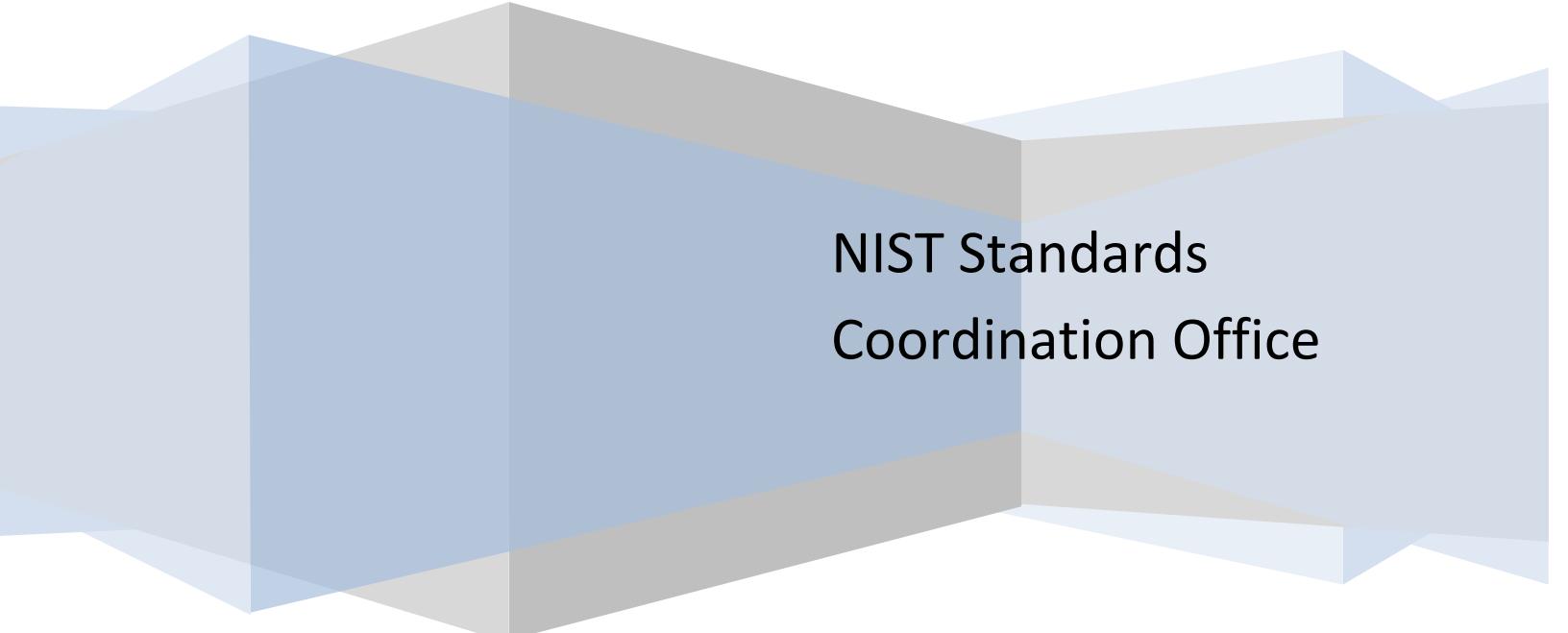# NIST Summary of the Responses to the National Science and Technology Council's Sub-Committee on Standards Request-for-Information, issued December 8, 2010:

Effectiveness of Federal Agency Participation in Standardization in Select Technology Sectors

NIST Standards Coordination Office

This document was compiled at NIST and is intended for informational purposes only. It does not represent official government policy and does not convey endorsement of any specific recommendations listed.

Contents

Introduction

About the Request-for-Information (RFI)

NIST issued a Request for Information on December 8, 2010 requesting information from interested stakeholders on how the federal government can more effectively engage in the private sector led standards system.

The RFI requested feedback on a set of core questions, with a particular focus on experiences with standards development for multi-disciplinary emerging technologies that address identified national priorities: Cyber Security, Smart Grid technologies, Health Information Technology, Nuclear/Radiation Detectors, and Emergency Communication Interoperability.

Respondents were given very broad guidance. Based on their experience and knowledge commenters were invited to describe:

- ○ The mechanisms and models by which federal agencies engage in standards-setting within their community
- ○ The issues that are considered during standards setting that could impact U.S. innovation and the ability of U.S. companies to compete, such as intellectual property issues, the impact of government regulation, etc.
- ○ Adequacy of resources to support successful standards development activities
- ○ Process review and improvement metrics that are incorporated into the current standards development system

The RFI is part of a larger process aimed at improving the effectiveness of U.S. federal government participation in standardization activities directed by the NSTC's Subcommittee on Standards chaired by Dr. Patrick Gallagher, Under Secretary for Standards and Technology and Director of NIST.

Broad Themes

The initial review identifies the following general themes related to government participation in standards setting:

- Guidance on government participation needs to be clarified as it is inconsistent across government agencies
- More resources need to be applied to increase participation in standards setting activities – funding of travel, membership dues.
- Federal agency positions must be coordinated during standards development
- NIST's convener role is appreciated and valued; many respondents expressed the view that the convener-role is government's most appropriate role in standards setting.

Profile of the RFI Respondents

A total of 92 responses were received to the NIST Request for Information issued December 8, 2010. Overall, this pool of commenters represents a wide spectrum of the standards stakeholders in the United States. Respondents were well-informed on the processes, political climate and complexities of standards development, nationally and internationally. Appendix 1 lists the commenters to the RFI.

92 Responses to the RFI

- SDO/SSO -34
- Industry -21
- Individual experts - 16
- Nonprofit organizations - 15
- Government - 6
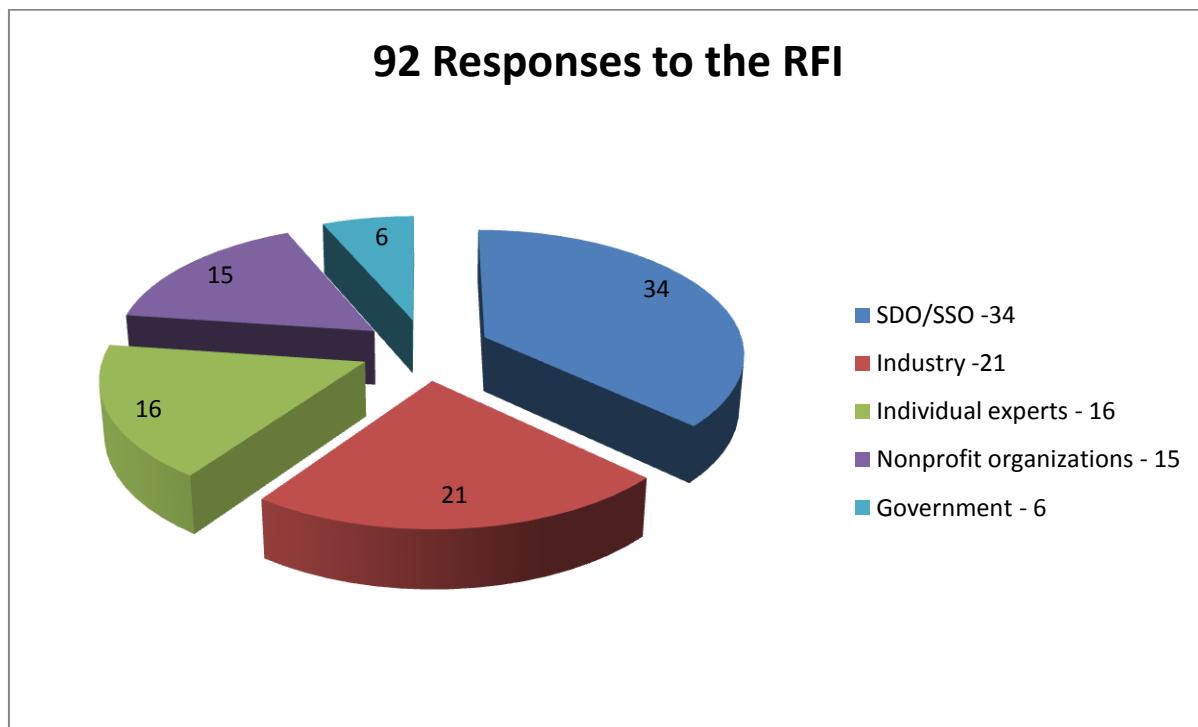
- The largest group of commenters – 34 in all – was Standards Setting Organizations (SSO), including ANSI-accredited standards developers and consortia developing standards and specifications for particular topical sectors.
- Twenty one respondents represented industry with global business interests; within that group, almost all of these respondents represented companies from the information technology sector – software developers, hardware providers – engaged in standards development in one or more of the sectors called out in the RFI;
- Sixteen individual experts with expertise and experience in standards development responded;
- Fifteen nonprofit-type organizations (trade associations, professional societies and educational institutions) responded to the RFI; nonprofits that were standards developers were classed as a Standards Setting Organization;
- Six commenters represented the government sector, 4 from within the U.S. (national and state-level) and 2 respondents tied to governments outside of the U.S.

Commenters Viewed by Technology Sector and Other Areas of Expertise

The respondents had varying degrees of expertise and experience in the technology sectors called out in the RFI:

- Twenty respondents had some knowledge of the Smart Grid (SSOs, industry, and government);
- Sixteen commenters had direct experience as developers or users of Health IT systems and standards (SSOs, industry, government, and nonprofit organizations);
- Eleven commenters had expertise in or comments pertaining to Cyber Security standardization
- Three respondents addressed in some way Emergency Communications Interoperability standardization;
- One commenter provided commentary on Radioactivity Detectors and Radiation Monitors standardization.

Various commenters had professional expertise in areas directly tied to standards setting:

- Five responding organizations or individuals came from the legal community;
- Two respondents represented conformity assessment programs/accreditation programs;
- Four respondents submitted commentary that had been submitted to the Department of Education RFI on educational accessibility interests; although their comments did not address the NIST RFI directly, they provided some useful insights into standardization practices and needs in the educational sector.

A numerical summary of the commenters' responses to the broad questions raised in the RFI is given in Table 1. Twenty-six responses provided general commentary that did not specifically address the questions outlined in the RFI.

Table 1: Numerical Summary of Responses to the RFI Questions

Topics Addressed	Number of Responders Addressing this Question
Standards Setting Processes	42
Reasons for Participating	11
Benefits of Standardization	14
Perspectives On Government's Approach to Standards	30
Issues Considered During the Standards Setting Process	51
Adequacy of Resources	37
Process Review and Improvement Metrics	24
Smart Grid	20
Cyber Security	11
Health IT	16
Radiation Detectors	1
Emergency Communications	3
Other Technology Sectors	6
Response to the U.S. Department of Education RFI	4

Mentions NIST Specifically	36
Provides one or more Case Studies	20
Addresses IPR issues	43
Provides Recommendations	32

Section 1: Standards-Setting Processes, Reasons for Participation and the Benefits of Standardization

Who participates in standards setting activities?

A broad array of stakeholders from the private and public sectors participate in standards setting activities.

Taking a high-level view, the participants can be categorized as representing:

- Industry
- Government
- Standards Setting Organizations
- Academic community (including teaching faculty and researchers)
- Professional communities (including law, architecture, engineering, medical)
- Nonprofit trade associations and interest groups
- Individual experts who advise and monitor standards development activities

Sixty-five U.S. government bureaus were specifically referenced in the responses to the RFI. These agencies represent twenty-five executive, independent and legislative branch departments and agencies listed in the following table.

US Government Departments and Agencies Referenced in Responses to the RFI

Access Board	**FCC**	**FTC**
Agriculture • Forest Service • Soil Conservation Service	**Interior** • National Park Service • USGS • Bureau of Reclamation	**National Transportation Safety Board**
Architect of the Capitol	**Justice** • FBI	**Nuclear Regulatory Commission**
CPSC	**GSA**	**State**

Commerce
• ITA
• NIST
• NTIA
• Census Bureau
• NOAA
	Health and Human Services
	• CDC
	   -NIOSH
	• FDA
	• SSA
	   -CMS
	• ONC
	• NIH
	   -NCI
	   -NLM
		Transportation
		• Federal Highway Admin
		• Federal Aviation Admin
		• NHTSA

Defense	**Homeland Security**	**Treasury**

• Army Corps of Engineers • Defense Logistics Agency • Defense Supply Center • National Geospatial Intelligence Agency • National Security Agency • Navy -Marine Corps	• FEMA • NCS • CBP • TSA	• IRS
Education • NIDDR-National Institute on Disability and Rehabilitation Research	**Labor**	**Veterans Affairs**
Energy • Lawrence Berkeley NL • National Renewable Energy Laboratory • Pacific Northwest National Laboratory • Oak Ridge NL	**Library of Congress**	
EPA	**NASA**	

Reasons for Participation[1]

The rationales for participating may be broken into three major categories including (1) general business and organizational motivators, (2) process or product improvement factors and (3) professional reasons.

- Business and organizational motivators: ensure business process representation, gain competitive advantage; obtain discounts; influence outcome; minimize the cost of establishing interoperability; support organizational mission; represent, advance, and protect corporate interests; ensure standards meet the broader needs of the industry; ensure fed agency requirements are met by the standards; reduce technology risk and systems costs; collaborate with other government agencies; encourage a more competitive market.

- Process or product improvement motivators include: achieve interchangeability, compatibility and related functionality; develop new test methods; influence reliability, quality, efficiency, support market acceptance; reduce costs; advance technology and the state-of-the-art; market acceptance; setting appropriate reliability and durability assessment method; fix historical problems; maximize the life span and value of legacy systems.

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[1] Of the commenters who responded to this prompt (11), there were 8 SSOs, two industry respondents and one individual.

Benefits of developing standards[2]

Respondents described myriad reasons for participation. The rationales may be broadly grouped into the following categories: cost savings, commercial and market interests, government/social interests and other. Below are examples of specific benefits by category which were called out by the respondents.

- **Cost savings:** greater efficiencies through eCommerce, paperwork reduction, simplification of contract specifications, overall efficiency, interoperability, avoids duplicative R&D and compliance with multiple format, production efficiencies, less costly exchange of data, interchangeability of replacement equipment and subsystems resulting in reduced life cycle costs, reduced vendor lock-in, free up resources to spend on innovation, protect investments in new technology.

- **Competitive and market advantages:** clarity between trading partners, ensuring standards meet business needs, understanding of issues facing industry, awareness of standards builds competitive advantage, improved quality, reliability, and market acceptance, commercialization of new technology, reduce potential for market failure, enable new business opportunities, enable new markets, foster innovation, facilitate technology diffusion, enhance competition, catalyze innovation.

- **Public Good (Government/Social):** meeting government requirements, stimulate investment and economic growth, improved safety, health, welfare, security of networks, conservation of resources, consistent nomenclature, consistency in testing, global development, better management of congestion resulting in improved security and emergency response relieves the government of developing technical specifications.

- **Other:** professional development, networking, developing of contacts to address issues, keeping up with state of the art.

How do standards impact organizations and their competitiveness?

Ten commenters, principally standards setters, responded to this question, generally agreeing that standards have a positive impact and contribute in a beneficial way to a competitive business environment. It was noted that as standards are used to address and resolve problems encountered by all those engaged in an industry sector resources can become available to support innovation that results in product differentiation that will fuel market growth.

How has standardization spurred innovation in the technology sector(s)?

Eleven respondents described how standardization activities intersect with innovation in their community. Two respondents offered the opinion that standardization has not been a driver of

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[2] Of those respondents (14) who commented directly to this prompt, 8 were standards setting organizations, 3 represented industry and one each represented government, a trade association and an individual expert. Of note also is that 8 are engaged in the IT, ICT or Health IT sectors.

innovation in their technology sector noting that, in their view, innovation has been spurred by cyclical peaks in industry activity. A third respondent commented that standards most often trail innovation in their particular industry sector. Other respondents reported that standardization activities have resulted in leaner, safer, sustainable designs and that the research undertaken to support standards efforts has resulted in improved and innovative products. One respondent, in the information technology sector, was unequivocal in stating that standardization was the driver that created innovative business opportunities that resulted in the formation of a new industry sector.

What is the current phase of the standards development process for this technology?

The respondents, in most cases, did not address this question directly. From the information presented we can conclude that the standards activities engaged in by the respondents ranged from relatively new standards work introduced within the last ten years to activities ongoing since the 1930s (or earlier). These represent mature standards supported through continuous maintenance to standards in the early development phases.

How has the process worked so far?

Commenters provided their perspectives on how well the process is working. Some described the overall standards development process model, while others described specific stakeholder engagement. Overall the majority expressed the opinion that their system of engagement was working fairly well. However, there were a number of commenters that mentioned areas for improvement under this question.

Areas of standards process improvement mentioned by commenters include:

- Purchase and implement electronic tools to support the standards development process
- Improve the length of time for standards development
- Lower cost of participation or increase resources allocated
- Increase stakeholder participation

In addition to commentary on areas of how the process has worked so far, several commenters made specific mention of areas that were working well that relate to federal engagement. These include:

- Participation in standards development has been an effective use of agency resources
- The role of convener (NIST) is an important role in the development of new standards for construction sealants.

How are standards setting processes managed and coordinated?[3]

Most respondents described an ANSI accredited process as the primary vehicle for management and coordination.

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[3] Of the respondents who answered this question directly (11), most (9) were standards developing organizations that to some degree or another described their organizations' internal standards development process.

Is there a strategic plan that identifies standards needs and defines the standards development life cycle?

Of the nine standards setting organizations that responded to this question directly, five indicated that they used some method of strategic planning.   These appear to be strategic efforts at the organizational level such as a Board or oversight organization rather than at the technical standards development level.

Are there barriers to the development of high level strategies for standards setting?[4]

Respondents cited a number of barriers, reflecting both internal and external factors:

- Internal organizational factors:
    - Resource constraints, including financial and personnel limitations
    - A lack of focus and vision characterized by indifference and complacency
    - Conflicting organizational priorities, citing that maintenance of legacy standards is burdensome
    - Lack of attention and lack of knowledge of strategic planning and tactics, i.e., participants in standards development are often technical and not strategic planners

- External factors
    - Uncertainty over federal, local or international policy (legislation and regulations)
    - Conflicting stakeholder objectives
    - Change: keeping pace with industry, technology, security threats
    - Concern that standards setting will stifle innovation
    - Concern over IPR issues in emerging technologies

One U.S. government respondent noted that a lack of familiarity with the NTTAA was a contributing factor to agencies not elevating standards setting as a strategic undertaking that would merit the attention of high-level strategy setters.

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[4] Seven commenters responded directly to this question. Five represented standards setting organizations, one was from government and one an individual with experience in standards development.

Section 2: Perspectives on Government's Approach to Standards Activities

What methods of engagement are used by Federal agencies to participate in private-sector led standards development?[5]

As described by the commenters, the U.S. Government engages in and supports private-sector led standards development in a variety of ways. Of the twenty-three respondents that addressed this question directly, most respondents had experience with more than one of the avenues for engagement described.

Government's engagement is either in a Leadership Role or a Supporting Role:

Federal Government Engagement as . . .	*Example . . .*
Convener/Coordinator Identifies needs and directions, useable standards, and architectures in cross-sectoral collaborations to meet national priorities	• Smart Grid • Nuclear Energy Standards Coordination Collaborative
Technical Leader Is a member of an SDO/SSO Agency staff are leaders in SDO/SSO governance and program execution	• The U.S. government participates in a leadership role in standardization work by private sector standards bodies (e.g., U.S. government staff leadership in OGC technical committees)
Participant Agency staff as members of a standards writing committee	• Over 748 federal agency staff are members of ASTM standards committees
Facilitator Includes contracting for services to enable standards writing	• In Health IT: CDC and other agencies engage in direct contracts that result in the development of standards and implementation guidance

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[5] Thirty commenters responded to the RFI questions pertaining to how the U.S. Government engages in private-sector standards setting.   Of those thirty respondents, 16 were standards developing/setting organizations, 5 from industry, 5 trade associations and nonprofits, 3 were federal agencies, and one an individual expert.

Implementer/Adopter Selects and implements a private sector-developed standard or requires its implementation through regulation.	• ASME standards on thermometers satisfy procurement needs of DoD and eliminate the need for a unique Federal standard
Funder/Enabler Funds standards activity of an SDO or assigns an SDO to manage the process; enables implementation of a standardized approach among a community of implementers	• Intelligent Transportation Systems: DOT funded SDO project management • Health IT: National Library of Medicine licensed access to the common vocabulary, SnoMed • DOE funding for ASME Energy Assessment standards
Technical Advisor Provides research and development to support standards development or develops test methods to support a technical standard	• Homeland Security: U.S. Government provided baseline test environment for DICOS
Coordinator of Federal Agency Needs Formally collaborates to address a common problem, transferring this knowledge to an SSO/SDO	• Federal Geographic Data Committee
Interested observer On an ongoing basis, monitors developments and assesses opportunities for engagement	

How transparent is each method?

All of the respondents agreed that the standards engagements driven by the ANSI-accredited model or fashioned on that model were transparent. Many respondents described the various aspects of the standards programs that supported transparency, such as frequently updated webpages, public review of drafts for comment, and availability of documents.

The method of federal government engagement that was viewed as least transparent was government contracting of standards development work as there are few opportunities for input and monitoring by outside parties.

How effective is each method of engagement?

Twenty respondents described federal government engagement in standardization as "effective." However, it was clear from the commentary that each approach pursued had its own strengths and weaknesses, and that the timing of the undertaking and the view of industry to the need and value of prospective standardization were important factors determining the success of federal government engagement. Respondents felt that the most successful engagements occur when industry determines that standardization is in their best interest and approaches the government for assistance.

The particular approach taken by the U.S. government to engage in standardization can be driven by the maturity of the technology subject to standardization. One commenter (a standards setting organization) observed that in the case of mature technologies, direct participation is highly effective. In the case of emerging technologies a more indirect approach, such as providing funding to explore various approaches or convening meetings to explore the issues and dynamics at play, can be more fruitful in the short to medium term as the industry coalesces.

There was a consensus among commenters in the IT sector (five respondents) that government should avoid mandating standards as it can be disruptive and, in the end, counter-productive given the rapid pace of innovation in the technology sectors.

The timing of the standards engagement was also discussed. It was noted that engagement by the U.S. government at an early stage was most effective especially when the standard will support regulatory needs.

Overall, the sense of the respondents was that U.S. government engagement is highly valued, but government must be prepared to participate as a partner in industry-led standards setting.

How could the methods be improved?[6]

Many responses addressed the need for improvements in federal engagement; the responses can be grouped into several broad categories: communication of government needs, coordination of engagement, designation of resources (including effective internal standards policies and strategies).

Communication of needs and coordination of engagement:

- Need better coordination of federal agency engagement
- Need mechanism to assess and communicate success and failures
- Engage early in the process of standards development
- Project regulatory needs
- Need better prioritization of needs and timelines
- Provide feedback on voluntary consensus standards that have been developed
- During rulemaking – need more transparency and communication of needs
- Empower agency representatives

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[6] Of the 21 respondents to this query, 11 represented standards setting organizations, 4 were from the non-profit/trade industry sector, 3 from industry, 2 from government agencies and one individual.

Improvements in internal policies and strategies:

- Need more consistent interpretation and policy implementation across Federal agencies relative to government participation in standards development
- Need incentives for staff participation
- Need better mechanism for maintaining up to date standard references in regulation
- U.S. government facilitation is needed to bring together cross sectoral industries – create a framework
- Government should not pick winners and losers, need market driven approach
- Government should approach standardization from a global perspective rather than purely national
- U.S. government has a shared objective with industry
- Need agency strategic plans with timelines
- Engage with SSOs that use open, transparent and inclusive procedures
- Choose and codify best standards to facilitate widespread use

Resource-related improvements:

- Need more government participation
- U.S. government should provide resources to support technology based standards development
- Provide resources, data and analysis for standards development
- Need sustained and properly resourced participation
- Need policy-level and technical representation from U.S. government
- Become dues paying members of ANSI
- Support engagement of federally funded state agencies
- Support the need for standards curricula in formal education

What other methods should the Federal agencies explore?[7]

General:

- In areas without strong industry support, such as "orphan standards" in the accessibility and assistive technology arena, there should be a mechanism to request U.S. government support.
- Agencies need a single department (office) within their organization to support standards in their mission area.
- Do not consider a single coordinating point in the U.S. government because specific technical expertise is needed and a single coordinator would not be adequately capable.

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[7] Fourteen respondents addressed this question directly including seven standards setting organizations, four organizations from industry, two from the non-profit professional society/trade industry sector, and one from government. Responses were either general or technology sector specific.

- Consider the model of a "request for proposal" for selection of a standards developer in emerging technology areas that cut across agencies
- Consider the success of the model used in the development and adoption of state-level codes – all jurisdictions are engaged resulting in broad adoption and sense of ownership.
- Consider promoting increased used of wiki-based tools in standards development.

Sector-specific:

- Health IT - continued engagement once standards have been developed – maintenance, updating, etc.
- Health IT - provide support to virtual meetings which will bring more individuals to the standards table.
- Health IT - consistent with their charter, ONC Office of Standards and Interoperability should be coordinating federal agency policy and program including contracting, direct and indirect involvement.
- IT - consider a process that is both open and global, prefer an international "design once, test once, single conformity assessment" approach.
- ICT - Enhance ICT systems and supply chain security by improving ISO 15408 – Common Criteria for IT Security Evaluation
- Smart Grid - NIST and FERC should consider the views of implementers such as state commissions and utilities, taking into consideration the potential for early obsolescence of deployed systems.

What impact have Federal agencies had on standards activities?[8]

Most comments reflected a positive impact of federal agencies on standards activities with one comment being negative and two neutral.

The types of impacts described include a critique of government's impact on the development of and use of standards that are created for purposes such as interoperability, technology advancements, and regulatory use (i.e. health and safety). Some commentary was non-specific or general.

In interoperability and technology deployment:

- Government engagement (NIST) facilitates acceleration of standards development in the area of Smart Grid technology
- Federal participation and support has been positive with agencies providing effective staff, content guidance, and funding to the development of Health IT standards.

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[8] Responding to this question were 19 entities representing 12 standards setting organizations, two government agencies, two companies from industry, two from the non-profit trade association/professional society sector and one individual.

- Government engagement (National Geospatial Intelligence Agency) with staff and funding support has enabled the rapid development of geospatial standards for national and international use while addressing urgent government interoperability challenges.
- Government successfully outsourced to an SSO numerous Health IT projects including Health informatics, Electronic Health Records, immunization registries, clinical data interchange standards, and other health data standards.
- U.S. Government (NIST) provided effective leadership in the development of biometric standards in coordination with a major ICT standards developer.
- U.S. Government leadership (NIST) and government participation on cross-cutting technical committees in nanotechnology provides scientific credibility to standards development.
- Federal agencies' obsolete policies and regulations impede progress and innovation in Health IT standards
- Federal agency impact on standards development in the nuclear area has been mixed
- Government mandated standards can alter the marketplace, resulting in reduced incentives for innovation and less optimal solutions for the affected technology sector.

In regulatory areas:

- Regulatory agencies have a large impact on the end use of voluntary standards through guidance documents and compliance schemes.
- Federal regulation and legislation results in mass adoption of standards by industry.
- U.S. government participation directly impacts technical elements of standards including data requirements
- U.S. government participation resulted in the establishment of a separate task group to address federal agency requirements (U.S. Customs and Border Patrol).
- When the U.S. government is engaged, the (financial data) standards developed address a broader range of business needs.
- The U.S. government (CPSC) model of strategic and effective engagement brings data and technical expertise to the effort resulting in the rapid development of safety standards.
- Mandatory standards can inhibit competition and investment

Other sectors and general comments:

- Federal agencies have provided funding to underwrite important standards development and have provided highly productive staff to the effort.
- The government (NIST) assisted the sealants industry with critical technical support and facilitated the development of test methods for architectural sealants which no single company had the ability to do.
- Government programs have a large financial impact: i.e., a large percentage of business in Health IT comes from federal programs.
- Current standards policies have resulted in increased use of voluntary standards, "has made government regulation and procurement more efficient and globally relevant" and has benefited both the government and regulated community

- U.S. government engagement provides a positive effect on the standards developing activity by bringing a different perspective, data, and resources to the effort.
- Government engagement shortens the standards development timeline.
- Government engagement ensures that government needs are being met (ICT services, applications and products).
- Government plays an important role in advocating a multiple-path approach to the development of international standards.

How well do Federal agencies coordinate their roles in standards activities in the sector of interest?[9]

Most of the comments received as a direct response to this question suggested that overall government agencies engaged in standards activities lacked coordination of their roles.

Negative

- In Smart Grid, there was a perceived lack of FERC engagement.
- In Health IT, while several federal agencies have engaged competently at the technical committee and leadership levels, across agencies "coordination is very poor" and there is "little or no coordination."
- In emerging technology areas, there is a need to "better coordinate and optimize federal resources" in support of commercialization.
- In nuclear technology, the government is not proactive in implementing policies, procedures and programs.
- Overall there is an observed lack of coordination or weak coordination across federal agencies.
- In nanotechnology, communication across federal agencies is limited.

Positive

- In intelligent transportation systems there is good coordination across agencies.
- In the import arena, there is excellent coordination between Customs and Border Patrol and agencies that rely on trade data.
- Digital Imaging and Communications in Security (DICOS) standards development efforts are coordinated across federal agencies.

When Federal agencies have been involved in standards setting efforts in a technology sector, how has the progress of standards setting efforts in this technology sector changed after Federal agencies became involved?[10]

Respondents described both positive and negative influences on the progress of standards setting efforts as a result of federal engagement in standards development in a range of technology sectors

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[9] Twelve entities responded to this question including eight standards developing organizations, two from government, one non-profit/professional society and one individual.
[10] Fourteen respondents, including 11 standards setting organizations, two government entities, and one individual addressed to this question

including smart grid, health IT, geospatial, nuclear, cable communications and aerospace. The respondents offered a number of views on the impact of U.S. Government engagement on the progress of standards setting:

Positive:

- Federal engagement can accelerate standards development.
- Significant contributions of federal resources and knowledge during standards development helps to develop, guide, and shape the standard.
- Federal engagement results in increased adoption of the standard.
- As long as the government and the private sector have a shared vision, federal engagement is not negative.
- Standards development runs more smoothly when federal agencies are involved.

Negative:

- Ineffective participation results in a lost opportunity for the government.
- Too much information (brought to the table by the government) can slow standards development.
- U.S. government participation can slow or impede standards development.
- Government contracting problems can slow standards development.
- U.S. government adoption of standards can result in "fossilization" of technology and hamper innovation.

Are Federal agencies generally receptive to input from other participants in standards-setting activities? Does receptiveness tend to depend on whether the Federal agency is a regulator or a customer?

Overall, government agencies were viewed as being receptive to input from others and working well within the standards framework to the benefit of all participants.

Only one commenter reported a difference in the character of the federal agencies' engagement based on the agency's regulatory responsibilities, noting that "occasionally a regulator (state or federal) will look at issues solely from the perspective of jurisdictional enforceability, rather than as drivers for improvements in safety, technology, performance, or global relevance."

In those sectors where Federal agencies play a significant role in standards activities, how valuable and timely is the work product associated with this effort?[11]

The consensus among the commenters was that the work product that results when the government is significantly involved is both timely and valuable. One commenter observed that the progress can be delayed due to the wealth of information that government contributes to the process, but that the quality of the final product benefits significantly as a result of U.S. government contributions.

A commenter from the SSO sector, in a position to observe the contributions by several agencies participating in standards setting activities, advanced that U.S. government agencies would benefit from having a clearer understanding of the policies undergirding government participation in standards development, in particular the NTTAA. This commenter observed that "Inconsistent application of the tenets of the National Technology Transfer and Advancement Act (NTTAA) and its implementing instructions delays the timely development of standards relevant to the needs of federal agencies."

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[11] Eight commenters responded to this question: seven standards setting organizations and one individual.

Section 3: Issues Considered During the Standards Setting Process[12]

Part 1: Technology, competition, the impact of innovation, etc.

Twenty-seven commenters spoke to issues including: technology, competition, the impact of innovation, trade issues and foreign regulations. Many of the standards setting organizations responding to the RFI noted that their organization's operating procedures provide explicit guidance to their standards committees on these matters.

However, many commenters then elaborated on areas of concern related to the topics suggested.

For example, in discussing the impact of technology, a number of commenters expressed the opinion that the government should avoid picking winners and losers in areas of technology standardization. It was suggested that when there is a government interest in standardizing in a technology, the government should identify and clearly describe its standards needs and objectives and let the market provide the solutions as market forces will enable the "right" standard to emerge. In developing technology standards, a number of commenters advised that accessibility issues must be considered early in the standards development cycle.

In issues of competition and innovation, federal agencies were often perceived to "handicap" competition, "inhibit innovation" and "shortchange consumers." This was attributed to the effects of premature standardization, vendor lock-in, and technical regulations that can result when regulators take a narrow view focusing solely on agency interests during standards setting. A number of commenters also noted that to promote innovation intellectual property rights must be protected during standards development so innovators have sufficient incentives to engage in and actively contribute to standardization work.

A respondent noted the federal government's lack of promotion and support for U.S. standards internationally has a detrimental effect on the competitiveness of U.S. products. For example, in the HVAC sector, it was reported that U.S. influence (and competitiveness) has waned as a direct result of non-participation of government experts in related ISO work.

Regarding standards overlap and duplication, several approaches to mitigate this issue were described:

- It was reported that federal agencies working in several technology areas provide a direct coordination role that minimizes overlap and duplication. These areas include nuclear energy,

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[12] Respondents to this question were asked to describe how various factors (intellectual property rights, technology, competition, innovation, foreign regulations, overlap and duplication of standards, and the impact of international standards) are considered in the standards setting process and how these issues might impact standardization processes and outcomes. Fifty-one respondents commented on this question. Factors related to intellectual property rights received most attention and are summarized in Part 2 of this section.

Smart Grid, nanotechnology, and hydrogen and fuel cell technology involving NIST and the Department of Energy.

- ANSI's Project Initiation and Notification System (PINS) is used by many, but not all, standards developers responding to the RFI, to announce standards projects in advance and call for stakeholders, including federal agencies, to provide input on overlap and duplication.
- The use of formal Standards Panels helps minimize overlap and duplication.
- It was also noted that U.S. government employees often bring knowledge of existing standards to the table.
- Some standards developers conduct an environmental scan prior to initiating a new project to identify areas of overlap or redundancy.

Finally, one SSO stated that the proliferation of standards development organizations has contributed to overlap and redundancy and urged the government to assert more leadership to promote coherency in standards development.

With respect to foreign regulations, most of the commentary centered on a description of the issues encountered rather than describing how the issues were addressed and /or resolved in standards development activities. Commenters offered that:

- Foreign regulations can be barriers to regulatory convergence for new technologies;
- U.S. government should work to eliminate non-tariff trade barriers by promoting use of international standards in technical regulations
- The U.S. should work to harmonize U.S. standards and with other international standards organizations, national standards bodies and international trading partners.
- U.S. government should seek full implementation of the WTO TBT agreement and require incorporation of previously agreed upon international standards principles into its legal framework.
- U.S. government, in collaboration with other stakeholders, should promote the U.S. standards system internationally so there is greater understanding globally of the U.S. system's strengths and benefits ;
- Standards developed by U.S. domiciled standards developers are often used as the basis for ISO standards and should also be promoted as input to foreign regulations.
- The European Commission welcomes the effort to implement a coherent standards system that does not overlap or duplicate international standards.
- There is a perceived lack of communication between ISO technical standards work and many U.S. standards developing organizations
- Globally oriented consortia tend to naturally operate well outside and beyond national standards bodies.
- The Food and Drug Administration supports international standards while many agencies ignore them.
- The U.S. government should support the development of international standards which reflect U.S. interests, and which will help to preempt the proliferation of regional standards.

- The U.S. should find better ways to represent national interests in international fora and the U.S. should be active on foreign standards bodies.
- The U.S. government should work to counter "not invented here resistance" and promote global interoperability.
- Aligning U.S. standards practices and interests with standards setters outside the United States can be a challenge, for example: the EU prefers open standards and open source software products in procurement; China requires use of indigenous developed technology and wants to discount royalty payments in procurement.

Part 2: Copyright[13] and intellectual property rights[14]

Patents in standards

Respondents noted that a range of approaches help address the complex interplay between patents and standards, and that having this flexibility enables industry to provide solutions that are timely meet the needs of the specific technology sector and the participants in that sector. Eight respondents indicated that the approaches which balance the rights of IP holders to recover their investments in developing IP with those of parties interested in licensing the IP provide adequate incentives to IP holders to put forward their IP for consideration in standardization.

According to respondents, with a few exceptions the current system in the United States has worked well with few instances of patent hold-up among thousands of standards that have been developed. One respondent noted the importance of distinguishing between true patent hold-up and the lack of agreement over licensing terms which would be considered a commercial dispute rather than patent abuse. Other respondents recommended that SSO IPR policies should do more to mitigate the risk of opportunistic licensing behavior by patent holders participating in standards-setting activities. A number of respondents noted that the flexibility afforded by the current system has enabled the United States to assume and maintain a leadership position in the global economy in the information and communication technologies related sectors.

Four respondents (all SSOs) noted that their rules either do not permit or discourage the inclusion of patented or business confidential technologies in the standards their organizations develop. A respondent suggested that due to the "patent thicket" it may not be possible to exclude all patented technology – e.g., certain standards may require the implementation of hundreds of patents.

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[13]The sixteen respondents who touched upon copyright and sales of standards related issues include 11 organizations with standards setting activities, 3 companies, and 2 respondents with an interest in the issue.

[14] Of the responses that provided perspectives on aspects related to patents in standards, 13 respondents are involved in standards setting activities, 8 are trade associations or professional societies, 9 respondents are companies, while 4 respondents may be considered to be organizations/individuals with an interest in the issue.

Some major themes

A number of respondents stressed the importance of transparency and clearly defined IP policies. Respondents also noted that the federal government should not mandate a single IPR approach for standards (in general, or for standards it is considering for its use), and that a mandatory IPR policy, even for standards that the government is considering for its use would have a stifling effect on innovation, and potentially adversely impact the willingness of IPR holders to participate in standardization.

Several respondents also noted that given SSOs are often best positioned to help articulate IPR policies for standards that they develop to strike an appropriate balance between the interests of its members, its standards users, IPR holders and licensees, SSOs have an inherent interest in getting this right.

With respect to mechanisms that enable inclusion of IPR in standards, 12 respondents discussed mechanisms for disclosure of essential patent claims and disclosure of licensing terms. A number of respondents voiced support for voluntary disclosure of licensing terms, with two noting that disclosure of maximum licensing terms can bring greater predictability and certainty to implementation costs. However, five respondents disagreed with any mandatory ex-ante declarations of maximum licensing terms, expressing concerns that such ex-ante mandatory disclosure requirements could potentially disadvantage the IPR holder if other parties engage in buyers' cartel-like behavior to extract the lowest possible licensing terms from the IPR holder. Eleven respondents also noted the role of licensing commitments whether on RAND, FRAND or royalty free terms.

Multiple respondents observed that IPR licensing considers a set of complex questions and licensing engagements are not simple one-to-one negotiations. IPR holders license IPR for defensive and/or revenue producing reasons; RAND terms provide IPR holders the flexibility needed to accommodate these various objectives. One respondent disagreed, noting even when IPR holders commit to license their IPR on RAND terms, the negotiation process lacks transparency to those who are not party to the negotiation, and this permits patent holders to negotiate with potential licensees one-on-one from a position of strength. This commenter noted that this factor can be particularly disadvantageous to a newcomer that does not have their own portfolio to trade. Noting instances of disputes and lawsuits between implementers and companies claiming to own essential patents regarding whether particular licensing terms do or do not comply with RAND and the potential costs to the federal government, another respondent noted that RAND terms provide federal agencies with little visibility into future licensing costs that the government could incur, either directly or indirectly in the prices they pay when they purchase products that implement standards.

One respondent noted the challenges associated with the use of standards from multiple sources with different licensing terms when implementing standards in complex technologies. Others felt that this is not a significant issue. [15] . One respondent noted that the uncertainty of disclosure in the standards

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[15] A recent study that identified 251 technical interoperability standards implemented in a modern laptop from multiple SSOs was cited in this context. Evaluating the IPR policies of 197 of these 251 standards, the authors noted that 75% of the standards were developed under RAND terms (including RANDz), 22% under royalty-free (RF) terms, and 3% were licensed through patent pools.

setting context has created opportunities for strategic behavior, such as "the ambush of standards by nonparticipating third parties", an issue that is outside the direct control of SSOs.

Suggestions from respondents relating to IPR in standards

Respondents made various recommendations to the federal government relating to aspects of IPR in standards, including recommendations specific to SSOs own IPR disclosure, negotiations and licensing rules. The recommendations implicating government participation are summarized here, and this summary does not reflect any federal government position on their merits. These recommendations include (in no particular order of importance, and representing the various perspectives):

- The federal government should not mandate a single IPR policy for standards it may wish to use, or consider for use, for its purposes. It should take an inclusive view of the spectrum of IPR policies, and not promote one approach over another.
- Revise OMB Circular A-119 to potentially:
    - announce a federal preference for standards created under rules that permit, encourage or require participants in standards development to state their maximum licensing terms during the standards development process
    - encourage federal adopters to select standards created using negative declarations, i.e. requiring participating patent holders to identify patents essential to the standards that they are unwilling to license
    - favor adoption of standards created under IPR policies that require transferees of essential patents to be bound by licensing commitments given by their predecessors in interest
    - clarify that a RAND or RF licensing commitment prohibits participants from seeking to enjoin implementers of standards, at least until an objective third party such as a court or arbitrator has determined that the patentee has offered to license on reasonable terms
- Clarify ambiguities and consider current SSO practices, which may not conform with the literal terms of OMB Circular A-119
- Relating to OMB Circular A-119, the federal government should clarify that reference to RAND in the Circular should be the minimum that federal agencies should require before they choose to adopt a standard, and that federal agencies are encouraged to include IP-based considerations in their selection of particular standards for federal adoption, including whether the standard were created using IPR policies that provide agencies, and vendors from which they purchase products that implement standards, with predictable IPR licensing terms.
- While considering standards for inclusion in standards frameworks that the federal government may be developing for its purposes (e.g., addressing national priorities or for procurement activities), the federal government could consider creating a check list to determine whether SSOs developing the standards in question have an IPR policy consistent with the requirements of OMB Circular A-119. A high-level check list developed in conjunction with the stakeholders,

including SSOs could identify issues potentially blocking the implementation of specific standards being considered by the federal government, e.g.:

- o any declarations of unwillingness to license essential patent claims on RAND or RF terms
- o any known IPR lawsuits, threats of litigation, or settlements involving the standardized technology
- o set time frames for early opt-out of participants who may not be willing to license essential claims on a RAND basis
- o policies relating to continuity of licensing commitment, if made, even after the participant withdrawal
- o any requirements that bind the employers of individuals participating on an individual basis in standards setting
- o policies relating to transfer of patents that include essential claims, and including patents transferred in bankruptcy
- o whether royalty rates and the determination of the "reasonable" element in RAND licensing would be based upon the contribution of the particular patent to the value of the device in which it is implements, or the value of the entire device

- The federal government should take into consideration whether the SSOs developing standards that it is interested in have IPR policies, and whether these policies are easily and publicly accessible. The federal government should also encourage SSOs to make easily accessible associated additional documentation such as patent self-declarations, essential claims, patent licensing commitments, letters of assurance, any notices of objection, exclusion, or exceptions to licensing commitment under the SSO's IPR policy, etc.

- The federal government should provide clear and uniform guidance by which developers (e.g., entities operating government laboratories or facilities, entities funded under research or development contracts, etc.) can take ownership of government-funded inventions (under Bayh-Dole or similar provisions), if the developer is subject to a RAND commitment to license necessary patent claims.

- To provide certainty to government-funded developers who may seek royalties for inventions they develop related to technologies of interest to the federal government, the federal government could provide guidance on when royalty-free license rights apply.

- The federal government should license patent claims made by government employees (or otherwise owned by the government) that are necessary to implement a government-supported standard, under royalty-free or RAND licensing terms.

Copyright and sale of standards

Responses relating to copyright and sales of standards addressed three major issues, including:

- Business models based upon revenue generated from sales of standards

Seven respondents addressed how sales of standards support various business models of SSOs. Responses indicated that sales of standards often are a significant revenue source for standards setting organizations, and enable low these organizations to keep the fees for membership/participation low, thereby reducing the barriers to participation in standards setting.

- Observing and protecting rights of copyright holders

Six respondents discussed aspects of observing and protecting the rights of copyright holders, including observing the appropriate provisions in OMB Circular A-119. Three called upon federal agencies that use standards developed in the private sector to respect the IP of the standards setting organizations developing these standards. One of these responses noted that agencies should provide proper attribution when using these standards. Three respondents noted provisions within OMB Circular A-119 requiring that "…*if a voluntary standard is used and published in an agency document, your agency must observe and protect the rights of the copyright holder and any other similar obligations*…"

- Access to standards

Different aspects of access to standards and availability of standards for review and/or use were also discussed within the responses – reflecting the current debate about enabling access to standards to all parties, particularly if the standards in question may be used in support of rule-making or may otherwise be adopted by state or local governments. Some of the responses have noted the high cost of standards as a barrier to access of standards. One response (state government regulatory authority) notes this to be a particularly significant issue, as they are charged with adopting standards by statutory authority, and observe that the high cost of the standard is a barrier to their ability to review the standard in question. Three respondents (all standards setting organizations) noted how they enable free or minimal barrier access to their standards to interested parties, using different mechanisms. These methods of access including access to the complete standard for free, or access to the standard in order to review the standard.

Three respondents also discussed various issues relating to free access to standards. Three respondents suggested that in case of standards with significant public use, the federal government could support SDOs through grants that could in turn enable free or very low cost access to the standards. One response noted that in cases where federal agencies have significantly supported the development of standards, including through federal grants/contracts/funds, etc., and significant agency staff time (e.g., in agency staff leadership and participation of standards activities) then the resulting standards should be made available to the public for free.

Ownership of copyright
Two responses touch upon copyright ownership of standards that are developed with either significant federal agency staff participation or by federal contractors. One response recommends guidance and clarification for situations where a standard has been developed in a private sector organization, with significant resources of the federal government and the help of federal government contractors. A second response notes that: *". . . copyright ownership in standards can be further complicated by the Government's participation in standards development. Any work 'prepared by an officer or employee of the U.S. Government as part that person's official duties' are not subject to copyright per sections 101 and 105 of the Copyright Act - Accordingly, while the Government's participation in standards development activities may be valuable, SDOs may wish to limit Government's role in standards development to minimize the risk that the Government could be considered a co-author of a standard*

unless there are changes to the Copyright Act that would allow standards co-authored by the Government to retain copyright protection."

Section 4: Adequacy of Resources[16]

Most respondents expressed the need for better and more consistent federal commitment to standards development within the existing private-sector led framework.

Participation in standards setting

Nearly two-thirds of respondents focused on the adequacy and quality of participation in standards activities. Many suggested that greater and sustained participation by the U.S. government both domestically and internationally is needed, along with the commitment of time and travel funding. Several commenters noted that the engagement of technical experts --offering "contributions of valuable expertise, knowledge, and time"-- is essential for developing a successful standard.

Federal funding support for standards development

Increased federal funding commitments were desired by many commenters. Specific suggestions included:

- providing additional resources to the private sector standards setting organizations through increasing the level of dues charged to federal agencies so that they more closely track corporate dues;
- providing grants for reserve funds;
- providing grants to standards setting organizations to enable them to make standards available for free, particularly those standards referenced in regulations; and
- working to ensure multi-year funding commitments for standards development engagement.

Federal government funding for targeted standards development projects was also identified as a tool for enabling strategic standards work. Examples include:

- seed funding to initiate projects similar to the Smart Grid effort;
- timely short-term bursts of funding to enable completion, maintenance and access to critically needed standards that must be completed in a short timeframe; and
- creation of an "evergreen fund" to provide loans to standards developers to underwrite essential technical projects.

In specific technology areas, suggestions for additional federal funding included the support of licensing and tool development costs for international interoperability in Health IT standards, support of a Smart Grid standards pilot project, and federal funding to identify the work needed to enable an expedited development schedule in nuclear energy standards.

Besides direct funding and participation, several commenters recommended in-kind support of standards development including use of federal testing and conference facilities to help lower costs of the standards development process. Additional suggestions included recommendations for improvements in resources such as the creation of a clearinghouse of global standards and those in

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[16] Thirty-seven respondents provided input related to the adequacy of resources invested in the standards setting process. Commenters included representatives from standards setting organizations, individuals, non-profit organizations including trade associations and professional societies, and industry.

development, and, as has been used successfully in the past, the strategic use of federal purchasing power to create markets for goods that meet targeted standards.

Management of standards development

The need for adequate and coordinated management of standards development efforts was expressed including providing additional support to NIST for its role.

In Health IT, resources are needed for a "coordinated strategy across the private and public sectors." The imposition of arbitrary deadlines has a negative impact on the quality of standards development efforts and creates unnecessary pressure which can impact the attainment of consensus. The use of standards development strategies and technology tools to enable greater participation, creation of incentives for small and medium sized businesses to participate, as well as employment of an ombudsmen model were recommended.

A few commenters opined that that the government does not need to allocate additional resources than what is already provided. One standards setting organization expressed the opinion that "federal funding is not a significant factor in the development and deployment of standards (but strategic government engagement is)." Others observed that government support is uneven noting that some agencies, such as the Department of Defense, have committed adequate resources while many civilian agencies have not. Another commenter suggested that a review of current federal resource allocation practices could result in more consistent (and effective) engagement.

Participation by state-level agencies and small and medium sized businesses is critically hampered by travel and staff costs which, over time, become prohibitive. As a consequence, the perspectives of these constituencies are absent during the standards development dialog at the national and international levels.

Section 5: Process Review and Improvement Metrics[17]

Lessons learned

The respondents offered "lessons learned" in three areas:

Standards engagements

- There is no universally applicable approach; each opportunity must be evaluated independently
- A cross-collaborative standardization model provides the process and framework for public and private sector stakeholders to work together to address issues of national priority
- All stakeholders must be engaged early in the standards development process to ensure market relevance;
- Stakeholders must embrace a shared vision

Government's role in standards setting

- Should engage at an early stage in standards development
- Must clearly articulate its goals and objectives
- Should regard standards engagement as an investment by offering expertise, resources, and tools needed to advance implementation of standard s

Standards development

- Standards work must be managed as any other significant project with milestones, deliverables, etc.
- Standards writers must unambiguously define system specifications prior to standardization

In most cases "lessons learned" are incorporated as appropriate into an organization's procedures and processes, and shared with volunteers and leadership, resulting in ongoing organizational improvements. One large standards developer reported that it now uses formal market research to determine the market relevance of proposed standards and conducts pre-standardization technical analysis to support standardization criteria as part of its standardization activities.

Performance metrics

Commenters described a variety of performance metrics to measure the success of a standards setting activity and the impact of standardization work:

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[17] Twenty-four respondents provided information on lessons learned and performance metrics used to quantify the effectiveness of the standards-setting. Half of the respondents were standards developers (consortia and SDOs); the rest were an equal mix of Government, industry, and nonprofit/trade associations, and individual experts.

Measuring the success of a standard: adoption, use, impact

- Size of specification (pages)
- Measures of use: Number of products implementing/testing in initial stage; Number of products implementing/testing after one year
- An objective measure of "ease of implementation"
- Requests for interpretation
- Requests for training
- Documented use of the standard in regulatory frameworks
- References in the scientific and professional literature, including peer reviewed articles
- Sales volume
- Proposed revisions under consideration
- Use/implementation of the standard in global markets (sales, mou's)
- Use of the standard in regulatory frameworks

Measuring success of standards setting processes: efficiency, inclusiveness, timeliness

- Participants: Number of participants in the development process; Number of balloters
- Committee Performance and Budget tracking
    - Total numbers of projects underway; percentage completion of each project; percentage completion to schedule; active projects completed in the year; projects with scopes defined; projects approved; percentage schedule adherence, overall; how quickly is the standard available (elapsed time from project inception to release/publication); committee membership and meeting attendance
- One commenter (from the geospatial community) indicated that a formal study was conducted to document the impact of standards setting in that sector. The 2005 study, funded by NASA and conducted by Booz Allen Hamilton, compared proprietary and standards-based large scale implementations. The study showed that geospatial standards delivered significant operational value and cost savings.

Appendix 1: Commenters to the NIST Request-for-Information released December 8, 2010

1. The American Association for Laboratory Accreditation (A2LA)
2. Accredited Standards Committee (ASC) X12
3. Advaiya
4. Aerospace Industries Association/Strategic Standardization Forum for Aerospace
5. Air-Conditioning, Heating, and Refrigeration Institute
6. Alliance for Telecommunications Industry Solutions
7. American Bar Association, Section of Science and Technology Law
8. American Council of Independent Laboratories
9. American Intellectual Property Law Association
10. American National Standards Institute
11. American Nuclear Society
12. AMIA
13. Anonymous individual
14. ASME
15. Association for the Advancement of Medical Instrumentation
16. Association of Home Appliance Manufacturers
17. ASTM International
18. AT&T
19. Aware, Inc.
20. Barbe, Louis
21. Bechard, Sue, et al
22. Beneficial Designs, Inc.
23. Cable Television Laboratories, Inc.
24. California Public Utilities Commission and Public Utility Commission of Texas
25. Center for Disease Control and Prevention/The National Institute of Occupational Safety and Health (CDC/NIOSH)
26. U.S. Chamber of Commerce
27. Cisco Systems and Research In Motion
28. Cohen, Howard J.
29. Computer and Communications Industry Association
30. Consumer Electronics Association
31. Davis Wright Tremaine, LLP
32. Deere & Company
33. Department of Veterans Affairs
34. Ebelhar, Ronald
35. Electronic Commerce Code Management Association
36. Epic
37. European Commission DG Enterprise and Industry Unit C5 - Standardisation
38. Federal Geographic Data Committee (FGDC)
39. GE Energy, Digital Energy
40. GE Healthcare Systems
41. GTW Associates
42. Health Level Seven International (HL7)
43. HIMSS Electronic Health Record (EHR) Association
44. IBM

45. Illumination Engineering Society of North America (IESNA)
46. Information Technology Industry Council
47. Intel Corporation
48. Intellectual Property Owners Association
49. Intellegere Foundation
50. International Code Council
51. IPC-Association Connecting Electronics Industries
52. JISC Center for Educational Technology and Interoperability Standards
53. Jordan, Tom
54. Laing, Patrick G.
55. Layer 7 Technologies
56. Loud, James
57. Lumeta Inc.
58. Maden Technologies
59. Marks, Roger B.
60. Medical Imaging and Technology Alliance
61. Microsoft Corporation
62. National Academy Foundation
63. National Council for Prescription Drug Programs
64. National Electrical Manufacturers Association
65. National Fire Protection Association
66. National Geospatial-Intelligence Agency
67. National Institute of Standards and Technology (NIST) Sealants Consortium
68. Newborn Coalition
69. North American Energy Standards Board (NAESB)
70. Open Geospatial Consortium
71. Open Secure Energy Control Systems, LLC
72. Organization for the Advancement of Structured Information Standards (OASIS)
73. Porterfield, Donivan R.
74. Purcell, Donald E., The Catholic University of America
75. Qualcomm Incorporated
76. SAE International
77. SAP AG
78. Schneider Electric
79. Society of Cable and Telecommunications Engineers
80. St. Luke's Episcopal Health System
81. Stanley Security Solutions, Inc.
82. Supply Chain Risk Management CS1 Ad Hoc Working Group
83. TechAmerica
84. Telecommunications Industry Association
85. The Artisan School Center
86. Trusted Computing Group (TCG)
87. Turner, Jim
88. U.S. Pharmacopeia
89. Underwriters Laboratories, Inc.
90. Updegrove, Andrew, Gesmer Updegrove LLP
91. Villanova, Villanova
92. X-Y Public Mapping Project