of health data and increase the efficiency of data transfer, the effectiveness of data distributions, and the potential for new data-driven insights into complex interactions of health and healthcare services.

Why a Prize as Preferred Method: The Metadata Challenge, along with the Simple Sign-On Challenge, was intended to tap the creativity of entrepreneurs and the productivity of developers to help build a coding community around the Health Data Platform.

Participants: The challenge sought the participation of computer scientists, academics, and individuals who worked in informatics and standards. Many data scientists are not U.S. citizens and do not work for U.S.-based companies. Under the prize authority provided by COMPETES,

these individuals were not eligible to receive prizes, sharply affecting participation, and leading to only three submissions.
Total entries: 3

Timeline:
Submissions – 6/5/2012 – 1/6/2013
Winners Announced – 1/28/2013

Solicitation and Outreach Methods and Results: Due to the unique, technically complex nature of the challenge, outreach was less focused on the typical healthcare and software app developer networks. In order to reach computer scientists, academics, and data scientists, outreach included direct outreach to computer science and related graduate programs and individuals, as well as posts to listservs at standards organizations like the World Wide Web Consortium.

Incentives: $35,000 prize purse

Evaluation: This challenge used an expert review panel to evaluate the challenge submissions against the following criteria: metadata, data, linked data, components, tools, best practices, documentation, and engagement.

Partnerships: ONC collaborated with the HealthData.gov team to administer the Health Data Platform challenges.

Resources: ONC personnel time. Individuals on the HealthData.gov team also contributed time doing outreach to potential participants and addressing technical questions. Funding, outside of FTE time, came from the i2 challenge program contract.

Results: The two challenges ONC ran for the Health Data Platform were not amongst its most successful, but lessons can still be learned. While there is a degree of overlap, developers of mhealth applications are not the same population as those involved in structured data and web ontologies and therefore need to be communicated with and marketed to differently. This can be dealt with in future challenges in part by ensuring that the challenge is using, if available, an online platform that is used by and engages those most likely to enter.

3.11. **Health Data Platform Simple Sign-On Challenge [ONC]**

Overview: HDP is a flagship initiative and focal point helping to establish learning communities that collaboratively evolve and mature the utility and usability of a broad range of health and human service data. The Health Data Platform Simple Sign-On Challenge was intended to improve community engagement by providing simplified sign-on for external users interacting across multiple HDP technology components. This would make it easier for community collaborators to contribute and leverage new approaches to decentralized authentication.

Website:
http://www.health2con.com/devchallenge/health-data-platform-simple-sign-on-challenge/

Problem Statement: The challenge winner would present a replicable open source virtual machine environment demonstrating how HDP components can provide and/or consume WebIDs, contributing to simplified sign-on for humans and machines. The developer would design a way for their code to utilize each component as a WebID identity provider or relying party, presumably leveraging existing capabilities to the fullest extent possible. The end result would demonstrate seamless integration across a number of HDP components, without introducing any external service dependencies that could not be operated by HHS.

Goal: Create new technology tools

Why a Prize as Preferred Method: The Simple Sign-On challenge, along with the Metadata Challenge, was intended to tap the creativity of entrepreneurs and the productivity of developers to help build a coding community around the Health Data Platform.

Participants: The challenge sought the participation of computer scientists, academics, and individuals who worked in informatics and standards. Many data scientists are not U.S. citizens and do not work for U.S.-based companies. Under the prize authority provided by COMPETES, these individuals were not eligible to receive prizes, sharply affecting participation, and leading to only three submissions.
Total entries: 3

Timeline:
Submissions – 6/5/2012 - 1/6/2013
Winners Notified – 1/28/2013

Solicitation and Outreach Methods and Results: Due to the unique, technically complex nature of the challenge, outreach was less focused on the typical healthcare and software app developer networks. In order to reach computer scientists, academics, and data scientists, outreach included direct outreach to computer science and related graduate programs, posts to listservs at standards organizations like the World Wide Web Consortium, and solicitations to individuals provided by the challenge lead on the HealthData.gov team.

Incentives: $35,000 prize purse

Evaluation: This challenge used an expert review panel to evaluate the challenge submissions against the following criteria:

- Coverage: The more integrated components the better, with an emphasis on leverage existing work and capabilities of each component
- Coupling: The level with which any integrated components can be removed without affecting the remaining component functionality

- Performance: The lowest latency and best responsiveness of the component interactions as demonstrated by test cases
- Elegance: How the design deals with both human and application agents that interact with different interfaces, and how each is managed across infrastructure components
- Documentation: Articulation of design using well known architecture artifacts and executable test cases
- Engagement: Willingness to participate in the community after award

Partnerships: ONC collaborated with the HealthData.gov team.

Resources: ONC and HealthData.gov personnel time. Funding, outside of FTE time, came from the i2 challenge program contract.

Results: The two challenges ONC ran for the Health Data Platform were not amongst its most successful, but lessons can still be learned. While there is a degree of overlap, developers of mobile health apps are not the same population as those involved in structured data and web ontologies and therefore need to be communicated with and marketed to differently. This can be dealt with in future challenges in part by ensuring that the challenge is using, if available, an online platform that is used by and engages those most likely to enter.

3.12. **Health Design Challenge [ONC]**

Overview: The purpose of this challenge was to improve the design of the medical record to be more usable by patients, their families, and others who take care of them. The opportunity was for designers to take the plain-text Blue Button file and enrich it with visuals and layouts to create a better patient experience. Innovators were invited to submit their designs for a medical record that can be printed and viewed digitally. Designs were reviewed in four categories: overall design, medication design, problem/medical history, and lab summaries.

Website:
http://healthdesignchallenge.com/

Problem Statement: Being able to access one's health information on demand can be lifesaving in an emergency situation, can help prevent medication errors, and can improve care coordination. However, too often health information is presented in an unwieldy and unintelligible way that makes it hard for patients, their caregivers, and their physicians to use. The challenge focused on the content defined by a format called the Continuity of Care Document (CCD). Submitted designs were required to use the sections and fields found in a CCD. The general goals for designs were to improve the visual layout and style of the information from the medical record; make it easier for a patient to manage his/her health; enable a medical professional to digest information more efficiently; and aid a caregiver such as a family member or friend in his/her duties and responsibilities with respect to the patient.

Goal: Improve service delivery; Public education

Why a Prize as Preferred Method: Challenges are an opportunity to shine a spotlight on an area of interest for an agency. This challenge was able to roll several priority topics into one challenge: Blue Button, patient engagement through useful information, and raising awareness of patient issues to the design community. Open source licensing and demonstration of all winners in an online gallery provide a diversity of design ideas meant to inspire other organizations to improve the usability of health records.

Participants: ONC intended to mobilize designers who were interested in methods of information presentation and visualization, whether or not they had health-specific experience. The challenge was a success with 232 different submissions received. Unlike the participants in the app challenges that comprise the majority of ONC's challenge portfolio, this challenge saw a wide mix of single individual entrants, a range of small to large teams unaffiliated with businesses, teams from design firms, and small teams from health-related businesses.
Total entries: 232

Timeline:
Submissions – 10/23/2012 - 12/2/2012
Winners Announced – 1/15/2013

Solicitation and Outreach Methods and Results: The challenge was announced via a post on the ONC Buzz Blog, followed by a webinar describing the challenge and answering questions. The challenge was also the focus of an article written on the tech blog TechCrunch[68]. This article was tweeted 781 times and received 43 comments.

Incentives: $50,000 prize purse

Evaluation: A 12-member review panel, including high-profile individuals such as former National Coordinator Farzad Mostashari, former Dept. of Veterans Affairs CTO Peter Levin, Facebook's Nicholas Felton, and former Executive Editor of Wired Magazine Thomas Goetz reviewed submissions based on the following criteria:

- Overall appeal
- Patient usefulness (does it address the needs of a patient?)
- Caregiver usefulness (does it ease the responsibilities of a caregiver?)
- Physician usefulness (can a physician integrate it into their workflow?)
- Visual hierarchy (can the most important information be easily found?)
- Information density (is it easy to digest the information that is presented?)
- Accessibility (can a varied population make use of this document?)

Partnerships: After the challenge had concluded, the U.S. Department of Veterans Affairs and the California Healthcare Foundation contributed engineering resources to developing the winning entry into a usable framework.

[68] http://techcrunch.com/2012/11/13/redesign-electronic-medical-record/

Resources: One ONC FTE and one Presidential Innovation Fellow assigned to ONC both worked on the project part-time. Funding, outside of FTE time, came from the i2 challenge program contract, as did additional labor.

Results: This challenge is one of ONC's most successful to date, having received the most submissions by far, garnering the most social media interactions and being built out into a viable framework on GitHub[69]. In addition to the heavily shared TechCrunch article that helped publicize the challenge, subsequent articles about the winners also received much positive attention: by TechCrunch[70], with 699 tweets, and Wired[71], with 247 tweets and 383 Facebook shares. The bbClear framework on GitHub serves an important purpose in the Blue Button initiative as a key element bridging raw medical information and the patients who need to understand that information.

3.13. **healthfinder.gov Mobile App Challenge [ODPHP]**

Overview: The HHS Office of Disease Prevention and Health Promotion (ODPHP), with the Robert Wood Johnson Foundation as a partner, challenged teams of developers, health professionals, and health consumers to co-design a mobile app which could be used by the public to access customized decision support for preventive services and wellness information from healthfinder.gov. The developers were encouraged to include information and tools to help users find preventive services covered under the Affordable Care Act.

Website:
http://www.health2con.com/devchallenge/healthfinder-gov-mobile-app-challenge/

Problem Statement: Challenge participants were asked, "How can your mobile app help health consumers access the preventive services information on healthfinder.gov to make health decisions? How can it be customized for them?" In the first phase, participants were required to submit a prototype of a mobile app, documenting evidence of co-design and user feedback via a crowdsourcing platform. In the final phase, challenge finalists were asked to provide demos of their final app submissions and to clearly describe the app and its features.

Goal: Solve a health problem

Why a Prize as Preferred Method: ODPHP hosted a prize challenge to foster creativity and spark new, innovative ideas for the development of a mobile app based on healthfinder.gov content.

Participants: The challenge was open to all United States citizens over the age of 18. ODPHP received 26 submissions for the first phase, with three of these participants moving on the final phase. Submissions were received electronically from teams all over the nation; teams varied

[69] http://blue-button.github.io/bbClear/
[70] http://techcrunch.com/2013/01/20/open-sourced-electronic-medical-record/
[71] http://www.wired.com/design/2013/01/medical-record-redesign

by size, and some were made up of individual developers, while others were made up of employees from health information technology companies. During the design phase, participants worked with health professionals who signed up as testers on a crowdsourcing website called Health Tech Hatch. More than 160 individuals signed up as testers.
Total entries: 26

Timeline:
Phase I Submissions Closed – 2/1/2013
Phase II Submissions Closed – 3/8/2013
Phase II Winners Notified – 3/15/2013

Solicitation and Outreach Methods and Results: ODPHP worked with contractor Health 2.0 to reach developers interested in health and with Health Tech Hatch to reach end users who could provide feedback during the first phase of the challenge. ODPHP also promoted the competition to the healthfinder.gov social media community, and provided sample promotional messaging to Office of the Assistant Secretary for Health offices, the Robert Wood Johnson Foundation, and other stakeholder groups. Promotion methods proved successful in garnering a high volume of submissions meeting challenge requirements and expectations.

Incentives: Placement on www.healthfinder.gov/StayConnected; $80,000 total prize purse, including a $50,000 grand prize (half via contract with Health2.0 and half from the Robert Wood Johnson Foundation) and $10,000 each for three finalists.

Evaluation: The judging panel included representatives from the Community Pediatrics Rotation from Stanford University, the Robert Wood Johnson Foundation, the Institute of Medicine Board on Population Health and Public Health Practice, and several HHS agencies and offices. The reviewers evaluated submissions for usability and design; health literacy principles; connection to clinical preventive services and wellness information; evidence of co-design with end users; innovation in design; functionality, and accuracy; and healthfinder.gov branding.

Partnerships: ODPHP teamed up with Health 2.0 and Health Tech Hatch for administration of the challenge. RWJF served as an early advisor to the competition. The partnerships were effective in reaching networks otherwise difficult for ODPHP to reach.

Resources: ODPHP allocated $80,000 towards prize money and challenge administration fees via a $25,000 contract with Health 2.0. ODPHP personnel managed challenge logistics.

Results: ODPHP received 26 complete submissions to the first phase of the challenge, all of which provided unique solutions to address the challenge of developing a mobile app that makes healthfinder.gov content customizable and easy to use, reaching consumers where they are. The winning app “myfamily” features personalized health information for each member of a user’s family, weekly messages based on family health plan, vaccination reminders and other message storage, a calendar for tracking medical check-ups and vaccinations, a service locator, medical adherence tool, and information on a large number of preventive health topics.

3.14. **Managing Meds Video Challenge [ONC]**

Overview: The Managing Meds Video Challenge invited the public to create short, inspiring videos sharing how they have used technology to manage taking medications effectively or to support individuals to take their medications as directed. This competition is important because there are serious consequences for patients from not taking medications as prescribed.

Website:
http://managingmeds.challenge.gov/

Problem Statement: Consumers and patients could participate by creating two-minute videos demonstrating how they use technology for medication management.

Goal: Public education

Why a Prize as Preferred Method: ONC wanted to crowdsource compelling personal stories from the public that inspire others to adopt health IT and eHealth tools to be more engaged with their health care provider and to take a more active role in their own health.

Participants: The public and health care professionals were the targets of this competition. The window for submissions was still open as of the end of FY2013. Final results will be reported in the fiscal year 2014 report on the use of the prize authority provided by COMPETES.

Timeline:
Submissions – 8/10/2013 - 10/19/2013
Winners Announced – 11/13/2013

Solicitation and Outreach Methods and Results: ONC leveraged its communication channel to raise awareness of the challenge including the ONC Buzz Blog, listserv, and social media. ONC also relied on outreach by its partner, Script Your Future.

Incentives: $7500 total prize purse ($3K-1st Place, $2K-2nd Place; $1K-3rd Place; $500-Honorable Mention (2); $500-Popular Choice.)

Evaluation: Submissions will be evaluated by a three-person panel.

Partnerships: Script Your Future reached out to member organizations and pharmacy schools.

Resources: ONC personnel time. Contract support from RTI and sub-contractor ChallengePost.

Results: The window for submissions was still open as of the end of FY2013. Final results will be reported in the fiscal year 2014 report on the use of the prize authority provided by COMPETES.

3.15. **Million Hearts Caregiver Video Challenge [CDC]**

Overview: Million Hearts™ is a five-year initiative launched by the Department of Health and Human Services with a goal of preventing one million heart attacks and strokes in the U.S. over the next five years. CDC and Million Hearts™ invited people who help to prevent or control high blood pressure or maintain the heart health of a loved one to share their stories of care giving by creating short, original videos. Family caregivers are a key audience of Million Hearts™ because they play an important role in caring for loved ones who have suffered from a heart attack or stroke, by monitoring, preventing and controlling their loved ones' high blood pressure. This video challenge intended to promote heart disease prevention through blood pressure control, medication adherence, and lifestyle changes.

Website:
http://millionhearts.challenge.gov/

Problem Statement: Heart attack and stroke are the first and fourth leading causes of death in the United States. High blood pressure, one of the major risk factors for heart disease, can be prevented and controlled. Family caregivers play an important role in helping their loved ones prevent and control high blood pressure. This competition invited family caregivers to share their stories of care giving by creating original, compelling videos that are less than two minutes long. The videos were required to include a description of how the caregiver contributes to another person's heart health and helpful tips related to high blood pressure prevention or control. The videos also needed to direct viewers to Million Hearts' web site.

Goal: Public education; to raise awareness of the role of caregivers and family members in preventing and controlling high blood pressure.

Why a Prize as Preferred Method: In the area of health, video competitions function as a tool to promote interest and engagement in public health topics. Health-related video competitions have been popular on Challenge.gov, and CDC has seen success from their own video challenges. The competition was a tool for Million Hearts™ to use to reach out to and interact with a key audience through a new, compelling mechanism not yet used by their initiative
Participants: CDC hoped to mobilize family caregivers. This challenge received three video entries from three participants. One of the videos was deemed ineligible as it had been posted to YouTube in 2011 and thus was made for other reasons beyond the challenge.
Total entries: 3

Timeline:
Submissions – 7/16/2013 - 8/31/2013
Winners Announced – 10/8/2013

Solicitation and Outreach Methods and Results: CDC marketed this challenge through social media posts, features on the CDC.gov home page and the Million Hearts'™ home page, a Federal Register Notice, listserv, and video competition listings. Million Hearts™ also

encouraged their partners, such as American Heart Association and Administration on Aging, to promote the competition. Various health-related blogs described the challenge.

Incentives: Prize purse was $1000. The CDC Foundation, an independent, non-profit organization, donated all prize money to CDC via the Outreach and Partnership Fund. A first place prize of $750 and a second place prize of $250 were awarded to two individual winners.

Evaluation: A panel of three judges evaluated the submissions against the following criteria: responsiveness to the challenge theme; how is the caregiver's story told; how enjoyable is the video to watch, and to what extent the video has the potential to impact others.

Partnerships: Many nonprofit, federal, and state health agencies shared social media posts on Facebook and Twitter, or shared information about the competition through blogs and web sites. With the help of these partners, Million Hearts™ was able to reach a greater number of people with competition information. CDC also partnered with the CDC Foundation, which donated prize money to provide an incentive to potential submitters.

Resources: Personnel time.

Results: Despite the low number of submissions, the winning videos successfully provided tips on how to prevent and control high blood pressure. The first place winner, in particular, used an innovative approach through a motion infographic to describe how a caregiver helps a loved one maintain their heart health. Winners were promoted through social media. Million Hearts™ has used the winning videos during subsequent outreach to caregivers via social media.

3.16. **Million Hearts® Hypertension Control Challenge [CDC]**

Overview: Million Hearts® has identified key clinical levers and the types of system changes that improve hypertension control. What is lacking is implementation experience with those systems and processes in order to promote best practices. This challenge reached out to small practices and health systems that achieve extraordinary hypertension control results but do not have the resources to publish their findings or promote their results.

Website:
http://millionhearts.hhs.gov/newsevents/hypertension_control_champions.html

Problem Statement: Currently, about 67 million American adults have high blood pressure and less than half (46 percent) have adequately controlled their condition. High blood pressure is one of the leading causes of heart disease and stroke, the two leading causes of cardiovascular disease-related deaths. While heart disease and stroke can also result in serious illness, disability, and decreased quality of life. Further, hypertension and its associated diseases pose $156 billion in medical and lost productivity costs each year.

The Million Hearts® Hypertension Control Challenge was intended to identify high performing large and small clinical practices and health systems and document the systems and processes that support hypertension control. The Million Hearts™ Hypertension Control Challenge was open to any private health care clinician, medical practice, or health system providing primary care services. Finalist "Champions" identified through the competition participated in the development of a 1-2 page brief that will share their success and how it was achieved. These briefs will be available through the Million Hearts® website to share successful strategies.

Goal: Through the challenge, CDC will improve service delivery by:

- Identifying large and small clinical practices and health systems with hypertension control rates greater than 70%
- Identifying Federal health care providers that document hypertension control rates greater than 70%
- Documenting usual and innovative system-level processes or approaches used by high performers to achieve exemplary hypertension control rates

Why a Prize as Preferred Method: The Challenge made it possible to identify hypertension control Champions without relying on expensive analysis of national reporting agency data or potentially incomplete data from recognition programs such as the National Committee on Quality Assurance. Further, the Challenge spurred 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.

Participants: Intended participants included clinicians, practices and health systems, both large and small, serving both rural and urban settings. Sixty-one nomination forms were received: eight health systems; seven large providers (caring for more than 50,000 patients annually); and 43 small providers (caring for fewer than 50,000 patients annually). Three nominations were accepted from Federal entities (who were eligible only for recognition, not the prize). Nominees provide direct clinical care in 24 states, in addition to one Federal nominee that provides direct clinical care nationwide. In total, nominees provide care for over 15 million adults.
Total entries: 61

Timeline:
Submissions Open – 8/9/2013 – 9/30/2013

Solicitation and Outreach Methods and Results: 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. Dr. Frieden, director of the CDC, contacted 23 key leaders of agencies and organizations, such as the American Medical Association, asking them to encourage their constituents to apply. The Million Hearts Executive Director and the Division for Heart Disease and Stroke Prevention contacted 117 organization leaders, such as the American College of Cardiology with a similar ask and all 50 state health department directors were notified. Among the highlights of the distribution of the announcement was the Dr. Oz Show's decision to post the Challenge badge

on their website. This was a very effective strategy to reach the very specific group of individuals intended for participation. Future Hypertension Control Challenges will use this same method and will promote the Challenge through relevant conferences and journal notifications.

Incentives: Recognition by Million Hearts, CDC, and HHS as a 2013 Hypertension Control Champion and up to $70,000 in prizes.

Evaluation: Nominations were autoscored when received using the following weighted criteria:

- 90%: reported hypertension control rate
- 5%: the extent that a challenging population was served, based on peer responses
- 5%: the systems and process reported that supported hypertension control

A panel of judges reviewed the top 14 nominations to approve their selection as finalists and to identify questions for further investigation. Each finalist is participating in a data-validation process conducted by an independent contractor (underway at the time of this report). 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. Partners were very responsive in using their social media and web presence to promote and support the Challenge. Two partner organizations, American Heart Association and Walgreens supported the judging of the Challenge and AHA has committed support for the announcement of Champions.

Resources: $70,000 was obligated to pay up to 14 cash prizes of $5,000 each to private-sector applicants. $83,000 was awarded to a vendor to develop the web portal for nomination, a database to store and score the nominations, and a platform for judging. $100,000 from an existing cooperative agreement was used via contract to identify and engage an organization to validate data reported by finalists. Three FTE were engaged over a 12 month period to manage and execute the challenge. 50% FTE was required in the 30 days preceding launch and 30 days preceding the announcement for promotional planning and activities.

Results: Evaluation of the top 14 nominations is still underway at the time of this report, and an update will be provided in the FY 2014 report on the use of the prize authority provided by COMPETES.

3.17. **Million Hearts Risk Check Challenge [ONC]**

Overview: The Million Hearts Risk Check Challenge asked developers to create a new consumer app that informs consumers of their general heart risk, motivates them to obtain a more accurate risk assessment by entering their blood pressure and cholesterol values, and directs them to nearby community pharmacies (and other locations) offering blood pressure and cholesterol screenings. The challenge led into an outreach initiative executed by the Million Hearts Initiative and its partner organizations in which Million Hearts worked with the local

health departments in Chicago, Baltimore, Tulsa, and San Diego to put on large, public events to educate people about cardiovascular disease and to use and publicize the winning app.

Website:
http://www.health2con.com/devchallenge/million-hearts-risk-check-challenge/

Problem Statement: Participants were required to design their apps around two APIs developed specifically for the challenge: one hosted by Archimedes for conducting the quick health risk assessment over a consumer-facing interface; and another hosted by Surescripts holding information on locations and descriptors of places where individuals can go for a lipid and blood pressure screening. The SureScripts API was used to show the screening locations, primarily in map form. After users enter their blood pressure and cholesterol data, the Archimedes API can calculate the cardiovascular disease risk score and provide steps the user could take to improve their health or get screened. To ensure the winning app would continue to be available, functional, and well-maintained after the competition, participants were required to submit short-term operating plans for app support and maintenance.

Goal: Solve a health problem; Public education

Why a Prize as Preferred Method: Prizes are an opportunity to shine a spotlight on an area of interest for an agency. With the post-challenge campaign elements of this project, this aspect was more prominent than for most other ONC challenges. It was also an opportunity to create or strengthen relationships with health departments at the municipal level.

Participants: ONC and Million Hearts intended to mobilize developers and clinicians to work together to find solutions to this problem. Participants were primarily teams within small businesses. The winner, Marshfield Clinic, was a Midwestern clinic.
Total entries: 35

Timeline:
Submissions – 7/27/2012 - 11/2/2012
Winners Announced – January 2013

Solicitation and Outreach Methods and Results: The challenge was announced via a post about the challenge on the ONC Buzz Blog, followed by a webinar describing the challenge and answering questions from the audience. In addition, a second webinar was held featuring HHS CTO Bryan Sivak and former National Coordinator Farzad Mostashari.

Incentives: $125,000 prize purse

Evaluation: This challenge utilized a two-stage process for evaluating submissions. In the first stage, submissions were pared down to five finalists who were given a small prize and another month to further refine their apps, from which a final winner was selected.

Partnerships: ONC collaborated with the Million Hearts initiative and worked with SureScripts via informal partnership and Archimedes under contract to develop APIs.

Resources: Personnel time. Prize purse supported through the i2 program contract.

Results: Through the development of the app solutions and the ensuing campaign events, the goals of promoting awareness of cardiovascular health and the empowerment of consumers to take greater charge of their own health were achieved. Submissions used a number of different approaches to addressing the problem. Some were simply mobile (phone or tablet) apps, others were integrated with other website tools that the solver already provided, and one used text messaging as a way to engage with users with phones that do not have smartphone capabilities. This challenge created new relationships between ONC/Million Hearts and the governments within the campaign cities.

3.18. **Mobilizing Data for Pressure Ulcer Prevention [ONC]**

Overview: According to the Agency for Healthcare Research and Quality, each year more than 2.5 million people in the United States are affected by skin breakdowns that cause pain, increased risk for serious infection, and increased health care utilization. This challenge called for the development of mobile health apps for iPhone, iPad, or Android devices that could help implement standards for documenting and exchanging health information about pressure ulcers; reduce the incidence and severity of pressure ulcers; facilitate meaningful information exchange; improve the patient experience and coordination of care across the healthcare continuum; and reduce health care costs.

Website:
http://www.health2con.com/devchallenge/mobilizing-data-for-pressure-ulcer-prevention-challenge/

Problem Statement: Many of today's electronic documentation systems require nurses to enter oversimplified text narratives or check boxes. Even when documentation systems include standard terminology, the data is locked inside proprietary software. The "Mobilizing Data for Pressure Ulcer Prevention Challenge" was a call to develop a mobile health app to facilitate observation and documentation for prevention, early detection and appropriate management of pressure ulcers in clinical settings. The apps were intended to encourage the use of information exchange standards. The challenge was to demonstrate the value of common models and terminologies and promote the continued integration of nursing content into Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT), as well as the development of common clinical information models of interest to nursing.

Entries were required to include the following functionalities:

- Provide an easy-to-understand and intuitive user interface
- Enter information about the pressure ulcer
- Capture photos of the pressure ulcer

- Generate a clinical assessment document
- Utilize the HL7 Pressure Ulcer Model
- Collect, display, and transmit content suitable for reporting for meaningful use, quality measures, research, and health information exchange with an electronic health record and/or personal health record

Goal: Solve a health problem; Improve service delivery

Why a Prize as Preferred Method: Unlike most contracts, grants, or cooperative agreements, challenges are an opportunity to shine a spotlight on an area of interest for an agency. While the headline topic for this challenge was pressure ulcers, the equally interesting and important aspects were the goals involving vocabularies and SNOMED CT, particularly with regard to nursing. Spreading the word and making more ground-level developers (as opposed to the large organizations whose business models are oriented on government procurement) aware of the importance of these topics would not have been possible through the standard processes.

Participants: ONC intended to mobilize developers and clinicians to work together to develop solutions for this challenge. Participants were primarily teams within small businesses, including the winners. With the added information model and vocabularies elements, multiple teams also had academics with informatics expertise.
Total entries: 14

Timeline:
Submissions – 12/5/2012 - 4/29/2013
Winners Announced – 7/17-19/2013

Solicitation and Outreach Methods and Results: The challenge was announced via a post about the challenge on the ONC Buzz Blog, followed by a webinar describing the challenge and answering questions from the audience. Challenge announcements were included in the regularly-scheduled marketing emails of the challenge's contract subcontractor Health 2.0. The organizational partners in this challenge (Dept. of Veterans Affairs and Kaiser Permanente) also provided outreach support.

Incentives: $80,000 prize purse

Evaluation: This challenge used a six-member review panel to evaluate the challenge submissions against these criteria:

- Innovation
- Design and usability
- Use of National Pressure Ulcer Advisory Panel guidance to improve pressure ulcer prevention and care
- Ease of integration with PHR/EHR interface
- Application of the HL7 Pressure Ulcer Prevention Domain Analysis Model

- Application of the LOINC Nursing Subcommittee and the International Health Terminology Standards Development Organization Nursing Special Interest Group terminology and candidate models.

Partnerships: ONC partnered with the U.S. Department of Veterans Affairs and Kaiser Permanente who provided expertise about pressure ulcers and the content models.

Resources: ONC personnel time. Prize purse funding came from the i2 challenge program.

Results: The top submissions for the challenge successfully implemented all the required functionalities, including the more general app characteristics, the complex models, and the use of vocabularies. The winner was announced by ONC's Deputy National Coordinator, Judy Murphy, during her keynote address at the Summer Institute in Nursing Informatics Conference. However, addressing pressure ulcers is not a topic that is within ONC's core competencies, so determining clear paths to sustainability for the apps was more difficult than anticipated at the beginning of the challenge.

3.19. NEI Challenge to Identify Audacious Goals in Vision Research and Blindness Rehabilitation [NEI]

Overview: NEI conducted the Challenge to Identify Audacious Goals in Vision Research and Blindness Rehabilitation to stimulate innovation in establishing a national vision research agenda. This open ideation competition sought proposals for audacious goals relevant to the National Eye Institute's mission to stimulate innovation in national vision research. The winners were invited to present their ideas at a 2013 NEI gathering of more than 200 experts working to develop a set of bold goals that will guide vision research priorities for the NEI going forward. This challenge generated valuable contributions from varied stakeholders to inform the Institute's strategic plan, energize the Institute's research efforts, increase public awareness of vision research, and enhance the national effort to reduce the burden of ocular disorders and diseases worldwide.

Website:
http://www.nei.nih.gov/challenge/

Problem Statement: To stimulate innovation in establishing a national vision research agenda, the challenge called for submission of audacious goals in any area relevant to NEI's mission to conduct and support research, training, health information dissemination, and other programs with respect to blinding eye diseases, visual disorders, mechanisms of visual function, preservation of sight, and the special health problems and requirements of the blind. }The proposed audacious goal needed to be a bold, innovative idea that would fundamentally change vision research or vision care; have a broad impact; address the NEI mission; require collaboration between multiple disciplines; and be considered achievable in about 10 years. Previous strategic planning efforts relied primarily on the expertise of NEI funded scientists to

review the state of the science and describe current specific research needs and opportunities. This challenge opened up the NEI strategic planning process to the public.

Goal: Solve a health problem; Public education

Why a Prize as Preferred Method: Previous strategic planning efforts relied primarily on the expertise of NEI funded scientists to review the state of the science and describe current specific research needs and opportunities. This challenge sought input from all eligible individuals (Entrants)—not just vision research scientists.

Participants: NEI received 476 entries in the competition from across the country. Almost half of the submissions came from people who had never received NIH research funding.
Total entries: 476

Timeline:
Submissions – 8/13/2012 - 11/19/2012
Winners Announced – 2/24-26/2013

Solicitation and Outreach Methods and Results: The NEI considered the outreach campaign for the challenge a success based on the number and variety of submissions. Due to time constraints, NEI elected to use print and digital advertising. The digital ads were displayed across 10 websites. Personal contacts and group presentations proved valuable as well.

Incentives: Invited presentation of winning goal at the 2013 NEI Audacious Goals Development Meeting. $30,000 prize money, $13,850 travel funding for winners to attend the NEI meeting.

Evaluation: Eighty-one clinicians and scientists with expertise in relevant disciplines evaluated the submissions according to the competition's specific criteria, narrowing the submissions down to 81 entries which then were evaluated by a Federal judging panel that selected ten winners. The selection criteria during the judging process included relevance to the NEI mission, audaciousness, feasibility, scope, and potential for transformative impact.

Partnerships: None

Resources: Prize purse. Advertising: $90,500. Administrative Support and Design: $103,000.

Results: 476 challenge entries were submitted within a three-month period. Nearly half of the submissions were from people who had never been funded by NIH. The winning entries served as the foundation for the 2013 NEI Audacious Goals Development Meeting. Dr. Paul Sieving, director of the NEI at the National Institutes of Health, stated: "the buzz that surrounded the challenge was very effective in attracting input from leading researchers, engineers, philanthropists, patient advocates, and venture capitalists, many of whom had not previously received NIH funding. The competition allowed us to reach out to everyone in the Nation—

even those not engaged in vision research."[72] The winning ideas[73] came from across the country: California, Oregon, Utah, Alabama, Missouri, Tennessee, Michigan, New York, Washington, and Massachusetts. About half of the winners were clinicians. The other half were research scientists. The winning entries fell into six themes that were used to organize the discussions at the Audacious Goals Meeting:

- Aging and mechanisms of disease development and progression
- Molecular therapy at the gene level
- Systems approaches to disease analysis
- Analysis and imaging of eye tissue
- Regenerative therapies for eye disease
- Vision restoration by advanced means, such as prosthetics or optogenetics

3.20. **Ocular Imaging Challenge [ONC]**

Overview: Documentation of the typical ophthalmology examination in an electronic health record continues to be challenging, creating barriers to full acceptance within the medical community. Ophthalmologists frequently perform office-based studies using ancillary measurement and imaging devices. Outputs from these devices are often stored on acquisition devices in proprietary databases and file formats and therefore have limited connectivity with electronic health record systems.

This challenge was a call to innovators and software developers to create an application that improves interoperability among office-based ophthalmic imaging devices, measurement devices, and electronic health records. These same challenges occur in other medical specialties that employ office-based testing and measurement, so the success of this challenge might be translatable to other practices that use imaging and measurement devices.

Website:
http://www.health2con.com/devchallenge/ocular-imaging-challenge/

Problem Statement: While was a very technically complex challenge focusing on a specific problem, functionality requirements were few, leaving significant leeway for developers to be creative with their applications. The requirements included:

- Convert output from legacy ophthalmic imaging and measurement devices from proprietary formats to vendor-neutral standard formats
- Archive data from multiple imaging and measurement devices
- Display images and data for clinicians, and permit basic functionalities such as optimizing viewing parameters (e.g. brightness, contrast, color, zoom, pan)
- Where applicable, leverage and extend NwHIN standards and services

Goal: Improve service delivery

[72] http://www.whitehouse.gov/blog/2013/05/15/audacious-goals-eye-research
[73] http://www.nei.nih.gov/challenge/index.asp

Why a Prize as Preferred Method: Challenges are an opportunity to shine a spotlight on an area of interest for an agency. While ophthalmology is just one specialty among many, it is a good example of one that produces outputs and information appropriate to be included in a patient's electronic health record. Spurring the creation of applications that can be used in the clinical setting, and can integrate with electronic health record, can help advance that conversation.

Participants: ONC intended to mobilize software developers and clinicians and ophthalmologists with software skills. The challenge ultimately received 13 submissions, exceeding expectations after taking into account the challenge's technical complexity.
Total entries: 13

Timeline:
Submissions – 5/14/2012 - 11/11/2012
Winners Notified – 11/27/2012

Solicitation and Outreach Methods and Results: The challenge was announced via a post about the challenge on the ONC Buzz Blog, followed by a webinar describing the challenge and answering questions from the audience. This challenge was one of the first in which ONC created a Google Group for participants to interact with one another during the submission process; they were encouraged but not required to join the group. Use of this group smoothed communication between participants and challenge managers.

Incentives: $150,000 prize purse

Evaluation: This challenge used a seven-member review panel, composed of non-Federal physicians and eye specialists to evaluate the challenge submissions against the following criteria:

- Breadth of input devices and formats
- Usability and interface for image viewing
- Integration with workflow
- Platform neutrality

Partnerships: None

Resources: ONC personnel time. Funding, outside of FTE time, came from the i2 challenge program contract, as did additional labor.

Results: Measured by the number of submissions, the challenge was more successful than expected, given that the creation of ophthalmology tools is a specialty that appeals to a smaller cohort of developers and practitioners than, for example, cancer applications. The best submissions created appealing, full-featured user interfaces that successfully addressed the requirements of the challenge.

3.21. **Propose new ideas for prescription drugs oral overdose protection [NIDA]**

Overview: This challenge was issued to find new and creative ways to diminish or eliminate overconsumption of intact opioid pills. NIDA was seeking ideas on how to reduce or eliminate the risk of harm from accidentally or intentionally swallowing too many pills at the same time. NIDA was particularly interested in approaches that deter overdosing on an intact product. The challenge was formulated as a broad ideation challenge.

Website:
http://preventoverdose.challenge.gov/

Problem Statement: Prescription pain medication containing opioids can be abused in several ways; unfortunately as-intended oral administration, when the drug delivery system is not altered by the user, can still lead to addiction and accidental overdose. The misuse of prescription drugs by persons who over-consume prescribed medications remains less of a research focus for academia. The Challenge was supposed to attract new and diverse expertise and experiences in various non-traditional areas to drug abuse research area, including chemistry, physics, bioengineering, and mathematics. Entrants needed to provide a technological summary and provide a background and outline of how the idea would function to limit or eliminate overconsumption of intact opioid tablets. Applicants were expected to use detailed descriptions, specifications, supporting precedents, analysis of existing data, drawings, figures, movies, or other media to define their proposal clearly.

Goal: Solve a health problem

Why a Prize as Preferred Method: The challenge mechanism was selected to engage the community and attract attention to this somewhat neglected area of research.

Participants: This Challenge was a broad question formulated to obtain access to new ideas, similar to a global brainstorm for producing a breakthrough. The Challenge was supposed to attract new and diverse expertise and experiences in various non-traditional areas to drug abuse research area, including chemistry, physics, bioengineering, and mathematics.
Total entries: 0

Timeline:
Submissions – 5/13/2013 – 6/14/2013

Solicitation and Outreach Methods and Results: There were several ways this challenge was promoted: Twitter, FedBizOpps, and NIH Guide.

Incentives: Up to three $5,000 prizes worth a total of $15,000

Evaluation: NIDA used a panel comprised of experts, including NIDA Director, Dr. Volkow, to evaluate submissions against these equally-weighted criteria: scientific foundation for the proposed idea; idea novelty and originality, and potential for development.

Partnerships: None

Resources: Prize purse supported through the NIDA Gift Fund

Results: No winners were selected. There were no entries that satisfied all criteria. The submissions were either non-scientific or not novel.

3.22. **Reducing Cancer Among Women of Color Challenge [ONC]**

Overview: Disparities in prevention, early treatment, and final outcomes exist across the spectrum of cancer types and are often amplified in women's health when we look at breast cancer and gynecologic cancers – primarily cervical, uterine, and ovarian cancer. With over 300,000 new cases combined and 68,000 deaths annually, the impact that these cancers have on the United States cannot be overstated. While the incidence and prevalence of these malignancies is as socially and geographically diverse as our nation, they strike women of color and women living in underserved communities with disproportionate lethality. This challenge was a call to innovators and developers to create a mobile device-optimized tool that engages and empowers women to improve the prevention and treatment of breast, cervical, uterine, and ovarian cancer in underserved and racial minority communities.

Website:
http://www.health2con.com/devchallenge/reducing-cancer-among-women-color-challenge/

Problem Statement: Recent research has indicated that individuals living in poor, underserved communities are increasingly using mobile devices, especially smartphones, as their main method for accessing the internet. As such, submissions were required to be developed for these mobile devices. The remaining functionality requirements were more narrowly focused on the challenge problem:

- Provide information regarding preventive and screening services for breast and gynecologic cancers including benefits, timing, scheduling, and location
- Allow for interface with patient health records or provider-sponsored patient portals to provide specific reminders and trigger electronic health record-based clinical decision support regarding the timing of preventive services
- Support the storage, viewing, and exchange of complex patient care plans
- Strengthen communication among provider care teams, possibly spread out across large geographic locations, to afford optimal remote follow-up (e.g., be able to send patient information to electronic health records)
- Support patient engagement and caregiver support to help patients or their caregivers keep track of complex care plans

Goal: Solve a health problem; Improve service delivery

Why a Prize as Preferred Method: Challenges are an opportunity to shine a spotlight on an area of interest for an agency. Providing services and developing applications targeted to underserved communities is not an area that would strike developers as a highly profitable market, so using a challenge to generate ideas and new services was a desirable approach.

Participants: ONC intended to mobilize developers, clinicians, and community workers with expertise in areas relating to underserved communities. 16 submissions were received. Most submissions were designed in a way that would leverage the types of community health resources available in underserved communities. Several applications were created by individuals or groups whose main occupation was working directly with these communities. Total entries: 16

Timeline:
Submissions – 8/23/2012 - 2/5/2013
Winners Announced – 4/22-26/2013

Solicitation and Outreach Methods and Results: The challenge was announced via a post about the challenge on the ONC Buzz Blog, followed by a webinar describing the challenge and answering questions from the audience. Challenge announcements were included in the regularly-scheduled marketing emails of the challenge's contract subcontractor Health 2.0. In addition, communications support was provided by the HHS Office of Minority Health (OMH).

Incentives: $100,000 prize purse

Evaluation: This challenge used a four-member review panel to evaluate the challenge submissions against these criteria:

- Patient engagement
- Quality and accessibility of information
- Targeted and actionable information
- Links to online communities and/or social media
- Innovativeness and usability
- Non-English language availability

Partnerships: ONC collaborated with the HHS Office of Minority Health, who provided subject matter expertise and communications support, particularly to underserved communities.

Resources: ONC and OMH staff time. Funding, outside of FTE time, came from the i2 challenge program contract, as did additional labor.

Results: The 16 submissions received were within the average range for ONC app development challenges. The participation of developers who themselves worked with women in underserved communities was particularly encouraging. This network had not previously

participated in ONC challenges and can now be added to communications outreach for future challenges. Due to the requirement that submissions be available in non-English languages, there are now more health apps available for Spanish speakers, as most submissions chose to go that route. In follow-up discussions, participants indicated that this was less of a technical issue than expected – if this is indeed the case, then it would make sense to have non-English language availability be a requirement for most other health apps, as it would make them more accessible to underserved communities, even if they are not the target population for the apps.

3.23. **SMART-Indivo Challenge [ONC]**

Overview: This challenge called on developers to build an Indivo application that provides value to patients using data delivered through the SMART API and its Indivo-specific extensions. Indivo is a free, open source, personally-controlled health record platform.[74] SMART (Substitutable Medical Apps, Reusable Technologies)[75] is one of four Strategic Health IT Advanced Research Projects (SHARP) funded by ONC. SMART facilitates innovation in health care by providing common APIs and standards for electronic medical records and personally controlled health records, enabling them to act as iPhone-like platforms; users can download or delete substitutable apps. Using the SMART API and standards, augmented by functionality like sharing, developers can create powerful patient-facing applications.

Website:
http://www.health2con.com/devchallenge/smart-indivo-app-challenge/

Problem Statement: The healthcare system is adapting to the effects of an aging population, growing expenditures, and a diminishing primary care workforce and needs the support of a flexible information infrastructure that facilitates innovation in wellness, health care, and public health. The challenge asked developers to create an Indivo app that could access patient demographics, medications, laboratory tests, and diagnoses using Web standards. Developers could, for example, build a medication manager, a health risk detector, a patient-friendly laboratory visualization tool, or an app that integrates external data sources (such as those found at http://www.healthdata.gov/) with patient records in real time.

Goal: This program was designed to test the challenge mechanism as a way to support an existing grant program.

Why a Prize as Preferred Method: The challenge mechanism was viewed as a way to generate proof-of-concept apps for the developer framework produced by an ONC grant. This would be a novel way to generate interest and awareness of the project and provide feedback on how developers unaffiliated with SMART viewed the framework. While the relatively small prize award may have put a ceiling on the amount of interest that would be generated, it also minimized the financial risk of an unsuccessful challenge.

[74] http://indivohealth.org/
[75] http://www.smartplatforms.org/

Participants: The challenge had five entrants: one a single individual, others were small teams linked through their workplaces or small companies.
Total entries: 5

Timeline:
Submissions – 7/9/2012 - 9/28/2012
Winners Announced – 11/30/2012

Solicitation and Outreach Methods and Results: Communications and outreach methods used include: social media (Twitter, Facebook, LinkedIn); outreach to the Health 2.0 Developer Community; a webinar discussing the challenge, framing issues, and Q&A; and conference promotion by Health 2.0. In addition, the SMART team at Harvard Medical School assisted by adding a challenge page to the project website.

Incentives: Total prize purse: $13,000 (First Place: $10,000 & publicity from Health 2.0/ONC; Second Place: $2,000; Third Place: $1,000)

Evaluation: Live demos of the top scorers were held via webinar to give the challenge managers the opportunity to ask additional questions of the potential winners that provided insight into the submissions, the developers, and their feedback on the challenge. A four-member review panel of individuals from the SMART team reviewed and scored each of the submissions against these criteria:

- Usefulness to patients
- Importance to clinical medicine or public health
- Interface and presentation
- Use of the Indivo and SMART APIs
- Creative use of data from the sandbox and (optionally) from open health data sources

Partnerships: None

Resources: All funds were drawn from ONC's i2 contract with Capital Consulting Corporation. No agency funding outside of the contract was used. One employee managed the challenge as a part of his overall challenge portfolio.

Results: This challenge had mixed results. Useful apps were created that used the SMART framework and Indivo extensions, the SMART team was able to see how developers new to the platform used it, and SMART's visibility was increased through outreach about the challenge. However, the apps created did not provide vital new uses of personal and open data, perhaps because the challenge mechanism was not effective in generating interest in a platform with which developers are not already familiar, unless a notably large prize is offered.

3.24. **Stop Bullying Video Challenge [HRSA]**

Overview: Bullying can affect everyone – those who are bullied, those who bully, and those who witness bullying. The Federal Partners for Bulling Prevention ("Federal Partners") is a workgroup comprised of nine departments. HRSA and the Federal Partners launched this video challenge to help prevent and end bullying in schools and communities nationwide.

Website:
http://stopbullying.challenge.gov/

Problem Statement: At the 2011 Federal Bullying Prevention Summit, the Federal Partners asked youth and leaders in the field about needs that could be addressed at the Federal level. The Federal Partners Communications Team targeted the goal of moving the focus from "awareness" to "action" with activities designed to communicate efforts to the public. In an effort to meet this goal and empower youth leaders across the country, the Team designed the Stop Bullying Video Challenge. HRSA coordinated the challenge.

Goal: Public education

Why a Prize as Preferred Method: The Video Challenge enabled HRSA and the Federal Partners to directly reach a target population of 13-18 year olds in a new way, that would not be possible via traditional methods such as contracts, grants and cooperative agreements.

Participants: The Challenge aimed to mobilize 13-18 year olds across the country. At the submission deadline, 879 videos were submitted. Youth submitted from various settings: middle and high schools, youth service organizations, and Department of Defense schools.
Total entries: 879

Timeline:
Submissions – 8/7/2012 – 10/10/2012
Winners Announcement – 12/31/2012

Solicitation and Outreach Methods and Results: The prize was marketed through many communication channels, including an announcement by Valerie Jarrett at the 2012 Federal Bullying Prevention Summit; posting on the StopBullying.gov website, Facebook and Twitter accounts; Federal Partner listservs; broadcast emails to Federal staff; and the Cartoon Network's Stop Bullying Speak Up campaign promoted to its Facebook followers. The public voting period for the Challenge was designed to be a grassroots effort, driven by the finalists themselves, which resulted in over 2,000 votes.

Incentives: Placement of winning videos onto the StopBullying.gov website; one $2,000 Grand Prize and two $500 Honorable Mentions (total prize purse: $3,000)

Evaluation: Eligible submissions were evaluated in three stages:

- Grading Rubric: the three Challenge judges graded each eligible video based on published Judging Criteria, which included: message and appropriateness to theme (50%); creativity and originality (30%); and audience appeal and quality (20%).
- Technical Advisor input: Private-sector technical advisors were invited to provide feedback on their top seven videos from 25 semifinalists. The three Challenge judges considered this feedback and identified the top seven finalist videos.
- Public vote: The public was invited to vote for their favorite videos, and the final winners were selected based on the vote ranking.

Partnerships: National partners served as technical advisors to the Challenge, including filmmaker Lee Hirsch, Alice Cahn from Cartoon Network's "Stop Bullying, Speak Up!" Campaign, Deborah Leiter from the Ad Council, and Scott Hannah and Tyler Gregory, previous finalists of The Great American NO BULL Challenge.

Resources: HRSA personnel time and the $3,000 prize purse

Results: HRSA's mission to improve health and achieve health equity through access to quality services, a skilled health workforce and innovative programs was advanced through this challenge. By virtue of producing a video for the challenge, 879 youth and their peers engaged in discussions around bullying, how to stop it, and what roles youth can play to make a positive difference in their community. The Challenge.gov platform allowed HRSA and the Federal Partners to give youth a direct voice in proposing innovative methods to stop bullying and improve the health and safety of young people across the country. Through this challenge, the StopBullying.gov website was able to extend its reach across the globe by activating the creative energy and networks of youth.

3.25. **Suicide Prevention: Continuity of Care and Follow-Up App Challenge [SAMHSA]**

Overview: SAMHSA's "Continuity of Care and Follow-Up App Challenge" asked individuals and organizations to develop an app for a mobile handheld device that will provide continuity of care and follow-up care linkages for a person at risk for suicide who was discharged from an inpatient unit or emergency department.

Website:
http://suicidepreventionapp.challengepost.com/

Problem Statement: Many people who attempt suicide end up in the emergency room. From 2005-2009, there was a 55 percent increase in emergency department visits for drug-related suicide attempts by men age 21-34 and a 49 percent increase by women age 50 and over. While treatment at an emergency department is critical, research has shown that the period following inpatient and emergency department discharge is one of heightened risk for suicide, particularly in the following 30 days. Approximately 10 percent of individuals who died by

suicide had been discharged from an emergency department within the previous 60 days. 8.6 percent of people hospitalized for suicidal tendencies are predicted to eventually die by suicide.

This challenge aligns with SAMHSA's mission to reduce the impact of substance use and mental disorders on America's communities. SAMHSA sought apps that could be utilized to connect health care providers/suicide crisis and support organizations to an at-risk individual who was recently discharged from an inpatient unit or emergency department. App features and functions of the application could include: live chatting, safety planning, SMS functionality, scheduling functionality and appointment reminders, and mapping functionality showing locations of health care resources. At a minimum, entrants needed to include safety planning and utilize two resources to provide contact and/or linkages to: the crisis centers within the National Suicide Prevention Lifeline via 1-800-273-TALK (8255) and the SAMHSA treatment locator. The SAMHSA treatment locator is found at http://findtreatment.samhsa.gov/.

Goal: Solve a health problem(s)

Why a Prize as Preferred Method: A prize competition was chosen in order to receive multiple examples of mobile technology engagement to solve this health problem. Other available means to the agency would not have provided such a robust engagement to the target audience (technology innovations field) or have provided the volume of responses that SAMHSA received.

Participants: The focus of the challenge was to engage the public, particularly those with mobile technology experience. The challenge received 25 completed applications from a wide range of participants, from the suicide prevention field to the technology field. The profiles of the entrants varied widely, from single individual youth to technology companies.
Total entries: 25

Timeline:
Submissions – 6/6/2013 - 8/9/2013
Winners Announced – 9/13/2013

Solicitation and Outreach Methods and Results: SAMHSA utilized many different avenues for outreach, from listserv distribution to targeting partnering organizations. Outreach was effective, as SAMHSA received a large amount of completed mobile applications, more than what was anticipated within the limited time frame for the competition.

Incentives: Total prize purse: $100,000 ($50,000 1st; $30,000 2nd; and $20,000 3rd)

Evaluation: The Administrator of SAMHSA made the final decision based on the top seven entries identified by a panel of expert judges who evaluated submissions against these criteria:

- Ease with which a user could navigate different mobile device interfaces
- Ability to initiate and sustain relevant information according to user need and location

- Demonstration of creative and innovative uses of multiple platforms over mobile devices
- Potential to help individuals identified to be at risk of suicide during emergency room or psychiatric facility discharge link to outpatient treatment or immediate help

Partnerships: SAMHSA utilized National Suicide Prevention Lifeline (Lifeline) expertise.

Resources: SAMHSA personnel time, along with the allocated prize purse

Results: This competition had an impact both within and outside the field of suicide prevention: SAMHSA engaged individuals and organizations that historically have not involved in suicide prevention. Both national and international awareness of the challenge has been achieved and many of the products that were developed have been utilized. Entrants had to submit their applications and source code under creative commons license, providing SAMHSA and the public license to all products created under the challenge. SAMHSA will evaluate the applications further with plans to ultimately develop a product for dissemination by SAMHSA.

3.26. System for Locating People Using Electricity Dependent Medical Equipment During Public Health Emergencies Ideation Challenge [ASPR]

Overview: The Office of the Assistant Secretary for Preparedness and Response's (ASPR) "System for Locating People Using Electricity Dependent Medical Equipment During Public Health Emergencies" Ideation Challenge sought ideas to establish a system for monitoring the location and status of life-sustaining durable medical equipment (DME) during a prolonged power outage or disaster situation. This information would be used by a network of family and friends, formal caregivers, emergency responders and others responding to a disaster to better assist individuals who are dependent on DME. The current Challenge focuses on obtaining information about DME; however, this is part of a larger effort to ensure that these people get the necessary help as quickly as possible.

Website:
http://www.innocentive.com/ar/challenge/9933433

Problem Statement: Many in-home patients require the daily use of a piece of electrically powered DME. During a disaster or other event that leads to a prolonged power outage, these patients often end up at shelters or emergency rooms looking for sources of power or alternate ways to manage their medical needs. This not only has the potential to adversely impact the health outcomes for individuals who rely on DME, but it also stresses the local health care system and reduces a community's resilience and capability to rapidly recover from an emergency. During an emergency, communities could better meet the needs of individuals who rely on DME if they had access to real-time, remotely transmittable information about the locations and remaining battery life of life-sustaining medical devices.

Currently, there is no reliable system to simultaneously and rapidly identify the locations of individuals who rely on DME or to understand the power status of their life-sustaining devices. Developing and integrating a system that automatically monitors and transmits the status and location of a device will provide caregivers and responders with actionable information to support emergency planning and response operations, such as deploying a charged replacement battery or prioritizing power restoration.

Goal: Developing a comprehensive action plan and reliable system available to identify, locate, and assist these individuals in a timely fashion. In this competition, the goal was to solicit ideas from entrants for systems to support obtaining information about DME; however, this is part of a larger effort to ensure that these people get the necessary help as quickly as possible.

Why a Prize as Preferred Method: ASPR sought fresh, new ideas that could be developed into new technologies or integrated with currently available technologies to help solve the problem.

Participants: ASPR hoped to mobilize the American public to provide ideas of how this problem might be solved. As of September 30, 2013, 234 Solvers had reviewed challenge online.

Timeline:
Solicitation Open – 9/20/2013 – 10/31/2013

Incentives: The total prize purse will be $10,000, with at least one award being no smaller than $5,000 and no award being smaller than $1,000.

Evaluation: Entries were evaluated by a panel of experts and judged by Dr. Lurie, the Assistant Secretary for Preparedness and Response at HHS.

Partnerships: None

Resources: The services of an outside competition vendor, InnoCentive, including their web-based platform were obtained through the GSA contracting vehicle 541 4G: Challenges and Competitions Services. Additionally, a FTE at ASPR served as a project POC.

Results: As of the end of FY 2013, the challenge was still open to submissions. Full results will be shared in the FY 2014 report on the use of the prize authority provided by COMPETES.

3.27. **Technology Based Products to Reduce High Risk Drinking Among College Students [SAMHSA]**

Overview: SAMHSA announced a challenge for individuals and organizations to help prevent high-risk drinking among college students. Excessive and underage drinking among college students are significant public health problems on college and university campuses across the United States, which often result in life-altering consequences such as death, injury, assault, sexual abuse, unintended pregnancy, sexually transmitted diseases, academic difficulties,

suicide attempts, and alcohol dependence. SAMHSA sought solutions to this problem through cost-effective, portable, technology-based products that effectively reach a diverse population of college students and their parents, as well as administrators, faculty, and staff, and that can be adapted to meet the local needs of these institutions throughout the United States.

Website:
http://collegestudentdrinking.challengepost.com/

Problem Statement: SAMHSA opened the challenge to seek solutions to prevent high-risk drinking among college students through cost-effective, portable, technology-based products. These products also needed to effectively reach college students and their parents, as well as administrators, faculty, and staff. In addition, they had to be adaptable in order to meet the local needs of academic institutions throughout the United States. Technology-based products could include, but were not limited to, web applications, mobile apps, short message services (SMS), and podcasts.

Goal: Solve a health problem

Why a Prize as Preferred Method: This challenge aligned with SAMHSA's mission to reduce the impact of substance abuse and mental illness on America's communities. SAMHSA recognizes that preventing high-risk drinking among college students will save lives, improve academic success, and decrease other risks to students' health and safety. SAMHSA currently does not have a grant or contract mechanism specifically targeted to prevent high-risk drinking among college students, and this Challenge presented an innovative opportunity to offer funding.

Participants: This Challenge was an open call for developers, substance abuse prevention practitioners, and other public and private entities and individuals to participate.
Total entries: 29

Timeline:
Submissions – 5/24/2013 - 7/8/2013
Winners Announced – 9/13/2013

Solicitation and Outreach Methods and Results: This competition was promoted by SAMHSA's Office of Communications through an e-blast to online subscribers of SAMHSA News (approximately 53,000 individuals) and through the Network Addressing Collegiate Alcohol and Other Drug Issues, a volunteer organization of more than 1,600 U.S. colleges and universities.

Incentives: $100,000 total prize purse

Evaluation: Each eligible entry was reviewed by a panel of Federal government experts who evaluated the entries on their quality of product design, product performance, and project personnel. Each of the three finalists participated in a proof of concept meeting with the judges to clarify any concerns or questions raised by the review panel.

Partnerships: None.

Resources: SAMSHA personnel time and SAMSHA funding for the prize purse

Results: The Challenge solicitation resulted in 29 eligible entries, with the highest-scoring ones demonstrating innovative approaches to prevent high-risk drinking among their students.

4. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

4.1. Rebuild By Design

Overview: In June 2013, the Hurricane Sandy Task Force launched Rebuild by Design (RBD), a multi-stage regional design competition to promote resilience for the Sandy-affected region. The goal of the competition is to attract world-class talent, promote innovation, and develop projects that will actually be built. As a member of the Hurricane Sandy Rebuilding Task Force, the competition is sponsored by HUD. The competition consists of four stages, each with its own process, timeline and deliverable:

Stage One:	Request for qualifications and selection of 5 to 10 interdisciplinary design teams
Stage Two:	Analysis of the region through collaborative process and identification of key design opportunities
Stage Three:	Development of design solutions and community and partner engagement
Stage Four:	Designation of winning designs (implementation to follow)

Website:
www.rebuildbydesign.org

Problem Statement: Hurricane Sandy was unlike any storm before it. The unprecedented damage revealed the true threat that weather events pose to communities, states, and regions, and marked a new era of public awareness about the need to change practices, thinking, and ways of living to address climate change and sea level rise. Those affected by Hurricane Sandy continue to push forward with the recovery process, knowing that they cannot simply rebuild what existed before, but instead must think differently this time around, making sure the region is resilient enough to rebound from future storms.

During Stage One of the competition, applicants were required to submit a short proposal, detailed in the REBUILD BY DESIGN Request for Qualifications[76], which summarized their intended approach to problem identification and development of design solutions, as well as their initial thinking on the issues at stake and the possible concepts that might emerge. Applicants also provided a narrative summary of their team's experience in interdisciplinary

[76] http://portal.hud.gov/hudportal/HUD?src=/sandyrebuilding/rebuildbydesign

research, analysis, and design—especially related to the spatial impacts of ecological, economic, and social development on the regional scale.

Goal: The competition seeks to bring local, regional, and international knowledge to bear in order to:

- Contribute to a better understanding of the region's vulnerabilities, strengths, and interdependencies;
- Generate design proposals that: focus on regionally applicable solutions; increase resilience; develop and promote innovation; and integrate local efforts in the region;
- Build capacity of local communities and Federal agencies, while promoting an integrated regional approach;
- Connect to local efforts and strengthen the collaboration within governments and between government, business, academic, non-profit, and other organizations;
- Ignite innovation, outside-the-box perspectives, and address new trends; and
- Execute world-class projects with regional impact (either large-scale or replicable across the region).

Why a Prize as Preferred Method: The use of a prize competition has the potential to provide solutions to problems that are larger or more complex than individual towns have the capacity to solve independently. A prize competition also is able to leverage the resources of philanthropy and the nonprofit sector to derive a substantial return on investment in terms of time and expertise dedicated to defining and solving complex regional problems. To date, the, selected design teams have contributed much more time and many more resources than the value of the cash prize awards.

Participants: Approximately 148 teams from more than 15 countries submitted proposals, representing the top engineering, architecture, design, landscape architecture and planning firms, as well as research institutes and universities worldwide. 10 teams were selected to continue into Phases Two and Three.
Total entries: 148

Timeline:
Stage One Submissions – 6/20/2013 - 7/19/2013
Stage One Winners Announced – 8/9/2013
Stage Two Concludes – 10/28/2013
Stage Three Concludes – 4/3/2014
Anticipated Announcement of Winners – 4/30/2014

Solicitation and Outreach Methods and Results: In Stage One, to market the competition, HUD used its network of project partners (both administrative and funders), media sources specializing in design, professional associations and universities; and NEA's mature network of design-focused stakeholders and interest groups. This outreach was successful, as the quality of proposals was extraordinarily high and represented some of the best design talent in the U.S. and internationally.

Stage Two outreach activities included outreach to community leaders and stakeholder groups to provide their unique insights and understanding of the region to the teams. This was done through public meetings, facilitated field visits, and one-one-one discussions. Local community outreach is also a major component of Stage Three activities.

Incentives: Stage one applicants that were chosen by the Selection Committee have the opportunity to participate in a facilitated analysis and design process over the course of seven months, gain access to a wide-variety of stakeholders, and be designated as a participating REBUILD BY DESIGN team. These Design Teams will be provided a cash prize award of $100,000 to participate in Stage Two and $100,000 to participate in Stage Three. A major incentive for the design teams is also the potential for future involvement with the development and implementation of their ideas through state or local jurisdictions.

HUD will incentivize the implementation of winning designs using funds made available through CDBG–DR program to leverage other public and private funds. Grants will be made to state and local governments, not the winning design teams. These grants are not the competition's prize award, as the teams are competing for designation as a winning design and all receive a cash prize award to help offset their contributions.

Total funding for the cash prize awards was $2,000,000 ($200,000 per team x 10 teams). Funding was provided entirely by philanthropy.

Evaluation: The Stage One Selection Committee identified the Design Teams to proceed based on the following criteria:

- Team composition [Depth of interdisciplinary experience; Capacity to work collaboratively]
- Quality of past work [Demonstrated excellence in each of the team member's respective disciplines; Commitment to participatory design and public engagement; Relevance of the team's experience; Track record of publically-funded, built projects]
- Clarity, style, and thoroughness of proposal

Designees from Hurricane Sandy Rebuilding Task Force member agencies comprised the committee which selected the 10 teams to participate in the competition and receive cash prize awards. The HUD Secretary, serving as Chair of the Task Force, made the final selection. Applicants chosen by the Selection Committee were invited to participate in Stages Two and Three, at which point they entered into a participation agreement with HUD and provided a Scope of Work.

Final design submissions will be evaluated by a diverse competition jury. HUD Secretary Donovan serves as the Chair of the Jury and will make the final determination of winners.

Partnerships: Though the Hurricane Sandy Rebuilding Task Force launched the competition, lead responsibility resides with HUD as the Task Force expired on September 30, 2013. HUD's Office of Economic Resilience serves as the Department's administering entity. The NEA has a

history of supporting and facilitating design competitions and provided their expertise to advise the Task Force and HUD. In addition, many other Federal departments and agencies are involved in the process both through the Task Force and in subsequent stages. Administration of the competition is led by a partnership consisting of: HUD, New York University Institute for Public Knowledge, Regional Plan Association, Municipal Art Society of New York, and Van Alen Institute. See the "Resources" section for a summary of funding partners.

Resources: Philanthropic resources were used to fund the prize and operations. The Rockefeller Foundation is the lead funding partner for the competition. The partnership of funders consists of the following: The Rockefeller Foundation; Deutsche Bank Americas Foundation; Hearst Foundation; Surdna Foundation; The JPB Foundation; and The New Jersey Recovery Fund. The Rockefeller Foundation and the JPB Foundation have also committed to funding an evaluation of the competition, which is being conducted by the Urban Institute. HUD resources used consisted of staff time. Agency funds were used for competition-related travel to the region.

Results: The competition remains underway at the end of this reporting period, and a final report will be provided in the fiscal year report on the use of the prize authority provided by COMPETES. HUD expects that the impact to the agency and advancement of its mission will be realized in helping to redefine how communities rebuild (and thus how they build – incorporating resilience as a fundamental planning and design element). RBD has been named number one of ten on the "CNN 10: Ideas"[77] list of the best and most innovative ideas.

5. DEPARTMENT OF STATE

5.1. **2012 Innovations in Arms Control Challenge**

Overview: A smaller, faster-paced world is changing the security landscape, and these changes will bring with them new challenges and evolutions in current threats. To respond to these changes, the Department of State must adapt instruments of statecraft to bring to bear the networks, technologies, and human potential of their increasingly inter-dependent and interconnected world. In this spirit, the Department of State launched the Innovation in Arms Control Challenge on August 28, 2012, asking Americans: "How Can the Crowd Support Arms Control Transparency Efforts?" Challenge organizers invited America to share their ideas for how commonly available technologies can support arms control policy. As the Department of State looks to the future of arms control, new thinking to face the challenges of the 21st century is vital as challenge organizers move to reduce nuclear weapons to lower numbers and look for ways to monitor smaller units of account, such as chemical munitions in storage facilities.

Website:
http://www.state.gov/t/avc/innovationcompetition/index.htm
http://challenge.gov/State/394-innovation-in-arms-control-challenge

[77] http://www.cnn.com/interactive/2013/12/tech/cnn10-ideas/

Problem Statement: How Can the Crowd Support Arms Control Transparency Efforts? This challenge asked for creative ideas from the general public to use commonly available devices to help confirm whether states are complying with treaties or international arms control arrangements addressing weapons and nonproliferationThis broad challenge question was an "Ideation Challenge," formulated to obtain access to new ideas, similar to a global brainstorm for producing a breakthrough idea or market survey which may include ideas for a new product line, a new commercial application for a current product, or even a viral marketing idea to recruit new customers. Solvers were asked to provide ideas that included a description of the proposed mechanism or idea to support arms control transparency efforts; a rationale for why the proposed idea will work in the real world; and any supporting information, publications, real-world use cases, or examples that reinforce the validity of the proposed idea.

Goal: The primary objective of the challenge was to discover new approaches and ideas on ways commonly available technologies can support arms control policy, to bolster interest in the general public on arms control issues, and to stimulate useful outside thinking that could provide additional transparency and information related to compliance with arms control, nonproliferation, and disarmament regimes.

Why a Prize as Preferred Method: Prize competitions can stimulate attention and encourage innovation in a highly leveraged and results-focused way. Incentives improve the performance of problem-solvers and mobilize new talent and ideas.

Participants: This challenge asked for creative ideas from across the general public, from garage tinkerers and technologists, to gadget entrepreneurs and students, to support the U.S. arms control and nonproliferation agenda. 565 registered solvers submitted 67 solutions. Of the solvers who registered, 24 were from universities including Georgetown, MIT, Princeton, Brown, Cornell, Carnegie Mellon, Stanford, UC Berkeley, Iowa State, and University of Michigan. Total entries: 67

Although participation was limited to U.S. Citizens and permanent residents under the prize authority provided by COMPETES, challenge organizers received a lot of interest and positive feedback from foreign publics. While continuously working to achieve their Department's overall mission of international engagement, challenge organizers discovered an inability to locate the appropriate authority to engage international publics on prize incentive challenges. For future Department of State prize incentive challenges, challenge organizers are considering using existing procurement or grant authority language in order to carry out the Department of State's overall mission of engaging foreign publics while also soliciting innovative proposals that could aid the U.S. government by providing additional transparency and information related to compliance with existing or future arms control, nonproliferation and disarmament regimes. An amendment to the prize authority provided by COMPETES could help alleviate the restrictions on engaging foreign publics under the existing authority. This would facilitate the Department of State's ability to reach out to an international audience of potential solvers.

Timeline: 08/28/12 – 10/26/2012

Solicitation and Outreach Methods and Results: On August 28, 2012, the U.S. Department of State issued an official announcement on the Federal Register and sent out a press release on the Innovation in Arms Control Challenge. Rose Gottemoeller, Acting Under Secretary of State for Arms Control and International Security, also posted about the challenge on the Department's official blog and the White House's Office of Science and Technology Policy's blog.[78] These releases were further amplified through various social media channels inside and outside the Administration. Acting Under Secretary Gottemoeller participated in an interview with Popular Mechanics and CNN about the competition and later received wide attention. The announcement of the State Department challenge was also picked up by regional television and newspaper outlets, including the Washington Post.

Incentives: The awards were paid to the best submission(s) as solely determined by the State Department. The total payout was $10,000.

Evaluation: Solutions will be reviewed in two rounds of technical reviews. After analyzing the technical reviews, finalists will be chosen by a small coordination group based on their composite weighted score. The Judging Criteria was organized into the following three categories: applicability, feasibility, and supporting documentation.

Partnerships: None

Resources: Prize purse.

Results: The Challenge received interest from more than 500 potential solvers. Ms. Lovely Umayam, a graduate student from the Monterey Institute of International Studies at Middlebury College, located in Monterey, California, was awarded the first prize of $5,000. Ms. Umayam developed "Bombshelltoe," an online education platform that examines the intersection of culture and nuclear issues in order to facilitate better public understanding of basic nuclear and arms control-related issues. Mr. Allan Childers, an aerospace/defense industry consultant from Florida, was awarded a runner-up prize of $2,500. Mr. Childers' proposal was a mobile application that provides a platform for users to connect and interact, as well as a rewards program for sharing information on various arms agreement regimes. Dr. Rudolph "Chip" Mappus, a research scientist at Georgia Tech Research Institute working on computational neurology and brain-machine interfaces, was also awarded a runner-up prize of $2,500. He proposed a unique geographically based online social game for verifying treaty compliance in which experts post detailed tasks online, and citizens complete tasks for rewards using photographic and human report data using smartphones or consumer grade hardware.

5.2. **2013 Innovation in Arms Control Challenge**

Overview: As a follow-up to its first Innovation in Arms Control Challenge (the Department's first challenge under the prize authority provided by COMPETES), the Department of State's

[78] http://www.whitehouse.gov/blog/2012/09/05/challengegov-two-years-and-200-prizes-later

Bureau of Arms Control, Verification and Compliance (AVC) launched the 2013 Innovation in Arms Control Challenge on July 22, 2013. This challenge expanded the scope of AVC's original 2012 Innovation in Arms Control Challenge initiative by seeking proposals from the public on innovative information technology tools and concepts that can support future arms control inspections. AVC set out to elicit ideas for arms control inspection tools and processes that capture the potential of an era characterized by mobile devices and open information sharing.

Website:
https://www.innocentive.com/ar/challenge/9933381

Problem Statement: This challenge sought to develop innovative arms control inspection tools and processes that capture the potential of an era characterized by mobile devices and open information sharing. Ideas were solicited for technology solutions to support future arms control inspections. This challenge question was an ideation challenge that required only a written proposal to be submitted.

Goal: The primary objective of the challenge was to discover ways information technology tools can support future arms control inspections. By engaging the public, AVC sought to generate innovative thoughts on how information technology tools can supplement or even replace current technical approaches to arms control inspections.

Why a Prize as Preferred Method: AVC sees prize competitions as a useful driver to stimulate outside perspectives on a topic, to seek innovative solutions to a question, and to scan technological possibilities in a specific area.

Participants: The challenge sought creative proposals from the general public. Out of 223 solvers who registered for our Challenge, 24 solutions were submitted. Solutions ranged from ideas focusing on monitoring capabilities to tagging and tracking methodologies.
Total entries: 24

Timeline:
Submissions – 7/22/2013 - 10/20/2013

Solicitation and Outreach Methods and Results: Prior to the launch of the challenge, AVC provided a notice of the upcoming challenge to over 100 contacts at U.S. universities and academic organizations. On the day the challenge was launched, the U.S. Department of State issued an official announcement in the *Federal Register* and sent out a media note on the 2013 Innovation in Arms Control Challenge. Rose Gottemoeller, Acting Under Secretary of State for Arms Control and International Security, also posted about the challenge on the Department's official blog. These releases were further amplified through various social media channels inside and outside the Administration. AVC was unable to publicize the challenge during its last few days due to the shutdown of the Federal government. After AVC reviews the submitted solutions, the Bureau will issue a media note on the conclusion of the challenge.

Incentives: $10,000 prize purse

Evaluation: At the time of this report, AVC is reviewing the 24 challenge solutions in three rounds. The first round reviewed all solutions for their relevancy and applicability towards arms control policy; the second round reviewed all remaining solutions from a technical standpoint; and the third round will review all of the technical reviews for a final determination of a recommended winner. Each technical reviewer submitted a score card evaluating the solution's applicability, feasibility and supporting documentation. After analyzing the technical reviews, a small group composed of Federal employees will recommend a winner to State Department senior leaders, based upon the solution's composite weighted score from the three rounds.

Partnerships: AVC did not partner with another agency or private sector entities for this prize challenge. AVC did contract with a vendor to support the challenge platform and logistics. AVC continues to explore partnering with other agencies, as well as outside organizations from the private sector, that complement our efforts and objectives.

Resources: The prize challenge was funded from the Arms Control, Verification and Compliance Bureau's Diplomatic and Consular Affairs appropriations.

Results: The challenge solutions are under review; following this review, AVC will evaluate the impact of this challenge on AVC's mission. The Innovation in Arms Control Challenges have raised awareness of arms control issues within the U.S. public, particularly regarding AVC's exploration on the topic of arms control in the information age.

6. FEDERAL TRADE COMMISSION

6.1. **Robocall Challenge**

Overview: The FTC challenged the public to create an innovative solution to block illegal commercial robocalls on landlines and mobile phones. As part of its ongoing campaign against these illegal, prerecorded telemarketing calls, the agency offered a $50,000 cash prize for the best technical solution from an individual or small group that could help consumers block illegal robocalls. This challenge was the FTC's first public prize competition.

Website:
http://robocall.challenge.gov

Problem Statement: The vast majority of telephone calls that deliver a prerecorded solicitation are illegal. The FTC receives between 125,000 to 200,000 complaints each month regarding these harassing calls. As technology has advanced over the years, so have the number of these calls, many of which are marketing harmful scams. In response to this rise in illegal activity, the FTC has unveiled a number of initiatives to protect consumers by curbing illegal robocalls. One such initiative was the FTC Robocall Challenge. In order to enter this ideation challenge,

participants were required to submit a brief text description of the solution; at least one image representative of the solution; and a file upload of a technical proposal that describes how the Solution functions (or would function if implemented).

Goal: Develop a solution to block illegal robocalls in order to protect consumers. Catalyze the development of multiple new and innovative private-sector solutions for blocking illegal robocalls. Promote awareness about FTC goals and initiatives around stopping illegal robocalls.

Why a Prize as Preferred Method: A prize competition was preferred to achieve the goals above for the following reasons:

- The FTC could not identify a currently available commercial product or service that would be able to solve the problem, nor could the FTC predict what form the solution(s) would take.
- The FTC's goal was to attract a diverse array of individuals to tackle this problem without predetermining their approaches. The agency also desired to pay only for the development of solutions that would likely work.
- The FTC did not have an interest in procuring, owning, or directly developing or administering solutions to the problem of illegal robocalls, just in stimulating their availability in the marketplace.
- A prize competition had advantages in promoting awareness 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 gained through a public competition.

Participants: The FTC Robocall Challenge was intended to mobilize individuals, teams and organizations of any size. These potential participants included those who were already working on a solution to block illegal robocalls, as well as new solvers. Corporations (including nonprofit organizations), limited liability companies, partnerships, and other legal entities needed to employ fewer than ten people to be eligible for a cash prize. Organizations that met the other eligibility requirements and employed ten or more people could compete only for the "Federal Trade Commission Technology Achievement Award," which did not include a cash prize. FTC received 798 eligible submissions: 721 submitted by individuals, 36 by teams, 35 by organizations with less than 10 employees, and 6 by organizations with 10 or more employees. Total entries: 798

Timeline:
Submissions – 10/25/2012 - 1/17/2013
Winners Announced – 4/2/2013

Solicitation and Outreach Methods and Results: The FTC announced the Robocall Challenge at the conclusion of its day-long public Robocall Summit on October 18, 2012. This event had attracted many of the relevant stakeholders, who either attended in person, participated via Webcast, or followed the agency's live-tweeting of the event. The FTC did outreach resulting in significant media coverage, including by all four major TV networks. The agency also hosted

social media "chats" on Twitter and Facebook, conducted broad outreach via relevant email listservs, and made in-person visits to several prominent institutions to spread the word to academics, students, and entrepreneurs with the necessary expertise. In announcing the challenge winners on April 2, 2013, the FTC did media outreach that resulted in coverage by major print outlets (e.g., AP, Washington Post), technology blogs (e.g., Gizmodo, Ars Technica), widely read websites (e.g., Slate, Huffington Post), national radio shows, and TV programs.

Incentives: The total cash prize amount for the challenge was $50,000. This cash prize was for the winner of the "Best Overall Solution" prize, and was divided equally between two tied entrants, who also received opportunities for promotion, exposure, and recognition by the FTC. The winner of the "Federal Trade Commission Technology Achievement Award" for organizations with 10 or more employees was not awarded a cash prize but, like the cash prize winners, received opportunities for promotion, exposure, and recognition by the FTC. Solvers retained ownership of their solutions.

Evaluation: The FTC Robocall Challenge was judged according to the following process: an internal FTC staff panel used the criteria summarized in the Problem Statement to judge all eligible submissions and determined a list of finalists; and then finalist submissions were judged by an expert panel using the same criteria. Criteria included:

- Does it work? (50%)
- Is it easy to use? (25%)
- Can it be rolled out? (25%)

Partnerships: The FTC drew on informal partner relationships with a diverse array of telecommunications industry insiders and other technical experts as it formulated the challenge. The Federal Communications Commission, the White House Office of Science and Technology Policy, and the General Services Administration were also engaged as partners to assist in designing the challenge, as were formal academic advisors.

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. In addition, the FTC contractually retained a competition administrator, ChallengePost.

Results: The FTC considers the Robocall Challenge an enormous success on multiple levels. The winners designed products capable of helping consumers block robocalls. "Nomorobo" is one winning solution – developed by citizen solver Aaron Foss, this service allows incoming calls to be routed to a second telephone line that can identify and hang up on illegal robocalls. As of late March 2013, Nomorobo has over 86,000 users and has blocked over 2 million robocalls.

In addition, the Robocall Challenge has promoted awareness of the FTC's initiatives among solvers and the public generally. The competition also provided a forum for citizens to voice their ideas, concerns, and solutions. The challenge also stimulated the communication of

practical tips from consumers about what they do to reduce robocalls. The General Services Administration helped FTC create a video[79] to share some of consumers' most helpful "tips and tricks." The FTC also received insightful long-term proposals about potential policy, regulatory, and technical changes. The agency created an opportunity for challenge participants to file a public version of their submissions so that these thoughtful entries could contribute to the ongoing discussion about fighting illegal calls.[80] Indeed, when the U.S. Senate Subcommittee on Consumer Protection, Product Safety and Insurance held a public hearing about robocalls on July 10, 2013, the FTC's written testimony cited some of the public submissions by Robocall Challenge entrants.[81]

Finally, the challenge engaged individuals who were not focused on helping consumers block illegal robocalls. For example, all four of the developers and engineers who created the winning solutions told us they had not previously been engaged with the problem.

7. NATIONAL ENDOWMENT FOR THE ARTS

7.1. **Presenting Arts Data Artfully**

Overview: NEA asked the public to develop interactive data visualizations for their flagship arts participation data.

Website:
artsdata.challengepost.com

Problem Statement: The Survey of Public Participation in the Arts (SPPA) is the NEA's flagship dataset and includes a host of demographic, geographic, and behavioral variables about how U.S. adults (ages 18 and over) participate in arts activities. 2012 SPPA data have become available through the U.S. Census Bureau. NEA asked innovative thinkers, data crunchers, and graphic artists to create visualizations reveal hidden or unexpected value from the raw numbers, asking: "How can information about the arts events that people experience yearly—and the types of art they otherwise consume or create—be used to tell people who they are as Americans and how they relate to one another? How can the information be linked to other datasets to profile behavior patterns within a geographic area, and how can arts and cultural managers use such data to improve their services and outreach capabilities?"

Goal: By issuing this challenge, the NEA seeks the design and development of interactive data visualization applications to showcase the SPPA data in exciting ways.

[79] http://www.consumer.ftc.gov/blog/reducing-robocalls-practical-tips-tricks
[80] https://ftcpublic.commentworks.com/ftc/robocallchallenge
[81] http://www.commerce.senate.gov/public/index.cfm?p=Hearings&ContentRecord_id=c1eec086-3512-4182-ae63-d60e68f4a532

Why a Prize as Preferred Method: The NEA expects that through interactive data visualization tools, the reach and impact of the SPPA will go beyond what has been possible in previous years, when glossy reports and raw data were all that were typically made available. However, the NEA does not have the resources in-house to create such visualizations. The Agency considered traditional contracting options and determined that a competition made sense deliver good data visualizations and to foster additional interest in, awareness of, and familiarity with the SPPA data themselves. The Agency wants to present multiple approaches to visualization of the data and to allow entrants to be as creative as possible in developing them.

Participants: Registration is open to the American public.

Timeline:
Submissions – 9/26/2013 - 2/3/2014

Solicitation and Outreach Methods and Results: The competition was widely advertised through a combination of emails to NEA contacts and to various service organizations and associations, press releases, notices posted to social media (NEA's social media following includes 30,230 Facebook likes and 42,305 Twitter followers), and public presentations. Many of these notifications were made in the context of the official release of *How a Nation Engages with Art: Highlights from the 2012 Survey of Public Participation in the Arts (2013)*.

Incentives: $60,000 total prize purse. The NEA will offer four cash prizes: $30,000 for first prize and $10,000 for each of three submissions selected as honorable mentions.

Evaluation: The Agency has just begun the process of identifying judges. Judges will evaluate the submissions on the basis of the following criteria:

- Creativity: Is the application creative, interesting, and easy to use?
- Artful Design: Is the application functional, artfully designed, and visually appealing?
- Statistical Validity: Does the application properly account for definitions of variables, statistical sampling procedures and weights, and differences across time, data sources, and data collection procedures?
- Use of Required Data: Does the application use the required 2012 SPPA?
- Technical Implementation: Is the application functional, elegant, and accessible on any internet accessible platform, including personal computers, tablets, and mobile devices? Does the application require purchase or downloading of a tool to use it?

Partnerships: None.

Resources: To date, the Agency has only used personnel resources required to coordinate the launch of the competition. The funds for the prize purse were obligated from the Program Budget for the Office of Research & Analysis.

Results: As of the time of this report, submissions to the challenge were still open. A final report will be provided in the fiscal year 2014 report on the use of the prize authority provided by

COMPETES. The competition has raised the profile of the data in the SPPA by broadening the base of individuals who are exposed to and become familiar with those data.

8. NATIONAL ENDOWMENT FOR THE HUMANITIES

8.1. **National Humanities Medal Design Competition**

Overview: NEH sponsored an online design competition for artists and designers to design a new National Humanities Medal, which is bestowed annually by the President of the United States in a White House ceremony. The National Humanities Medal, inaugurated in 1997, honors individuals or groups whose work has deepened the nation's understanding of the humanities, broadened our citizens' engagement with the humanities, or helped preserve and expand Americans' access to important resources in the humanities. It is a distinguished group of thinkers who deserve a glorious medal.

Website:
http://humanitiesmedaldesign.challengepost.com/

Problem Statement: Translating the idea of the humanities—the study of literature, philosophy, history, and other subjects—into a visual form is a challenging task. The first and only medal design for this award, done in 1997 by illustrator David Macaulay, was in need of updating. The new design would reflect the importance of the award and of the humanities in a graceful, insightful, and ultimately beautiful manner.

Goal: Receive a submission that could be made into a new medal to premiere at the 2014 National Humanities Medal ceremony and serve NEH in the future.

Why a Prize as Preferred Method: Because of the difficulty of translating the idea of the humanities into a visual form, NEH hoped that through a national competition, artists would be challenged to offer a variety of different solutions to this problem, solutions that we would not be able to imagine on our own or through the solicitation of proposals from only a few designers. In addition, NEH believed that hosting a national competition could raise public awareness about the prestigious National Humanities Medal.

Participants: NEH hoped to mobilize artists and designers to compete in the challenge.
Total entries: 131

Timeline:
Submissions – 10/1/2012 - 3/15/2013
Winner announced – 6/4/2013

Solicitation and Outreach Methods and Results: NEH engaged the artistic community through direct outreach (e-mail and critical follow-up phone calls) to colleges and universities known for

their design and art programs, to associations and organizations that cater to its artist members, and to undergraduate and graduate schools nationwide. University and association contacts spread the word to their faculty, membership, and communities. The U.S. Mint helped to spread the word through their specific outlets. Also, by recruiting well-known artists and curators as judges, NEH hoped to elevate the prestige and visibility of the competition. For a minimal cost of $200 each, two online advertisements were placed with the online newsletter "Riveting News," which caters to the metal arts community.

Incentives: The prize for the medal competition was $3,000 and an invitation to the final medal unveiling in Washington, D.C. The $3,000 prize was obligated out of funds donated to the agency (i.e., not funds appropriated by Congress) and was paid by direct deposit to the winner.

Evaluation: Beginning March 18, 2013, a committee of three NEH employees met together to perform an initial review of the 131 submissions. NEH contracted with three outside judges to rate the final 49 submissions. Four criteria were used to rate the designs: relationship to the humanities; ability to translate into a 3-dimensional medal; ability to be replicated; and beauty of design. Because of concerns for preserving the reproduction rights of the artists who submitted designs, NEH did not wish for public voting or viewing of competition submissions. From the review of the 49 submissions, NEH selected the ten top-rated designs to show to the acting chairman of NEH, Carole Watson, who made the final winner selection.

Partnerships: None

Resources: NEH personnel time. NEH spent $4150 for this competition: $3,000 for the prize purse and $750 in honorariums for three outside judges (both paid from funds donated to NEH, not from appropriated funds), and $400 for placement of web ads.

Results: Overall, this competition was a success for NEH. Our hope was that we would have a handful of outstanding designs to choose from, and we are extremely pleased with the winning design,[82] which exceeded many expectations and which advanced the mission of the agency by elevating the design of the National Humanities Medal to match the prestige of the award. The final medals will be ready for the next White House presentation in early 2014.

9. NATIONAL SCIENCE FOUNDATION

9.1. Basic Research to Enable Agricultural Development Ideas Challenge

Overview: The Basic Research to Enable Agricultural Development (BREAD) Ideas Challenge was a call to the scientific community to identify the next big research foci for the BREAD program. In partnership with the Bill & Melinda Gates Foundation (BMGF), BREAD supports innovative

[82] http://humanitiesmedaldesign.challengepost.com/submissions/14016-paul-c-balan-national-humanities-medal-design

basic scientific research at the proof of concept stage designed to address key constraints to smallholder agriculture in the developing world. Awards made through the first three BREAD competitions can be found on the BREAD Awards page.

In line with the BREAD mission, the BREAD Ideas Challenge was part of a two-stage competition involving small cash prizes to stimulate new ideas and EAGER proposals to explore new, high risk, high payoff research. The challenge offered up to 25 cash prizes of $10,000 each for innovative, potentially transformative challenges and research foci that, if addressed by basic scientific research in any of the major fields supported by the BREAD program, could lead to significant benefit to smallholder agriculture in the developing world. Research challenges were accepted in any area of basic research and technology development in all fields of biological and physical sciences and engineering as long as the proposed research challenge was consistent with the BREAD Program objectives.

Website:
http://www.nsf.gov/BREADIdeas

Problem Statement: The BREAD Ideas Challenge was an opportunity for researchers in the agricultural sciences in the U.S. and abroad to bring attention to what they believe are the most pressing issues facing smallholder farmers in the developing world today. Entrants were asked to submit an entry written in English that consists of 100 words or fewer and describes the challenge or research focus adequately for an internal panel of experts to assess its merits and relevance to smallholder agriculture in the developing world.

Goal: The goal of the BREAD Ideas Challenge was to spur the development of new ideas for research foci and challenges that could be addressed in future BREAD competitions.

Why a Prize as Preferred Method: There have been three full proposal competitions for the BREAD program. The prize competition was a pilot activity by which the Program could evaluate whether a prize approach would have a different outcome from a regular competition without a prize component. These included:

- Attracting new ideas and participants into the BREAD program
- Increasing involvement of individuals in developing countries
- Encouraging international collaborations to address constraints facing smallholder farmers in developing world
- Providing US researchers and students with international research experiences

In addition, the activity offered an alternative perspective on soliciting high risk, potentially transformative research.

Participants:
By opening up the prize competition to researchers at U.S. and non-U.S. academic and not-for-profit research institutions, the Program tested the notion that "ideas can come from anyone and anywhere". To be eligible, an entrant was required to be 18 years or older and a graduate

student, postdoctoral associate, or faculty member employed at an eligible institution (in the U.S. or internationally). A summary of the quantity of entrants into the competition, along with a descriptive summary of the aggregate profile of those entrants, geographic distribution, or other notable attributes of the entrant pool, is available from the NSF.
Total entries: 801

Timeline:
Submissions – 4/1/2013 - 4/30/2013
Winners Announced – July 2013

Solicitation and Outreach Methods and Results: The objectives of the BREAD Ideas Challenge communication strategy were to maximize participation of diverse researchers in relevant fields at eligible institutions. Methods used to market the prize competition, mobilize potential participants, and ensure high quality submissions included:

- Dear Colleague letter and posting of information and URLs on the NSF BIO, BIO/IOS, and BREAD and PGRP program websites and the BREAD Ideas Challenge website
- Emails to PGRP and BREAD PIs and reviewers, and other organizations including BMGF
- Workshops/outreach to announce and provide information about the prize competition at international meetings
- Social media
- Videos developed with NSF/Office of Legislative and Public Affairs highlighting PIs and the research challenges that their projects are addressing with support from BREAD
- Press releases

Incentives: The BREAD Ideas Challenge offered up to 25 cash prizes of $10,000 USD each. It was hoped that the prize monies would provide the winners with flexible travel funds to network with other researchers or limited support for exploratory research. In addition, it was hoped a prizewinner would have a chance of competing in the subsequent EAGER competition if his/her submitted idea for research focus was selected.

Evaluation: Judges were assigned to categorical brackets to take advantage of their fields of expertise. Some were assigned to multiple brackets. In all cases, judges were instructed to score only those entries for which they felt qualified; entries with insufficient scores were assigned to additional judges prior to final determination. As per the Management Plan, BMGF judges could only constitute 25% of total judging pool.

A set of entries that ranked in the top 25 in each of five fields of research (for portfolio balance, overall quality, and program goals) were evaluated by Program Officers in a “roundtable” format. Up to 25 submissions could be nominated for prizewinning status.

The main criteria for selecting prizewinners were:

- Challenge – A successful entry described a challenge or research focus, rather than a specific solution, for future research proposal solicitations

- Potential – A successful entry described a scientific challenge that, if resolved, would result in transformative change to smallholder agricultural outcomes and/or a scientific field relevant to smallholder agriculture
- Novelty – A successful entry described a challenge that is new, or that has not received substantial consideration in the scientific community

In keeping with the objectives of the BREAD Ideas Challenge, additional considerations were used to select the final winners. These included the potential to inspire basic research involving a broad spectrum of scientific fields, promote new and equal international partnerships and achieve a diverse global distribution of prizewinners.

Partnerships: BREAD is a joint program with the Bill & Melinda Gates Foundation (BMGF). BMGF was instrumental in helping NSF on marketing and advertising for the challenge to their communities and networks.

Resources: $130,000 prize purse (distributed to 13 prize winners via contractor Skild); $19,168 for the Skild web platform; $20,150 prize disbursement. The funds were sourced from NSF/BIO/Integrative Organismal Systems (IOS)/PGRP program funds and from BMGF gift funds. Prizes for U.S. winners will be paid from PGRP Program funds where these fall within the scope of the Program. All other prizes, including prizes for international winners, were be paid from BMGF gift funds. Many NSF Personnel contributed time. NSF contracted Skild to design the challenge submission website and to disburse prize monies.

Results: The BREAD Ideas Challenge was a pilot activity designed to determine whether a prize approach has different outcomes from a regular competitive funding competition without a prize component (e.g., attracts new ideas, addresses the need to engage individuals in developing countries, encourages international collaborations to address constraints facing smallholder farmers in developing world). The prize competition exceeded expectations. Over 800 entries from 68 countries were submitted with about 40% of submissions from individuals at non-U.S. institutions. Entrants included tenure-track and research faculty, postdoctoral researchers, and graduate students. Graduate students comprised over 30% of the entrants.

There were 12 prizewinning challenges submitted by 13 entrants, including one graduate student and three postdocs[83]. The prize competition was Phase 1 of the FY 2014 BREAD competition. In Phase 2, the BREAD program is accepting Early Concept Grants for Exploratory Research (EAGER) proposals. The winning ideas from the BREAD Ideas Challenge will be focus areas for the second stage of the program, although all ideas within the scope of the BREAD Program will continue to be welcome.

As of December 1, 2013, 80 EAGER inquiries have been received from PIs at 49 lead institutions. It is important to note that the average number of EAGER inquiries submitted to PGRP each year is five. Seven of the inquiries involve BREAD Ideas Challenge prizewinners, with three

[83] Information about the prizewinning challenges can be found at http://www.nsf.gov/bio/bread/winners.jsp.

inquiries involving the same prizewinner. Three include non-U.S. prizewinners. All twelve prizewinning challenges were addressed by one or more inquiries, with 31 inquiries addressing challenges originating outside the BREAD Ideas Challenge.

9.2. Graduate Research Fellowship Program (GRFP) "Creating the Future" Video Competition

Overview: For over 60 years, NSF Graduate Research Fellows have made outstanding contributions to science and engineering and to our nation. To celebrate this milestone in 2012, NSF sponsored the GRFP "Creating the Future" Video Competition. The competition challenged current NSF Graduate Research Fellows to create and submit a 90-second video, expressing how they envisioned their research shaping the future. The competition demonstrates the accomplishments and creativity of NSF Graduate Research Fellows and their ability to communicate their research. As members of a nationally-selected group, NSF Graduate Research Fellows are poised to encourage the next generation of scientists and engineers.

Website:
http://challenge.gov/search?utf8=%E2%9C%93&terms=GRFP

Problem Statement: The "*Creating the Future*" Video Competition was designed to give NSF Graduate Research Fellows a creative opportunity to communicate their research to the public, in celebration of the 60th anniversary of GRFP. The NSF GRFP is the country's oldest Federal fellowship program directly supporting graduate students in science, technology, engineering and mathematics fields. Current NSF Graduate Research Fellows were invited to submit short videos, not to exceed 90 seconds, written, directed, produced and starred-in by current NSF Graduate Research Fellows.

Goal: The primary objectives of the GRFP "*Creating the Future*" Video Competition were:

- To further the goals and objectives of the NSF by identifying, encouraging and supporting future scientists who are making an effort to solve problems of tomorrow
- To recognize NSF Graduate Research Fellows and their research, within the context of celebrating the 60th anniversary of the Graduate Research Fellowship Program
- To ascertain if NSF Graduate Research Fellows could successfully represent their research in a clear and concise manner to acquaint the public with their research

Why a Prize as Preferred Method: The competition provided NSF Graduate Research Fellows the opportunity to showcase their research in a creative format.

Participants: The target audience for the video competition was current NSF Graduate Research Fellows, which included approximately 6,000 students. 63 diverse NSF Graduate Research Fellows from 45 institutions across the country responded with competitive videos that were reviewed and scored.
Total entries: 63

Timeline:
Submissions – 7/9/2012 - 9/14/2012
Judging – 9/17/2012 - 11/6/2012
Peoples' Choice Award – 10/31/2012-11/14/2012

Solicitation and Outreach Methods and Results: The video competition was announced on Challenge.gov, and emails were sent to the entire listserv of current NSF Graduate Research Fellows. This direct email to all eligible participants was determined to be the most effective communication. The competition was also advertised on www.nsfgrfp.org, and announcements were made on the GRFP Facebook and Twitter social media sites. The results of the competition were announced and made available to the public on the NSF Special Report website[84] and the GRFP 60th anniversary website[85], along with additional content. To date, five video submissions have been featured on the GRFP website, including those of the three winners.

Incentives: Competition winners were awarded cash prizes totaling $5,500. Prizes were to be used for attending conferences and meetings or for research-related expenses. In addition to the cash prizes, non-monetary incentives were used to motivate participants. These incentives included the use of the winning videos as outreach materials to introduce potential applicants to the program, as well as the opportunity to meet and network with NSF staff, NSF senior officials, and former NSF Graduate Research Fellows at the 60th Anniversary Ceremony held in December 2012 at the National Science Foundation. During the ceremony, their videos were shown to the attendees, which included members of the press, distinguished guests, and member of the National Science Board in addition to NSF staff.

Evaluation: There were eighteen judges for the competition, which included NSF staff as well as professional videographers, film producers, science writers, and former Graduate Research Fellows. In addition, almost 2,000 individuals cast their votes for the People's Choice Award. There were three rounds of judging, and a People's Choice voting round in parallel with the final round of judging. Videos were reviewed by judges using the following criteria:

- Visual Impact –provides viewers with new insight, is visually striking, incorporated a variety of perspectives and media, and is filmed and edited to a high standard.
- Effective Communication –clear and understandable messages using plain language (written and spoken) throughout
- Freshness/Originality –an individual voice, vitality and energy, and effectively emphasizes new methods and insights to create a novel presentation or tell a compelling story about the researcher(s) and/or their research.

Partnerships: None

Resources: The cost of the contractor support was $26,950. As the contractor disbursed the cash prizes totaling $5,500, the total contract expenditure was $32,450. These funds were

[84] http://www.acpt.nsf.gov/news/special_reports/grfp_anniversary/index.jsp
[85] http://www.nsfgrfp.org/60th_anniversary_grfp

obligated by the GRFP, Division of Graduate Education (DGE), Education and Human Resources Directorate. Travel funds for the winners to attend the celebratory event showcasing their videos were additional costs provided by the GRFP; travel to Arlington, VA for the three NSF Graduate Research Fellows was at a total cost of approximately $2,500.

Results: The specific objectives of the competition were met. The video entries demonstrated to the judges that NSF Graduate Research Fellows could successfully represent their research in a clear and concise manner and effectively communicate to the public about their research and its impact on society. The topics highlighted in the videos produced by the NSF Graduate Research Fellows addressed societal issues such as species conservation and human impacts on the environment. The videos of the top competitors are being used in NSF science outreach and continue to be used as outreach materials to students and institutions interested in the GRFP.

9.3. **Innovation in Graduate Education Challenge**

Overview: The Division of Graduate Education at NSF challenged STEM graduate students across the nation to submit innovative ideas to prepare them for tomorrow's opportunities and challenges. Entries were solicited for ideas with the potential to improve graduate education and professional development. Ideas could be directed toward, for example, students, faculty, departments, institutions, professional societies, or Federal agencies. The challenge offered cash prizes to first-, second- and third-place winners, selected by a panel of judges of current and recent STEM graduate students as well as experts in higher education in two rounds of judging. In addition, the public at large was invited to vote for their favorite submission from among 53 finalists to select the Community Choice winner, who also won a cash prize.

Website:
www.nsf.gov/gradchallenge
http://challenge.gov/NSF/506-innovation-in-graduate-education-challenge

Problem Statement: The world faces extraordinary challenges and requires solutions based in science, technology, engineering, and mathematics (STEM). What is needed to prepare STEM graduate students to meet these modern day challenges? Further, given the fundamental changes occurring in the career options for STEM professionals, what is necessary to navigate the career pathways of the future?

Participants were asked to submit a 1000-1500 word essay that addresses three questions about STEM graduate education:

- The issue in graduate education they wish to address
- Their solution or idea
- How their idea will change graduate education

Goal: Solicit creative ideas from graduate students themselves; give voice to graduate students on issues that matter to them; and analyze the submitted entries to better understand the needs of current graduate students.

Why a Prize as Preferred Method: This competition is a rapid means to collect ideas, engage the student and higher education communities, and inform policymakers and implementers about new ways to address challenges in graduate education.

Participants: NSF invited currently enrolled STEM graduate students to participate.
Total entries: 534 teams comprising 724 individuals

Timeline:
Submissions – 2/15/2013 - 4/15/2013
Winners Announced – 6/13/2013

Solicitation and Outreach Methods and Results: We took a broad approach to get the word out to graduate students and the general public including:

- Emails to students and student groups, graduate deans, the NSF program listservs, and other organizations with connections to STEM grad students
- Social media via Grad Ed Challenge Facebook and Twitter accounts, and NSF social media
- Advertised at the 2013 AAAS Annual Meeting in Boston, MA via postcards and a workshop session to announce the official launch of the challenge
- Press release from NSF
- Media coverage in C&EN News, Science Careers, Inside Higher Ed, Durham Herald-Sun, and NatureJobs
- Community choice voting
- Stakeholder engagement, including NSF program officers, OSTP, the Council of Graduate Schools, and a group of IGERT PIs at NSF.

Incentives: $14,000 in total prize purse, including one first prize of $3,000, two second place prizes of $2,000, four third place prizes of $1,500, and one community choice prize at $1,000.

Evaluation: The NSF Innovation in Graduate Education Challenge entries were first judged by peers, followed by experts in graduate education. All entries were scored by the same criteria in both judging rounds. At each round of judging, all entries were read and scored by three judges. The average of all three judges' scores was used to determine which entries advanced in each round of the challenge. Judging methods were effective overall, in part, because NSF was able to recruit 70 judges for round 1 which had over 500 entries and 20 judges for round two which had over 50 entries.

Participant submissions were judged by the following criteria:

- Vision 30%: Is the submission compelling, inspiring, and forward looking? Does it provide an innovative or creative solution to the needs of graduate students and/ or graduate education?
- Impact 25%
- Potential for Success 20%

- Rationale 15%: Does the author explain how and why the idea would help graduate students and/ or improve graduate education? Is the idea adequately developed?
- Presentation 10%: Is the submission effectively written?

Partnerships: NSF did not engage in any formal partnerships for this challenge. NSF contracted Skild to design the challenge platform and website. This was not considered a partnership, but a contract agreement.

Resources: $47,850 total budget, including $14,000 in prize money (distributed to winners via contractor, Skild), $23,000 for the web platform (via contractor, Skild, to collect participants' registration and submissions, judges' scores, etc.), $6,500 for website design via Ajil/Skild to be posted at www.NSF.gov/gradchallenge/, and $4,350 (10% for contract costs). The funds were sourced from two NSF DGE programs: GRFP, and Integrative Graduate Research Traineeship.

Results: The Graduate Education Challenge advanced the NSF mission by raising awareness of STEM graduate education issues and engaging graduate students in the broader dialogue of graduate education. NSF also advanced the DGE mission. This challenge raised the visibility of DGE and graduate education issues within the NSF and outside NSF, and solicited a large number of high quality ideas from students to inform future graduate education programs in STEM. DGE has a better idea about the perceived needs of graduate students themselves because of the student participation in this challenge. NSF is currently conducting a thorough content analysis of the 534 submissions, to identify themes among STEM graduate students to better understand their needs and to find and share unique ideas proposed by students. NSF plans to share this analysis broadly with stakeholders in graduate education, including the Graduate Education Modernization working group at OSTP.

9.4. **Mozilla Ignite Challenge**

Overview: In this $500K multi-stage competition, Mozilla and NSF invited designers, developers and everyday people to brainstorm and build applications for the faster, smarter Internet of the future. The winning entries were designed to run on next-generation networks with speeds of up to one gigabit per second — roughly 250 times faster than the internet most of us are used to today. The twenty-two winning entries included applications that would aid emergency responders, enable three-dimensional video conferencing, provide real-time health monitoring, and inform connected traffic control systems, among other ideas.

Website:
https://mozillaignite.org/

Problem Statement: NSF funded the non-profit Mozilla Foundation through a cooperative agreement to develop a prize platform, recruit judges, and do the relevant marketing necessary to host a two-stage competition composed of: 1) an ideation competition, and 2) a multi-round application development competition. The ideation competition sought ideas for novel gigabit applications in service to society. An open competition cast a wide net for next-generation

application development. The application development competition built on the ideation competition and challenged the open developer community, over a period of several months and a number of community events, to develop implementable solutions and to demonstrate their novelty, feasibility, and societal benefit. There are three rounds in this competition.

Goal: US Ignite seeks to spark the development of next generation applications in areas of national priority -- health, education, energy, advanced manufacturing, transportation, and public safety -- on an ultra high-speed (>100 Mbps up- and down-load), deeply programmable (i.e., allowing new internet architectures not requiring use of Internet protocols), and sliceable (i.e., isolated resources running in parallel) network. The result will be the development and deployment of applications that would not be possible on today's Internet.

Why a Prize as Preferred Method: No one discipline or research community within academia develops applications in areas of national priority that are designed for ultra-high-speed networks. Hosting prizes and competitions was designed to jumpstart this activity, advertise it widely, and potentially gain the attention of open source software developers.

Participants: The ideation competition was open to anyone regardless of age, demographic, or organizational membership. The application development competition was open to individuals and teams that potentially include members of the general public and open source software developers, as well as scientists and engineers from academia and industry. If someone from the international community participated, they had to affiliate with a U.S.-based team.
Total entries: 300 [Ideation Phase]; 22 [Development Phase]

Timeline:
Ideation Competition – 6/4/12 - 8/26/12
Development Round Open – 8/26/12 - 1/16/2013
Final Winners Announced – 6/25/2013

Solicitation and Outreach Methods and Results: NSF funded the non-profit Mozilla Foundation through a cooperative agreement to develop a prize platform, recruit judges and do the relevant marketing necessary to host a two-stage competition. Mozilla has proven to be superior in its outreach to the open source world, with 300 applications to the ideation competition (and eight winners) and 22 winning developer teams. The competitions were advertised widely on Mozilla's challenge website as well as on Challenge.gov.

Incentives: Mozilla made monetary awards for both competitions based on a set of criteria that judges will use to evaluate the ideas and applications. The total for prizes for the ideation competition was $15K.[86] The "gold prize" winning team received $5K for its idea. Two silver prizes were given at $2.5K each. Five bronze awards were given at $1K each. The first development round completed on November 26, 2012 with ten winners receiving a grand total

[86] https://blog.mozillaignite.org/2012/09/ideation-winners/

of $85K.[87] The second round of solutions was due on Jan. 16, 2013. Participants presented use cases, compelling stories with demonstrated impact, and working demos. Teams could build on the winning ideas from the previous round or start de novo. $150,000 was allocated for this round. On May 1, 2013, 23 teams pitched for a share of the $250,000 final prize purse.

Evaluation: An independent panel of expert, external judges[88] who have no conflicts of interest with the applicants was used to evaluate submissions to both competitions. Mentors were also selected for the application development competition.

Partnerships: NSF funded the non-profit Mozilla Foundation to administer the competition. Partners include the non-profit US Ignite organization[89], the Global Environment for Network Innovations (GENI) project[90] funded by NSF / CISE, and the Mozilla Developer Network[91] .

Resources: NSF initially funded Mozilla at about $700K. It supplemented this award the following year for ~$250K as they have been outstanding partners, volunteering staff and resources beyond what anyone had originally thought would be needed.

Results: The response from a diverse set of stakeholders for the ideation competition was large. Many open source developer teams turned their attention to the competition stage, focusing their energies on the development of public goods and traveling to hackathons across the country for in-person mentoring. In the ideation phase, prizes were given to the best ideas for novel public sector gigabit applications, including health IT, cyberlearning, advanced manufacturing, public safety and clean energy, that are not possible on today's Internet because of lack of speed, resolution or functionality. On June 25, 2013, 22 final round winners of the Mozilla Ignite Challenge were announced at the US Ignite Summit in Chicago.[92] All the winners and their pitches can be seen on the Mozilla Ignite site: https://mozillaignite.org.

[87] https://blog.mozillaignite.org/2012/11/mozilla-funds-teams-and-looks-for-shipped-code-by-jan-16/
[88] https://mozillaignite.org/judges/
[89] http://www.US-Ignite.org
[90] http://www.geni.net
[91] http://developer.mozilla.org
[92] http://www.whitehouse.gov/blog/2013/06/25/mozilla-ignite-challenge-winner-announced

APPENDIX 2: AGENCY PROGRAMS CONDUCTED UNDER OTHER AUTHORITIES

This Appendix provides a summary of select prizes and challenges conducted in FY 2013 under agency prize authorities other than that provided by COMPETES. Agency reporting on prizes conducted under non-COMPETES prize authorities was optional, so the list of challenges included here may be incomplete.

LIST OF PRIZES

10. Department of Defense

- 10.1. **Air Force Research Laboratory**
  - 10.1.1. GPS Jammer Locator Challenge
  - 10.1.2. HAD Skid Plate Challenge
  - 10.1.3. Direct Digital Manufacturing for Composite Materials Challenge
- 10.2. **ARL**
  - 10.2.1. Federal Virtual Worlds Challenge
  - 10.2.2. Ideation Challenge Pilot Project
    - 10.2.2.1. Concentration Desalination Challenge
    - 10.2.2.2. Fuel Cell Safety Challenge
    - 10.2.2.3. Hiker Energy Harvesting Challenge
    - 10.2.2.4. Novel Highly Energetic Materials Challenge
    - 10.2.2.5. Water Scavenging Challenge
- 10.3. **DTRA**
  - 10.3.1. Automated Latent Fingerprint Matching Challenge
  - 10.3.2. Branding Strategy for an International CBRNE Information Web Service Challenge
  - 10.3.3. Data Fusion Analysis from Moving Vehicles Challenge
  - 10.3.4. DTRA Algorithm Development Prize
  - 10.3.5. Mobile and Novel Chemical Warfare Agent Destruction and/or Neutralization Challenge
- 10.4. **Defense Advanced Research Projects Agency**
  - 10.4.1. FANG Mobility/ Drivetrain Challenge
  - 10.4.2. Spectrum Challenge

11. Department of Health and Human Services

- 11.1. Medicaid Provider Screening Challenge [CMS]

12. Department of the Interior

- 12.1. App-lifying USGS Earth Science Data Challenge [USGS]

13. Department of Justice [National Institute of Justice]

- 13.1. Body Armor Challenge
- 13.2. Developing Strategies to Measure the Implementation Costs and Public Safety Benefits of the Sex Offender Registration and Notification Act (SORNA)

13.3. Delivering Mission Critical Voice Communications for Law Enforcement and Public Safety Responders in the COTS LTE Environment
13.4. Ultra-High Speed Apps: Using Current Technology to Improve Criminal Justice Operations

14. Environmental Protection Agency

14.1. Campus RainWorks Challenge
14.2. Cyano Predictive Modeling & Mobile App Challenge
14.3. Real-Time Sewer Overflow Sensor Challenge

15. National Aeronautics and Space Administration

15.1. Collective Minds & Machines Exploration Challenge
15.2. Disruption Tolerant Networking (DTN) Challenge Series
15.3. Exploration Design Challenge
15.4. International Space Apps Challenge
15.5. International Space Station (ISS) Longeron Challenge
15.6. ISS FIT (Food Intake Tracker) iPad App Challenge
15.7. Lunabotics Mining Competition
15.8. NASA Aeronautics Engineering Design Competition
15.9. NASA Climate Modeling – Search for New Sources of Observational Data
15.10. NASA Great Moonbuggy Race
15.11. NASA Student Launch Projects
15.12. New Space Business Plan Competition
15.13. Night Rover Challenge
15.14. Non-Invasive Measurement of Intra-Cranial Pressure Challenge
15.15. Rice Business Plan Competition
15.16. Robonaut Challenge
15.17. Sample Return Robot Challenge
15.18. Unmanned Aircraft Systems Airspace Operations Challenge

16. USAID

16.1. Tech Challenge for Atrocity Prevention

SUMMARY REPORTS OF PRIZES

10. DEPARTMENT OF DEFENSE

10.1. Air Force Research Laboratory

By partnering with Wright Brothers Institute – a nonprofit institute that assists the Air Force Research Laboratory (AFRL) in problem definition and innovative practices – and by opening up challenging near-term problems facing the warfighter to the world on InnoCentive's online

platform, AFRL is able to identify promising ideas and technologies at low cost and only pay for successful outcomes. In FY 2013, AFRL and Wright Brothers Institute ran three challenges:

10.1.1. **GPS Jammer Locator Challenge**

The GPS Jammer Locator Challenge[93] ran from October 25, 2012 through January 3, 2013, attracting 442 participants. One award of $20,000 was made. This theoretical challenge was to create a system that could detect the location of GPS jamming devices (a hardware- or software-based design that can be implemented on smartphones). Of the 32 concepts that were submitted, the challenge manager designated three solutions with merit. Of these three, a solution based on crowdsourcing was deemed as worth pursuing. The first part of this solution was to use stationary systems (i.e., cell towers and ATMs equipped with GPS systems) to be the notification platform for signals being jammed. This platform of stationary systems would alert a low-level response in cell phones inserted by a free application or updated to smart phones operating system, so existing applications (e.g. maps and trackers) automatically report outages to a central location. These reports would be aggregated to show the jammed area visually. From this, the submitter showed how the source of the outage could be pinpointed. AFRL is planning to develop this system further to assess its effectiveness.

10.1.2. **HAD Skid Plate Challenge**

The largest safety concern during Humanitarian Air Drop (HAD) missions centers on the support board that is used to restrain the boxes during transport. It is large and heavy, and the boxes can fall too fast and may injure people on the ground. AFRL sought an economical way to replace this support board, so that when it exits the aircraft, the opportunity for harm to anyone located in the drop area is reduced. The HAD Skid Plate Challenge[94] ran from February 19, 2013 to April 9, 2013, attracting 1031 participants. Three awards were made from a total prize purse of $8,000. The evaluation team found several interesting solutions through the challenge and performed testing of some concepts, but this project was put on hold until the team can find stronger and lighter materials.

10.1.3. **Direct Digital Manufacturing for Composite Materials Challenge**

The Direct Digital Manufacturing for Composite Materials Challenge[95] ran from March 22, 2013 through April 19, 2013, attracting 139 participants. Three awards were made from a total prize purse of $8,000. AFRL was looking for concepts for applying additive manufacturing to the fabrication of fiber-reinforced high temperature polymer matrix composites (PMC). While additive manufacturing has traditionally been applied to complex shaped structures of polymers and metals, AFRL researchers were interested in concepts for the fabrication of cross-linked PMCs with minimal tooling and post processing. Minimal tooling is described as the

[93] https://www.innocentive.com/ar/challenge/9932738
[94] https://www.innocentive.com/ar/challenge/9932740
[95] https://www.innocentive.com/ar/challenge/9933053

tooling that is sufficiently common and inexpensive to require no more than four hours to fabricate or adds no more than 20% to the cost of the final fabricated item. The evaluation team found three solutions with merit. The top solution considered manufacturing the item from the granules of prebuilt reinforced plastic, being held together by the polymerization of the same monomer creating “bricks.” This approach included a slightly modified use of 3D printers with a sprayable "mortar" binder to link up the fuzzy powder "bricks.” In this case for the direct manufacturing process, the polymerization reaction works like the “glue” of some kind, stacking together the polymer granules. The evaluators assessed the proposers’ idea of creating "Fuzzy 3D printable Polyimide Powder" as “excellent!” and AFRL researchers plan to research and develop it further.

10.2. ARL

10.2.1. Federal Virtual Worlds Challenge

ARL first introduced the now-annual Federal Virtual Worlds Challenge (FVWC)[96] in the summer of 2009 to explore a multitude of potential capabilities and developments within virtual environments. In FY 2013, the FVWC pursued two challenge focus areas: critical thinking/adaptability and navigation interface into a virtual environment. Challenge entries are prototypes built within virtual environments. Winners in each category received $10,000 for first place, $5,000 for second and $3,000 for third place. Finalists were invited to demonstrate their submission at the Defense GameTech Users’ Conference, and winners had the opportunity to describe their solutions to government users and policy makers.

The First Place Winner in the Critical Thinking / Adaptability Focus Area was from the Virtual World Activities entry. "Compound" is a virtual team building game for the Second Life virtual world that was developed for the Air University Squadron Officer College and in which students learn how to lead a team, to delegate, communicate tasks and work together to analyze and adapt to the situation, while making decisions to accomplish a mission. The First Place Winner in the Navigation Interfaces into a Virtual Environment Focus Area was the “VIPE Holodeck” which explores the use of a low cost, off the shelf motion capture system (Microsoft Kinect) linked to a free development kit, resulting in a way for a user to move through a virtual environment that feels natural and easy to adapt to and learn from.

10.2.2. Ideation Challenge Pilot Project

A new program for ARL in FY 2013 focused on prize awards to identify technologies and innovative solutions to challenging near-term problems facing the warfighter. Conducted in partnership with AFRL and the Wright Brothers Institute, the program used ideation challenges to seek solutions to five identified challenges.

[96] http://www.fvwc.army.mil/

ARL selected challenges that were amenable to an unclassified and publicly releasable challenge description, where the technology or solution did not exist currently in the laboratory, and where the planned award was more affordable and rapid than other potential solution approaches including: re-directing in-house research activities; adapting the work of other service laboratories; or other cooperative work arrangements. Since the timeline (less than 2 months) and cost ($10,000 per challenge) for solutions obtained by the open innovation approach is so small, and since the approach carries so little cost risk, other approaches were seldom deemed to be more effective for suitable problems.

ARL reports that this pilot program has proven to be "a real thinking force multiplier… [ARL] was able to multiply the people thinking about this problem over 100 fold, and received workable solutions within a very short amount of time. The quality of the various solutions has been outstanding and this approach has energized the workforce teams that participated to quickly test and deliver solutions to our warfighters… This approach has proven to be cost effective and rapid, and has enabled systems to be developed for test and evaluation in time to meet…urgent needs as well as adding new insight to existing research efforts."[97]

10.2.3. **Concentration Desalination Challenge**

This challenge[98] ran from 11/9/2012 through 1/4/2013 and attracted 170 solvers. Eleven proposals were received and three awards were made from a $10,000 prize purse. ARL sought novel micro-channel devices that could separate water into ion free and concentrated streams as a result of interaction with repulsion zone created through electrical potential and separation by an ion-selective nano-channel. The first place winner was Peter Nordin from Sweden (a PhD in Computer Science and Genetic Programming). Peter's idea was for the use of microfluidic silicon wafer chips with perm selective nanojunctions for desalination. The second place winner was Aniruddh Sarkar, an Indian citizen who hold a Masters degree and is a graduate student in electrical engineering and computer science at MIT. Aniruddh proposed direct seawater desalination by ion concentration polarization and proposed a novel ion-selective junction using fabricate vertical micro-pores with a conducting mesh material coated with the ion-selective material. The third place winner was Tony Cupolo, an electronics designer from Georgia who proposed a unique approach based on applying a known technology, electrolyte concentration polarization. The ideas are being reviewed by the ARO Water Panel.

10.2.4. **Fuel Cell Safety Challenge**

This challenge[99] ran from 11/9/2012 through 1/3/2013 and attracted 156 solvers. Sixteen proposals were received and three awards were made from a $10,000 prize purse. New racecar and helicopter fuel containment technology has reduced injury and death significantly over the past two decades. However, improvements need to be made to further reduce risk to drivers,

[97] U.S. Army Report on Prizes for Advanced Technology Achievements, FY 2013, Army Research Office
[98] https://www.innocentive.com/ar/challenge/9933050
[99] https://www.innocentive.com/ar/challenge/9933051

pilots, passengers, and spectators alike. ARL asked solvers to identify novel ideas regarding lightweight, crashworthy and penetration tolerant fuel containment systems that more efficiently utilizes space and do not degrade engineered performance capabilities. ARL was particularly focused on rotocraft applicable technologies, which could in part come from those working on fuel cell safety in the racecar safety arena. The first place winner was engineer Bryan Jackson from Florida who proposed a floor-based bladder system encased in metal composite self-sealing polymers with proposed integrated fire suppression system. The second place winner was engineer Agung Nuswantoro from Indonesia who proposed a pulp-like or fuel cell design that was air-free based on nanosponge aerogel materials, similar to F-1 racing fuel cells. Some of the information in Mr. Nuswantoro's inventive solution was known to ARO but not all of it or the ways of adapting it to rotocraft. The third place winner was Timur Mammayev, a chemist from Russia, who proposed a super absorbent based on sodium polyacrylate – similar to disposable diapers.

10.2.5. **Hiker Energy Harvesting Challenge**

This challenge[100] ran from 11/9/2012 through 1/2/2103 and attracted 503 solvers. Seventy-five proposals were received and four awards were made from a $10,000 prize purse. ARL asked for submissions of ideas for novel non-solar and non-wind energy harvesting devices that provide supplemental power for hikers and others located in austere environments. The winner was Edward Melcarek from Ontario, Canada (PhD Electronics; Analog / Digital Circuitry). Edward proposed a novel method of harvesting energy generated by a walking hiker. The system uses magnets and coils to capture the energy generated by walking action to generate between 1 and 10W continuous power. The idea will be used as the foundation of a future SBIR funding solicitation. The second place winner was Pushpakaran Thiyadi from India, who proposed a novel method using piezoelectric materials to be placed in hiker's shoes, gloves, hiker coats, with elements fitted on knees, elbows, shoulders blades, back, backpack where repeated flexural stress/strain take place. The idea may be combined with the third place idea as the foundation of an SBIR funding solicitation. The third place winner was Wade Olsen from Florida who proposed the use of piezoelectric-active polymers and dielectric elastomers. In this system, flexing and stretching actions during hiking would be used to generate electrical energy. The fourth place award went to Pralhad Bhide who proposed a novel method using thermoelectric modules to scavenge and store energy from the hiker's body temperature. This system could be integrated into clothing with no moving parts and at negligible metabolic cost to the wearer. Additional investigation of the idea has been initiated.

10.2.6. **Novel Highly Energetic Materials Challenge**

This challenge[101] ran from 11/09/2012 through 1/03/2013 and attracted 141 solvers. Nine proposals were received and two awards were made from a $10,000 prize purse. ARL asked solvers for ideas for novel high-energy materials. Most high-energy materials innovations of the

[100] https://www.innocentive.com/ar/challenge/9933048
[101] https://www.innocentive.com/ar/challenge/9933049

last fifty years have been incremental improvements on the chemistry of the preceding 50 to 100 years, so ARL sought novel thinking that would help change the direction of research in a significant way. The first place winner was Dave Vivek, a materials engineer from New Hampshire who partnered with Dennis Wilson from Texas on a very detailed and novel proposal that combines energetic materials in various configurations in order to obtain 4-5 times the performance yield currently available. This proposal relies on pre-compressing materials in a detonation wave and has a real chance of being successful. Experimental work being considered at Picatinny Arsenal. The second place winner was David, a Texas-based PhD research scientist in the semiconductor industry, who proposed an idea is to make EM compounds using carbon atoms that have been replaced by aluminum atoms. From a basic chemistry point of view, the compounds should exist, but whether or not they would be stable needs to be established. Staff at the Picatinny Arsenal has moved forward to conducting lab experiments to test the idea**.**

10.2.7. **Water Scavenging Challenge**

This challenge[102] ran from 11/9/2012 through 1/2/2013 and attracted 250 solvers. Seventeen proposals were received and three awards were made from a $10,000 prize purse. ARL asked solvers for ideas for technology capable of scavenging water and producing potable water in areas with limited surface water sources. ARL sought technology to purify water from impaired surface sources, to include high salinity sources, or technology to produce and purify water from sources other than surface water – a device that expands the capability to provide potable water in remote areas or during humanitarian assistance activities. Of greatest interest were devices that do not require a surface water source and are suitable for use in any region or environment. ARL was interested in a system that can demonstrate the potential for supplying potable water to approximately fifteen to fifty individuals in volumes relevant to humanitarian activities using only a small battery or integrated power supply capable of operating on liquid fuels or alternative energy sources.

The first place winner M. James Allen from Indiana who proposed a novel method to scavenge water from the atmosphere including the use of a combined slit fin bundle heat exchanger and the cooling properties of a Ranque-Hilsch vortex tube. The idea will be used as the foundation of a future SBIR funding solicitation topic. The second place winner was Dmitriy Tipikin, a research associate in a Department of Radiology at a medical school in New Hampshire, who proposed a solar cooker used as a distillation unit powered by a hybrid energy system and electrical energy from a solar panel. The thorough description of the proposed solar cooker was very valuable. The solution is receiving more detailed evaluation and could be combined with the third place idea for a future SBIR funding solicitation. The third place winner was Pushpakaran Thiyadi from India who proposed extracting capillary water from soil, which would disrupt large tracts of land and require several days to achieve restoration of water content to the capillaries, as identified in the proposal. This is a highly innovative and straightforward

[102] https://www.innocentive.com/ar/challenge/9933052

approach, but has several significant limitations. The annual ARO Water Panel will evaluate these solutions.

10.3. DTRA

DTRA has been exploring open innovation and incentive prizes as an alternative way to access new and innovative ideas for technology development, outside of other approaches such as Broad Agency Announcements (BAAs) and Requests for Information (RFIs) and to reach a potentially new community of problem-solvers who would otherwise not respond to (or work with) Government agencies and their requests. The open innovation model of soliciting for ideas and solutions was chosen as the method to pursue. DTRA intends to continue exploring its use, evaluating how it has worked internally as well as with other organizations. In FY 2013, DTRA ran five competitions on the online open innovation platform InnoCentive. Four of these challenges were posted anonymously to reach potential solves who might not otherwise respond to Department of Defense or government requests.

DTRA reports that open innovation approaches have "the potential to help DTRA stay on the leading edge of technology development, and be cognizant of the current and emerging state-of-the-art" and that ideation competitions can reach "a larger community of people with a more diverse educational and experiential background, an advantage in that different perspectives on a problem are looking at the problem and inherent biases are mitigated."[103]

10.3.1. **Automated Latent Fingerprint Matching Challenge**

The goal of this challenge[104] was to find new and innovative methods or approaches to perform fully automated one-to-many matching of latent fingerprints against a gallery of known and unknown prints. This challenge ran from August 28, 2012 through March 24, 2012. Two awards of $10,000 each were made after evaluation of 16 submissions. Results from this challenge went directly to the DOD Biometrics and Forensics group in ASD(R&E)/RRTO and will be used in the development of the R&D plan for automated fingerprint matching.

10.3.2. **Branding Strategy for an International CBRNE Information Web Service**

This challenge[105] solicited public and non-governmental input for supporting the development of public accessible portions of the Global Knowledge Management Capability (GKMC). GKMC is intended to support public, non-governmental organizations and the international community by providing timely, accurate, and useful information promoting public safety, subject matter knowledge, engagement, and support for cooperative threat reduction activities. This challenge ran from August 4, 2013 through September 4, 2013. The challenge generated 220 reviews and

[103] From the FY 2013 "Defense Threat Reduction Agency report on the use of Title 10, U.S.C, Section 2374a prize authority"
[104] https://www.innocentive.com/ar/challenge/9932941
[105] https://www.innocentive.com/ar/challenge/9933084

38 actual responses, resulting in a single $15,000 prize award. The designs and web-concepts obtained are being used at DTRA by GKMC management to develop a brand concept for public-facing portions of the system.

10.3.3. **Data Fusion Analysis from Moving Vehicles Challenge**

DTRA used this challenge[106] to solicit concepts for algorithms that would enable high-confidence detection, localization, and identification of anomalies within background radiation measurements. This challenge ran from July 26, 2013 through August 26, 2013. Of 15 responses received, three awards were made (one for $5,000, one for $3,000, and one for $2,000). Results from the challenge have been shared with the Department of Homeland Security (Domestic Nuclear Detection Office) and DOE (National Nuclear Security Administration) and could be shared with active performers. Some portions of the responses may potentially be incorporated into future basic and applied research BAA topics.

10.3.4. **DTRA Algorithm Development Prize**

By enlisting next generation sequencing methods, this $1,000,000 challenge[107] was to develop algorithms capable of both quickly and accurately characterizing complex clinical samples by using only raw DNA sequence data and analyzing samples of mixed genetic sequence (thereby catalog the identities of all the organisms present in each sample) – a very difficult algorithmic challenge. The solution would not only identify genes and species from raw DNA, but also would be capable of detecting potential bioterror threats. The project looked to develop a tool that quickly and accurately unravels complex human diagnostic data in order to establish human health status and better determine effective treatment options.

DTRA worked with MIT Lincoln Laboratory on the development of program metrics and datasets. Lincoln Labs also provided final performance evaluation of the submitted algorithms. Edgewood Chemical Biological Center helped prepare the test plan, problem description, samples, and data analysis and implemented the submitted algorithms on their high-throughput computing environment. Pacific Northwest National Laboratory provided “Red Team” exercises to test the metrics and posted data in the challenge, acting as a potential solver before the competition was opened to the public. Los Alamos National Laboratory sequenced the samples prepared using Ilumina, Roche 454, Ion Torrent, and Pacific Bio sequencing platforms.

This challenge ran from January 3, 2013 through August 12, 2013. Over 2,700 potential respondents reviewed the challenge, 24 solutions were able to pass the threshold for 90% accuracy, and one team was awarded the $1,000,000 prize. The MetaScope metagenomic algorithm submitted by Team Huson was selected as the winning algorithm because it best met all challenge requirements, representing a dramatic performance improvement over existing

[106] https://www.innocentive.com/ar/challenge/9933394
[107] https://www.innocentive.com/ar/challenge/9933138

tools. “Team Huson’s solution to the challenge will lead to an enhancement of DTRA’s capability to diagnose and treat biothreats to the U.S. Armed Forces by giving DOD the ability to process and analyze biological sequence data rapidly in a realistic, moderate-to-low resource setting,” said Dr. Christian Whitchurch, Devices Branch Manager for DTRA’s Diagnostics, Detection and Disease Surveillance Division. The winning algorithm will be further assessed in FY 2014. In addition to distributing the pre-release version of the algorithm to DOD/DOE/DHS-supported laboratories, a Technology Transition Agreement is being coordinated with the Joint Project Manager Medical Countermeasure Systems office.

10.3.5. Mobile and Novel Chemical Warfare Agent Destruction and/or Neutralization Challenge

The Mobile and Novel Chemical Warfare Agent Destruction and/or Neutralization effort was an ideation challenge[108] to find new or novel ways to destroy or neutralize chemical agents. Twenty-nine initial ideas were submitted and ten were selected for awards from a $160,000 prize purse. Although DTRA determined that none of the submissions were mature enough for near-term operational needs, DTRA is evaluating ideas for potential additional analysis by DOD weapons of mass destruction elimination capability developers.

10.4. Defense Advanced Research Projects Agency

10.4.1. FANG Mobility/ Drivetrain Challenge

Initiated in 2010, the Adaptive Vehicle Make (AVM) portfolio of programs has conducted significant research in the area of design and verification flow for the “make” process of complex systems and the development of an integrated software tool suite that implements this new process. Early in 2013, AVM sponsored the FANG-1 Challenge[109] in an effort to run a focused test of the first release of these tools.

A total prize purse of $1,000,000 was offered to the team whose design submission best achieved established requirements for performance, lead time, and cost using the META design tools and the VehicleFORGE collaboration environment. The Ground Systems team – James Nees, Eric Nees, and Brian Eckerly – was awarded the $1,000,000 prize based on its final design submission, which received the highest score when measured against the established requirements for system performance and manufacturability.

The Defense Advanced Research Projects Agency (DARPA) reports that “prize authority made it possible to work with more than 1,000 individuals comprising more than 200 teams, many of whom had never worked directly with DOD. The target audience for participation included small automotive and technology enthusiasts, businesses, mechanics, academics, designers, manufacturers, vehicle designers within established industrial concerns, and hobbyists.

[108] https://www.innocentive.com/ar/challenge/9932942
[109] http://www.darpa.mil/NewsEvents/Releases/2013/04/22.aspx

Accessing this population efficiently and effectively enough to exercise the AVM tools on a mobility and drivetrain design for an amphibious vehicle in less than three months would not have been possible with standard authorities such as contracts, grants, or cooperative agreements."[110]

The DARPA FANG-1 Challenge was a successful demonstration of the AVM toolset, models, and collaboration platform for the compositional design and testing of an amphibious vehicle mobility and drivetrain system. DARPA reports that the challenge "attracted attention far beyond the participant pool and expanded the conversation around comprehensive systems design and manufacturing simulation." DARPA is pursuing a dual track of validating the predicted performance for the winning system, while continuing development of the AVM tools.

DARPA is building a full-scale test article to verify the software predictions made by the AVM tools based on the winning design from the FANG-1 Challenge. These real-world test and evaluation results will provide firm data points for assessing the accuracy of the software simulation tools.

The utilization of the AVM software tools during the FANG-1 Challenge also informed the continued development of the AVM tool chain and models. Metrics on model use and re-use, predictive capabilities of the META tools, utilization of the Vehicle FORGE platform, and experience in the utility of an open design challenge as a method for developing complex systems design are all feeding into the next set of research and development activities to improve and expand the AVM tool chain capabilities.

10.4.2. **Spectrum Challenge**

As the use of wireless technology proliferates, radios often compete with, interfere with, and disrupt the operations of other radios. DARPA seeks innovative approaches that ensure robust communications in such congested and contested environments in support of military operations. The goal of the DARPA Spectrum Challenge[111] is to develop and demonstrate electronic warfare strategies for guaranteeing successful wireless communication in the presence of coalitions of cognitive radios, which may have conflicting co-existence objectives. Cognitive radios identify, in real time, the most efficient frequencies to use in order to optimize use of available wireless spectrum. The techniques employed by the participants are expected to be representative of next-generation adaptive radio protocols that will be seen in future military and commercial communications systems.

Prize authority made it possible for DARPA to work with academic institutions, small businesses, and individuals, most of whom had never worked with DOD. The competition would not have been possible using standard authorities such as contracts, grants, or

[110] DARPA FANG Mobility/Drivetrain Challenge Fiscal Year 2013 Report, February 3, 2014
[111] http://www.darpa.mil/spectrumchallenge/

cooperative agreements. Incentive to participate in the Challenge, which required significant time and effort to implement operating strategies and test and tune the algorithms, was provided by $150,000 in prize funds.

The DARPA Spectrum Challenge called on participants to demonstrate radio protocols that can best utilize a given communication channel in the presence of other users and interfering signals. The need to provide robust communications in the presence of interfering signals is of great importance to military applications. The Spectrum Challenge is targeted at finding successful strategies for guaranteeing successful communication in the presence of other radios, each programmable and running its own spectrum etiquette protocols and that may have conflicting co-existence objectives.

The DARPA Spectrum Challenge was announced on December 13, 2012, in a web feature, posted on the DARPA homepage, and reported in national media and social media outlets. The registration period was open from January 9, 2013, to January 31, 2013, and 94 teams registered for the Challenge. The first qualification event required teams to complete a series of three technical hurdles that were designed such that each step required more effort and proficiency. Sixty-six teams completed the first hurdle, 59 completed the second, and 45 completed the third. The top 15 teams were selected to participate in the Preliminary Challenge Event, and the remaining teams competed for three additional spots.

The Preliminary Challenge Event took place at the Rutgers University Wireless Innovation Network Laboratory in North Brunswick, New Jersey, with live results viewed by the teams at the DARPA Conference Center in Arlington, Virginia. Teams compete head-to-head in a structured test environment, using identical radio hardware, to determine the most capable algorithms, as measured by how quickly a block of data can be transmitted from one radio to another. Awards were made to the best performing systems in two tournament scenarios:

- Competitive Scenario – Two teams attempt to simultaneously transmit a data file from one of their radios to the other. This tests their ability to design a radio that can best overcome interference.
- Cooperative Scenario – Three teams are grouped together with the objective that each team transmit a data file across their radio pair while causing minimal disruption to the other two teams. This tests their ability to design a radio that can operate in the presence of other radios while causing minimum disruption.

The Preliminary Challenge Event was held on September 11 and 12, 2013 with prizes of $25,000 awarded to the winners of the Competitive and Cooperative tournaments. The Competitive tournament was won by a team from Vanderbilt University, and the Cooperative tournament was won by a team from Northeastern University. The Final Challenge Event will be held March 19 and 20, 2014, with $100,000 awarded in prize money.

The DARPA Spectrum Challenge is proving to be a successful demonstration of novel radio protocols under various interference scenarios. DARPA has been discussing the initial results with several organizations within the law enforcement, military, and intelligence communities.

11. DEPARTMENT OF HEALTH AND HUMAN SERVICES

11.1. Medicaid Provider Screening Challenge [CMS]

CMS launched the Medicaid Provider Screening Challenge,[112] a series of software development challenges to the public with a total prize purse of $500,000, in order to develop a multi-state, multi-program provider screening application capable of risk scoring, credential validation, identity authentication, and sanction checks, while lowering burden on providers and reducing administrative and infrastructure expenses for States and federal programs. The goal of challenge series was to improve capabilities for streamlining operations and screening providers to reduce fraud and abuse. CMS partnered with the NASA COECI, NASA's contractor the Harvard Business School, Harvard's subcontractor TopCoder, and the State of Minnesota to execute a series of challenge competitions to develop components of software applications that could be compiled into an open source, shared service solution that would deliver a reliable, scalable, and economic provider screening capability for multiple states (or even the nation). The state of Minnesota is working on full deployment of the software, and CMS is initiating a campaign to encourage other states to leverage the software.

COECI estimates that the cost of building the portal through crowdsourcing was one-sixth of what the effort would have cost using traditional software development methods. Through the success of this and subsequent challenges, CMS is attempting to establish a new paradigm for constructing state and Federal information technology systems in a low-cost and agile manner by opening challenges to new players, small companies, and talented individual developers to crowdsource new technology solutions which can "plug and play" with existing legacy systems or can operate in a shared, cloud-based environment.

12. DEPARTMENT OF THE INTERIOR

12.1. App-lifying USGS Earth Science Data Challenge [USGS]

The United States Geological Survey (USGS) sought help from the Nation's application developers and data visualization specialists to develop new data visualizations and applications for a range of earth science datasets. The App-lifying USGS Earth Science Data Challenge[113] was open for submissions from January 9, 2013, to April 1, 2013. Submissions were judged on their relevance to today's scientific challenges, innovative use of the datasets, and overall ease of use

[112] http://www.topcoder.com/cms/medicaid-enrollment-portal/
[113] http://applifyingusgsdata.challengepost.com/

of the application. The challenge helped advance the mission of the agency by informing more people about their science and encouraging use of USGS science and data. Entries spanned a cross-section of topics including taxonomic classification, conservation status of species, the range and distribution of animals, and one innovative app integrating social media with species occurrence records. The winner for Best Overall App was "TaxaViewer,"a web interface, submitted by rOpenSci from California, which allows the user to view species-specific taxonomic data, invasive status, phylogenetic relationships, and species occurrence records. The Popular Choice App award went to the "Species Comparison Tool" by Kimberly Sparks of Raleigh, N.C., which allows users to explore the distribution and/or range of two species concurrently and make visual comparisons of the maps. Winners[114] were honored at the 2013 USGS National Map Users Conference. Overall the challenge was well received by the public and the challenge website had almost 7,000 visits. One effect of the challenge was an increased awareness of Core Science Analytics and Synthesis (CSAS) and its activities and products – daily visits to the CSAS website were up 50% during January to March 2013 compared to the same time period in 2012.

13. **DEPARTMENT OF JUSTICE**

13.1. **Body Armor Challenge [NIJ]**

The Department of Justice's (DOJ) National Institute of Justice (NIJ) offered its first-ever challenge, the Body Armor Challenge,[115] to seek viable solutions to determine whether individual in-service body armor has maintained an acceptable level of ballistic performance to a high degree of certainty at any point during its service life and in a manner that does not render it unfit for continued use. The goal of this challenge was to empower end users who depend on this critical safety equipment to make informed decisions based on solid scientific evidence regarding the ballistic performance of the soft body armor they use. The submissions received from challenge entrants represented very different approaches to the problem statement, each of which contained some positive value as judged by the peer review panel. A number of ideas came from individuals that would probably not otherwise have had the opportunity to share their ideas on this topic with NIJ.

Four semi-finalist teams split a $25,000 initial prize purse based on the initial prospectus they submitted in the first phase of the competition. Based on their full proposal submitted in the second phase of the competition, the winning team was from Purdue University's school of Aeronautics and Astronautics Engineering. The Purdue team received a $25,000 prize for proposing a concept for testing the viability of in-service body armor called the Vibration Energy Signature Test (VEST). While very promising, this methodology will require further development to determine its ultimate viability. Honorable mentions include teams from the Department of Apparel, Events, and Hospitality Management at Iowa State University;

[114] http://www.usgs.gov/core_science_systems/csas/challenge.html
[115] http://www.nij.gov/funding/Pages/fy12-body-armor-challenge.aspx

Southeast Efficiency Improvement Associates in South Carolina and the Center of Integrated Nanotechnologies and the Earth and Environmental Sciences Division at Los Alamos National Laboratory, New Mexico. The challenge ran from September 14, 2012 through August 16, 2013.

13.2. Developing Strategies to Measure the Implementation Costs and Public Safety Benefits of the Sex Offender Registration and Notification Act (SORNA)

The Sex Offender Registration and Notification Act (SORNA) aims to improve the effectiveness of sex offender registration and notification programs in the United States. NIJ launched the SORNA Challenge[116] in July 2013 to ask individuals, researchers, and practitioners to think creatively about SORNA and its impact and to develop creative and innovative research strategies for future researchers to use when studying SORNA. This Challenge presented a unique opportunity for NIJ and the Office of Sex Offender Sentencing, Monitoring, Apprehending, Registering, and Tracking (SMART) to collaborate on an important issue. This Challenge was important because although empirical research on sex offenders has grown over the past decade, no study to date has examined the multifaceted effects of SORNA, specifically the wide range of costs that have been or may be incurred in implementing SORNA, or the public safety benefits achieved with SORNA compliance. While many ideas were submitted to the SORNA Challenge, no submission met the Challenge requirements, so an award was not made. NIJ and the SMART Office will continue to collaborate on this important issue.

13.3. Delivering Mission Critical Voice Communications for Law Enforcement and Public Safety Responders in the COTS LTE Environment

Increased access to mobile broadband services is vital to law enforcement and other public safety responders. Broadband communications offers the potential for greater efficiencies and new capabilities in day-to-day operations, response to critical incidents, and management of major events. Recognizing the potential offered by broadband communications to enhance public safety, Congress directed the establishment of a nationwide, interoperable public safety broadband network in the Middle Class Tax Relief and Job Creation Act of 2012. The FCC required that all networks deployed in the 700 MHz public safety broadband spectrum adopt LTE. Through this challenge[117] launched in September 2013, NIJ seeks innovative solutions to providing mission-critical voice communications services for law enforcement and other public safety responders. Solutions need to function within the LTE Environment, use commercial-off-the-shelf (COTS) technology, and be able to be brought to market within five years of the Challenge prize being awarded. A$50,000 prize purse is available – of that total prize amount, $25,000 will be apportioned equally among the Phase 1 entrants invited to submit a Phase 2 proposal. The remaining $25,000 will be awarded to the contestant deemed to be the winner of Phase 2. This challenge is ongoing and Phase I is not completed at the time of this report.

[116] http://nij.gov/funding/Pages/fy13-sorna-challenge.aspx
[117] http://nij.gov/funding/Pages/fy13-comms-challenge.aspx

13.4. Ultra-High Speed Apps: Using Current Technology to Improve Criminal Justice Operations

New Ultra-High Speed (UHS) apps have the potential to provide ubiquitous, real-time, individually tailored information and decision-support for criminal justice and public safety practitioners in rapidly evolving emergency situations, and to merge and manipulate data for the development of powerful analytical and management tools. The expansion of UHS networks offers increased opportunity for the development of "disruptive" criminal justice apps – apps that actually change the way services and information are delivered to criminal justice and other public safety practitioners. Through this $150,000 prize competition,[118] NIJ seeks to encourage the development, use, and evaluation of UHS apps capable of improving criminal justice and public safety efficiency and/or effectiveness. NIJ is also interested in developing models for measuring and quantifying the specific impact of these apps. This is a two phase competition, requiring proposals in the first phase and prototype apps in the second phase. It is anticipated that this Challenge will help to accelerate the development and deployment of UHS applications in many other fields. The initial phase of the Challenge has not closed as of the time of this report.

14. ENVIRONMENTAL PROTECTION AGENCY

14.1. Campus RainWorks Challenge

EPA's Campus RainWorks Challenge[119] asks students to design an innovative green infrastructure project for their campus which shows how managing stormwater at its source can benefit the campus community and the environment. Green infrastructure uses vegetation, soils, and natural processes to manage stormwater and create healthier urban environments. Winning teams will earn a cash prize to be distributed evenly among student team members. Subject to the availability of funds and the nature and quality of the projects proposed, EPA hopes to invite selected colleges and universities in the Site Design category to compete for grant funding. Through this simplified grant competition, EPA hopes to award 2 to 4 schools $25,000 each to help carry out demonstration projects based on the student design submissions. Winners will be announced March 2014.

14.2. Cyano Predictive Modeling & Mobile App Challenge

Algae are natural components of marine and fresh water flora. Excessive growth of algae becomes a nuisance to users of water bodies for recreation activities and to drinking water providers. This challenge will develop a predictive model (algorithm) based on the best available science to forecast the location of cyanobacteria bloom events up to 30 days in

[118] http://nij.gov/funding/Pages/fy13-ultra-high-speed-apps-challenge.aspx
[119] http://water.epa.gov/infrastructure/greeninfrastructure/crw_challenge.cfm

advance of previously available satellite observation. The model will be based on the best and most appropriate scientific information available to predict the growth and movement of cyanobacteria blooms. The first component of the Cyano Predictive Modeling & Mobile App challenge[120] is the predictive cyanobacteria modeling capability (which will be an algorithm).The model will forecast the status of cyanobacteria bloom events corresponding to 7-, 14-, and 28-day intervals. The second component is the development of an Android application. The app will display water quality and color data and the modeling outputs for cyanobacteria predictions. As of the time of this report, there are ongoing competitions on the TopCoder platform to finish the algorithm and Android app integration. Final product delivery is scheduled for June 2014.

14.3. Real-Time Sewer Overflow Sensor

The Real-Time Sewer Overflow Sensor Challenge[121] is an ideation competition to identify designs for efficient, low-cost, and low-maintenance real-time sensors which can monitor sewer overflows and provide characterization of wet-weather impacts on urban sewers, in order to reduce sewer overflows in urban areas. The lack of cost-effective technologies to monitor such overflows often makes data collection efforts in these areas inefficient and ineffective. One award of $6,000 and two smaller awards of $2,000 were given to three winning solvers. The Krishna Priya solution combined water level and ultrasonic sensors with a cellphone radio to create a prototype device that monitors water level and flow and can send data back to utilities via text message. Partnering with utilities allowed EPA to accomplish two goals: the challenge identified solutions to a pressing environmental issue and connected the winners to real-world users who can put those ideas into practice by serving as test beds for the technology and potential buyers in the market.

15. NASA

15.1. Collective Minds & Machines Exploration Challenge

The Collective Minds & Machines Exploration Challenge[122] was designed to develop an active, machine-learning algorithm that matches human capability and to determine if it is possible to train algorithms to learn from collective human perception. Because human perception currently surpasses the capability of computer vision to identify unknown patterns in enormous data sets, Dr. Albert Lin, University of California San Diego (UCSD) scientist and National Geographic Society Emerging Explorer, recently utilized crowdsourcing to help with an ambitious satellite imagery labeling initiative. In partnership with UCSD, NASA supported this challenge in order to use the resulting algorithm(s) to support efforts to enhance its current techniques for assessing planetary imagery. The competition ran from September 2013 through

[120] http://www.topcoder.com/epa/challenge-details/
[121] https://www.innocentive.com/ar/challenge/9933103
[122] http://www.topcoder.com/collectiveminds/

late October 2013. Two awards were made for a total prize purse of $10,540. The challenge resulted in two winning algorithms that will significantly advance Dr. Lin's National Geographic Explorer search for Ghengis Khan's tomb. For NASA, the result of the challenge provides an approach that has the potential to enhance the Agency's ability to efficiently process huge volumes of planetary data, identify geographically significant sites on the Moon or on Mars, and more rapidly and accurately identify asteroids.

15.2. Disruption Tolerant Networking (DTN) Challenge Series

The DTN Challenge Series[123] was designed to develop data networking protocols that can extend our Internet into the Solar System. This DTN software code base is the core of what is used for space flight applications. Building on prototype implementations of the DTN protocol suite, these challenges will improve the security, performance, and application of network protocols that can withstand the time delays caused by the immense distances between planets and the disruptions and non-contiguous paths of the space communications links. The challenge series launched in August 2013. The first challenge concluded in November 2013, the second challenge concluded in December 2013, and the third challenge will run through May 2014. Additional challenges are possible. Over $35,000 in awards has been made to date, and the results of these challenges seem to be providing cost-effective, usable products that NASA can utilize. For example, the first challenge resulted in fully functional code that is currently undergoing final modifications and NASA is planning to incorporate the resulting product into the official DTN software code base.

15.3. Exploration Design Challenge

NASA is planning for longer human space exploration missions, and these missions will require new technologies, including ways to keep astronauts and hardware safe from the effects of deep-space radiation. Through a partnership between NASA and Lockheed Martin, the Exploration Design Challenge (EDC)[124] provides students in grades K-12 the opportunity to play a unique role in the future of human spaceflight, help solve this problem, and chart their journey to Mars. In Phase I of the EDC, students in grades K-12 think and act like scientists to study radiation, its effects, and current solutions for blocking it. Using standards-based activities, students analyze materials and make determinations as to which material(s) best block simulated radiation. In Phase II, students in grades 9-12 can take the challenge further to think and act as engineers to design shielding to protect sensors from space radiation. The winning shield design will be built by students and flown as a payload aboard the unmanned Exploration Flight Test-1 (EFT-1) of Orion scheduled for fall 2014. All students participating in the EDC will have their names flown on Orion as members of the virtual crew. Although still in progress, the Exploration Design Challenge has increased awareness of EFT-1 and Orion while engaging students in authentic, NASA-unique STEM activities.

[123] http://www.topcoder.com/dtn/
[124] http://www.nasa.gov/education/edc

15.4. International Space Apps Challenge

The International Space Apps Challenge[125] is a two-day hackathon where teams of technologists, scientists, designers, artists, educators, entrepreneurs, developers, and students collaborate across the globe, using publicly available data to design innovative solutions for global challenges in software development, citizen science, hardware, and data visualization. The challenge provides an opportunity to create solutions to real world challenges and allows the public to interact with NASA's datasets and engage in the mission of space exploration. At the April 2013 event, 57 challenges were posed to the global community, including needs for software applications, hardware projects, data visualization, and citizen science platforms.

More than 9,000 global citizens in 44 countries and 83 cities engaged directly with NASA datasets for the largest hackathon in history. In 83 hours, these participants collectively developed 770 solutions. In addition, over 2,200 people participated virtually from less formal locations – coffee shops, libraries, community centers, and their own homes. Participants formed teams that spanned the globe. The most popular challenges related to asteroids and the International Space Station. Participants designed CubeSats for Mars; integrated wind, solar, and geothermal energy data trackers; as well as developed visualizations for air traffic control, satellite tracking, and solar electric propulsion. Sol, the first interplanetary weather app using actual Mars science data took one of the top global awards.

No cash awards were offered through Space Apps. Local hosts organized awards and worked with local entities for incentives. Each local event was given the opportunity to nominate their top two solutions to advance to global judging, and each project was required to provide a two-minute video to be used in the global judging process. Over 130 globally-nominated projects were culled down to five finalists in each of the five following categories: Best Use of Data, Best Use of Hardware, Best Mission Concept, Galactic Impact, Most Inspiring, and People's Choice for the highest number of public votes on the Space Apps website. Global winners received guest invitations to attend the MAVEN launch in Florida in 2013.

15.5. International Space Station (ISS) Longeron Challenge

The goal of the ISS Longeron Challenge[126] was to develop a complex algorithm that would allow NASA to position the solar collectors on the ISS to generate as much power as possible from the sun's energy during the most difficult orbital positions. The long thin rods that hold the solar panels to the Station are called longerons. Any time an odd number of longerons are in full sunlight with others in shadow, they bend and will eventually break. Therefore, ISS Program engineers position the station in orbit to limit shadowing. Simply put, this positioning reduces the amount of overall power that can be collected, and more power means more science on orbit and enhanced ISS operations.

[125] http://spaceappschallenge.org
[126] http://www.topcoder.com/iss/longeron

NASA received a huge response to the challenge. The challenge ran from January 2013 through early February 2013. There were 4056 registered solvers, 459 competitors, 2185 submissions, and ten winners selected. NASA reviewed the top 20 solutions. While the detailed power analysis was not better than NASA's current implementation, the solutions give NASA ideas and options if certain issues arise in the future with the ISS solar array – approaches that would not have been available in the toolkit prior to running the challenge. After running the results through the NASA models, the technical team determined the challenge submissions are very close to the solutions that NASA uses today, proving that NASA is now running near-optimal solutions today. That learning in and of itself is a valuable outcome from the competition. The NASA challenge lead was impressed that it took a three-week challenge to result in the near optimal solutions that NASA has today.

As the challenge lead stated: "NASA is one of many organizations that follow a strict procedural approach to solutions. This is valuable, but has the potential to blind problem solvers to alternative solutions. I saw value in reaching out to solvers who could look at the problem from a completely new perspective as long as the challenge requirements were well developed. It was refreshing to see the different viewpoints and the enthusiasm of the solver community. I'd definitely run a challenge again." There are tentative plans for a follow-on challenge to develop a ground-based operations tool that utilizes the results from this challenge. This follow on work could happen in 2014 depending on funding availability and organizational readiness.

15.6. ISS FIT (Food Intake Tracker) iPad App Challenge

As part of this challenge, participants were tasked with formulating a leading-edge solution to an intractable, age old problem: How to keep track of what you're eating? Astronauts and Cosmonauts aboard the ISS all face huge technical challenges, are performing scientific experiments on a daily basis, and are working hard to stay fit. NASA works to understand how microgravity affects astronaut bodies and how to best keep them healthy. To keep astronauts healthy, it is important to understand what they have eaten, and how much they have eaten.

NASA's ISS Food Intake Tracker App Challenge[127] was a series of 17 software development competitions conducted by a NASA contractor with a total $36,288 prize purse. Through the competition series, participants were challenged develop an iPad application for use by on-orbit astronauts that allows them to easily track their daily dietary intake in a zero gravity environment and transmit the data to the ground-based scientific team for evaluation. The competition ran from February to September 2013 and attracted 177 unique registrants from 20 different countries for a total of 79 submissions.

The competition resulted in a unique and user-friendly iPad application that will allow NASA astronauts to easily enter and track their daily dietary intake to create a more detailed food log. This will enable NASA scientists to better understand the role of nutrition in spaceflight, and

[127] http://www.topcoder.com/iss/fit/

provide better dietary recommendations to help mitigate the negative physiological effects of spaceflight. The application is currently being ground tested with possible future on-orbit use.

15.7. Lunabotics Mining Competition

NASA's Fourth Annual Lunabotics Mining Competition[128] is an international university-level competition which asks students to design and build a robotic excavator that can mine and deposit a minimum of ten kilograms of regolith simulant within ten minutes. The grand prize winner received a $5,000 scholarship. On-site mining winners received $3,000, $2,000 and $1,000 scholarships for first, second and third place. Numerous corporate sponsors provided monetary and in-kind support. The competition was held on site at Kennedy Space Center, Florida in May 2013. NASA has benefited from the competition by encouraging the development of innovative excavation concepts from universities that may result in clever ideas and solutions which could be applied to an actual excavation device or payload. Since over 50 percent of the Lunabotics participants are underclassmen, the competition inspires these students to continue with their engineering degrees. In addition, NASA researchers were able to see how different technologies performed on lunar simulant.

15.8. NASA Aeronautics Engineering Design Competition

For almost two decades, NASA Aeronautics has offered an engineering design competition[129] to teams of college and university students. The competition encourages multidisciplinary collaboration, systems level engineering, and partnering among colleges. This year's challenge was to design a cost-effective UAS firefighting system to help ground teams extinguish a large area of wildfire near a populated area. Teams could win a cash award ranging from $5000 for first place to $3000 for third place. Additionally, U.S. citizen students from all teams could submit a resume and transcript to compete for paid summer internships in UAS at NASA Langley. In 2013, the top award went to two teams from Purdue University that tied for first place. Students from three other teams received paid internships that were competitively selected from those who submitted resumes and transcripts. Five selected interns came NASA Langley and successfully designed, built, and flew a portable UAS that could detect fire and smoke from fires. A follow-on challenge will take place in 2014 to design a high-altitude, long-endurance UAS that can be used to help track Hurricane development and movement.

15.9. NASA Climate Modeling – Search for New Sources of Observational Data

NASA is seeking new sources of observational data for climate modeling – an activity to assemble climate analysis data from daily observations collected by satellites, surface devices, buoys, and other devices from 1979 to today. This challenge[130] sought to identify new sources of high-quality observational data.

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[128] www.nasa.gov/nasarmc
[129] http://aero.larc.nasa.gov/university-contest/
[130] http://studio.topcoder.com/?module=ViewContestDetails&ct=30032756

The competition ran from May 27, 2013 to June 18, 2013. Four awards were awarded, a first place award of $2,500, a second place award of $2,000, a third place award of $1,000, and a fourth place award of $500. An additional incentive of $575 was awarded to the winner for submissions across several contests, for a total of incentive purse of $6,575.

The winning entrant exposed a climate data-source formerly completely unknown to NASA climate scientists. Additionally, the applicability and relevance scores were very high, indicating that this data source will have a high probability of improving the overall MERRA data initiative. The remaining winners identified data sources that were previously examined, although judges did find merit in the proposed uses of the data. This Challenge demonstrated that out-of-discipline perspectives can sometimes yield outstanding and unique results.

15.10. NASA Great Moonbuggy Race

The 20th annual NASA Great Moonbuggy Race[131] was held April 25-27, 2013, at the U.S. Space & Rocket Center in Huntsville, Ala. More than 85 student teams—many representing schools that field competitors year after year—demonstrated the same engineering skills and innovation that made NASA's Apollo-era lunar rover program a success four decades ago. This engineering design competition challenges high school, college, and university students to design, build, and race lightweight, human-powered rovers—"Moonbuggies"—which address challenges much like those faced by NASA's lunar rover developers in the late 1960s. The fastest first, second, and third place high school and college division buggies win corporate-provided cash awards. The competition is designed to teach students to troubleshoot and solve problems and also demonstrates NASA's continuing commitment to inspiring new generations of scientists, engineers and astronauts.

15.11. NASA Student Launch Projects

The NASA Student Launch Projects (SLP)[132] challenges middle, high school, and college students to design, build, and launch a reusable rocket to one mile above ground level while carrying a scientific or engineering payload. SLP is an academic-year-long commitment requiring teams to submit a series of reports and reviews, develop a website, provide educational engagement in their local community, and provide a timeline, a budget, and other requirements. The largest SLP event thus far was in 2013, with approximately 675 participants including 21 middle and high schools and 36 colleges and universities participating. SLP is comprised of two project elements: NASA Student Launch Initiative (SLI) for middle and high school teams and NASA University Student Launch Initiative (USLI) for community college and university teams. Any community college or university located in the U.S. is eligible to propose to participate in USLI. Interested teams are encouraged to participate in the Advanced Rocketry Workshop (ARW), where participants learn more about SLP expectations, NASA's mission and education goals and objectives, high-powered rocketry, and rocketry safety. After successful completion of the

[131] http://moonbuggy.msfc.nasa.gov
[132] http://education.msfc.nasa.gov/slp

ARW, each team is issued a Request for Proposal to participate in SLP in the fall. A panel of NASA and NASA contractor engineers, scientists, and education specialists review the proposals and make a selection of new SLP teams. The reports and reviews are similar to NASA's technical review process, requiring teams to complete a Preliminary Design Review, Critical Design Review, Flight Readiness Review, and Post-Launch Assessment Review. In addition, teams must complete a Launch Readiness Review, or hardware and safety inspection, prior to launch in Huntsville, Alabama.

15.12. New Space Business Plan Competition

The Space Frontier Foundation's NewSpace Business Plan Competition[133] is the country's only business plan competition that targets professional space entrepreneurs, in addition to students. NASA funds were provided in response to a grant request submitted by the Space Frontier Foundation and fulfilled in accordance with NASA's grants authority. This competition seeks entries from seed, startup, or early-growth firms from the following fields: entrepreneurial space, space-related, or space-scalable. Applicants must explain why their product or service helps with the economic development of space. Through this competition, NASA seeks to encourage the development of new companies, diversify the vendor marketplace for NASA and the aerospace industry as a whole, maximize to the greatest extent possible the fullest commercial use of space, obtain information on the emerging space community, especially new startups, and encourage, to the maximum extent practical, the fullest commercial use of space.

The prize was announced on May 24, 2013 and ran through October 24, 2013. The first place award was $100,000, second place award was $25,000, and third place award was $5,000. The first place winner, Generation Orbit,[134] produces GOLAUNCHER, an air-launched system specifically designed for small payloads, enables satellite developers to design small spacecraft and experiments to their full potential by offering fast, flexible, and dedicated space transportation services. The second place winner, ELIGOS, is currently developing E-IMPAcT technology, a patented electrodeless plasma propulsion system and a potential game-changer for operating communications and observation spacecraft. The third place winner, Prospect Dynamics, is developing technologies for asteroid mining, planetary defense, space debris mitigation and on-orbit servicing.

This competition offers a "boot camp" for participants where they receive guidance on developing and marketing business plans from successful venture capitalists. Teams have the opportunity to meet and network with space industry executives, investors, and successful entrepreneurs who attended as both guests and judges. The event included a review of business plan submissions by venture capitalists, angel investors, and business leaders.

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[133] http://spacefrontier.org/events/business-plan-competition/

[134] http://www.generationorbit.com/

15.13. Night Rover Challenge

The NASA Night Rover Challenge[135] called upon innovators to demonstrate high energy density storage systems suitable for lunar applications. This challenge simulates a potential extended duration Lunar Rover mission scenario. However, despite a $1,500,000 total cash prize purse and significant outreach efforts to identify potential competitors, NASA's prize administration partner Cleantech Open was unable to entice any to register for the 2014 competition. Several indicated that they are interested but not ready to compete. Lack of apparent application to terrestrial markets and high costs of developing the technology are formidable barriers to overcome. After study of reformulation options, NASA and Cleantech Open jointly decided to terminate the challenge.

15.14. Non-Invasive Measurement of Intra-Cranial Pressure Challenge

During spaceflight, the astronaut's body experiences short- and long-term changes in physiology which may result in permanent changes to tissues and organs, especially during long missions. NASA has documented that some astronauts who have been on long duration missions (six months in microgravity) experience changes in visual acuity and in eye anatomy. NASA suspects that these changes in the eye are related to increased intracranial pressure and would like to monitor this pressure non-invasively over time. Known measurement technologies are too invasive or inaccurate to be used for repeated measurements over time.

This challenge[136] put out a call for non-invasive methods or technologies that could measure the absolute intracranial pressure (i.e., the pressure of the interior of a human's head). The challenge was run on two online crowdsourcing platforms from January 2013 to May 2013. A $15,000 prize purse was awarded. Through the challenge, NASA identified new solutions in the current marketplace that were previously not known and now ha three high interest solutions and an additional five leads on developing technology. When asked if any of these technologies meets all of NASA's needs, the challenge owner commented: "There's no holy grail. But we have several promising technologies in development and we found several more with a variety of methodologies." Additionally, "We learned that we should have revisited technologies that we rejected earlier – people learn & technology improves with time and data." Overall, the challenge lead was surprised by the quality of the results the team received from using these open innovation techniques and is now a spokesperson for how these techniques can and should be used to accelerate and enhance project execution.

[135] http://www.nightrover.org

[136] https://www.InnoCentive.com/ar/challenge/9933284 NOTE: For those NASA challenges involving InnoCentive which are outlined herein, NASA entered into a services contract with InnoCentive in accordance with the Federal Acquisition Regulation. InnoCentive conducted competitions to come up with workable solutions, and delivered the winning result to NASA.

15.15. Rice Business Plan Competition

Since 2008, the Human Health and Performance Directorate (HH&P) at NASA's Johnson Space Center has supported a $20,000 annual award for companies focusing on new and emerging health- and performance-based technologies at the Rice Business Plan Competition, held at Rice University in Houston, Texas. NASA funds were provided in response to a grant request submitted by Rice University and fulfilled in accordance with NASA's grants authority. Forty-two student teams enter the competition each year. The award recognizes companies that are commercializing a health-related technology that will improve medical care capabilities on Earth and have potential application to human spaceflight. Since 2008, the HH&P award has gone to Heart Sounds, Integrated Diagnostics, GlucoGo (subsequently named LyoGo), Diagenetix, Innovostics, and, in 2013, BriteSeed. BriteSeed is a company focused on fostering innovative technologies to improve the healthcare experience. BriteSeed is commercializing a product called SafeSnips, which integrates blood vessel detection technology with existing laparoscopic surgical instruments. The product is designed to reduce morbidity and mortality associated with unintentional vascular injury during laparoscopic surgery.

15.16. Robonaut Challenge

Robonaut 2 is the first humanoid robot in space and was sent to the ISS with the intention of taking over tasks too dangerous or too mundane for astronauts. However, Robonaut 2 needs to learn how to interact with the types of input devices the astronauts use on the ISS. The Robonaut Challenge,[137] directed towards the software and algorithm development community, was to write an algorithm to control Robonaut and teach him how to interact with the taskboard. Specifically, competitors were asked to teach Robonaut how to recognize the state and location of several buttons and switches on the taskboard. This was important to advance Robonaut 2's "seeing" capability and potentially accelerate his effectiveness in supporting efforts on the ISS. The $10,000 algorithm contest launched on May 8 and was completed on May 15, 2013. The challenge had a total of 1190 registrants with 304 submissions from 40 competitors (7.6 average submissions per competitor). The Robonaut team received four quality algorithms that they anticipate will be useful as they continue to develop and mature their new software architecture. The value provided in seeing the different approaches in each of the algorithms they received will advance their efforts. The Robonaut team plans to begin to integrate the challenge results in early 2014. One of the biggest benefits of this challenge, in addition to new perspectives on specific software challenges, was that it served as a way to augment current team capabilities.

15.17. Sample Return Robot Challenge

The NASA Sample Return Robot Challenge[138] called upon robotics innovators to build a robot that could autonomously locate, identify, and collect a variety of samples and then return the

[137] http://www.topcoder.com/ISS/
[138] http://www.nasa.gov/robot

samples to a designated point without reliance on GPS or other terrestrial navigation aids. This challenge simulates a potential Mars Sample Return mission scenario. This prize competition offers a total cash prize purse of $1,500,000. The challenge drew novel approaches from non-traditional sources. 14 teams registered for the 2013 competition. As compared to the first competition in 2012, the competitors demonstrated significant progress toward achieving the challenge goals. Nearly all competitors were able to initialize their positions without GPS or magnetic compasses and initiate their search sequences. Three teams were able to locate the sample, two picked it up, and one was able to return it to home base.

The top team demonstrated the functionality needed to compete at the next level, where they will have no knowledge of the sample locations and will have to locate and pick up samples of various sizes and shapes – just as rovers may on future NASA missions. The competition was also the cornerstone of a large-scale public outreach effort that attracted over 10,000 guests to the competition at Worchester Polytechnic Institute and provided NASA with the opportunity to educate the public on NASA robotics and Mars exploration efforts. The competition is being repeated in 2014.

15.18. **Unmanned Aircraft Systems (UAS) Airspace Operations Challenge (AOC)**

The UAS AOC[139] is focused on developing and demonstrating key enabling technologies needed to safely operate unmanned aircraft systems in the same airspace as manned aircraft, where the ability to sense and avoid other air traffic is critical to air traffic safety. The ability to remain well clear of other aircraft and obey the same rules as other air traffic is an important aspect of safely integrating unmanned aircraft into the same airspace as manned aircraft. Competitors will operate a robotic aircraft that can fly 4-Dimensional Trajectories, receive and transmit position messages via Automatic Dependent Surveillance-Broadcast, detect and avoid other similarly equipped air traffic, and operate safely in a number of contingency situations. Since fall 2012, this challenge has generated significant interest in the UAS community and has drawn university and small business registrations. Competitor registration closed on 3/31/2014 and the competition is scheduled for 9/10/2014-9/17/2014. The UAS AOC was developed jointly by NASA's Space Technology Mission Directorate (STMD), Aeronautics Research Mission Directorate (ARMD), and AFRL. AFRL provided $500,000 in direct support. These three partners developed the details of the competition, in consultation with DOD and Federal Aviation Administration (FAA).

[139] http://uasaoc.org

16. USAID

16.1. Tech Challenge for Atrocity Prevention

In FY 2013, USAID, in partnership with Humanity United, completed the implementation of the Tech Challenge for Atrocity Prevention,[140] a series of five prize competitions run on the OpenIdeo, TopCoder, and InnoCentive online challenge platforms. USAID worked with NASA COECI to implement four of the five competitions. These challenges sought to engage a broad range of scientists, technologists, and other solvers not typically involved in the human rights field to uncover new ways in which technology might be used by USAID and its partners to help reduce, predict, punish, or prevent mass atrocities and genocide. The competitions gathered over a thousand participants and sourced nearly twenty actionable solutions, such as predictive statistical algorithms that can help the global ability to understand where and when mass violence occurs; mobile applications to support effective evidence collection by medical workers; and secure, low-cost networking solutions for threatened communities. USAID is now exploring various applications for these solutions.

[140] http://www.thetechchallenge.org