Defense Standardization Program

Journal

October/December 2003

American National Standards Institute

American Society of Mechanical Engineers

ASTM International

VOLUNTARY STANDARDS

Electronics Industry Alliance

Society of Automotive Engineers

Inside

The DoD Partnership with ANSI
Can Timely Delivery of Information Be Guaranteed?
Aerospace Standards
The Many Faces of SAE

Defense Standardization Program
Journal

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Gregory E. Saunders
Director, Defense Standardization Program Office

Defense Standardization Program Office
8725 John J. Kingman Road
Stop 6233
Fort Belvoir, VA 22060-6221

703-767-6874
Fax 703-767-6876

dsp.dla.mil

Voluntary Standards… A Vital Resource

It will not come as news to readers of this *Journal* that DoD is a major user of nongovernment standards (NGSs)—what many call voluntary standards—or that it participates actively in the NGS development process. But why? Why have we replaced thousands of our military specifications and standards with NGSs? Why do we spend thousands of dollars in travel and salaries sending some of our best technical experts to participate in meetings sponsored by nongovernment standards bodies (NGSBs), when the result of their efforts will end up as someone else's copyrighted material? What's the value to DoD—or more important—to the taxpayer?

A lot can be said for owning your own documents. When we relied heavily on MilSpecs, we had total control over the development process, the technology that went into the documents, the publication and distribution process, and the revision and amendment process. Federal government ownership of the documents means that they may be used in almost any way. Users can extract paragraphs, requirements, or whole sections to put into shop procedures, internal specifications, quality assurance procedures, or subcontracts; they can print multiple copies; and they can even post them on internal LANs or on public websites.

But, it takes considerable resources to develop and maintain documents. Our engineers and scientists are busy with research, development, failure response, and other duties associated with being in a laboratory, design center, maintenance facility, or quality assurance activity. Documenting standardization agreements in a strict format, coordinating the agreements, resolving comments, and driving forward to publication are time-consuming activities and are not the primary job of most of our technical people. With more design and development work being done by contractors, we have fewer technical people to develop and maintain government specifications and standards. We are simply losing the technical infrastructure to do this work. And even more important, we need our people to stay abreast of the latest technology to meet defense needs.

Of course, using NGSs is not a cheap alternative for DoD. To participate effectively in NGS development, our engineers and scientists must spend some of their valuable time writing standards for the committees, researching technical information, reviewing draft standards, and resolving issues among a wide array of users and manufacturers. They also must spend both time and travel dollars to attend meetings. And, once the document is completed, DoD has to buy it, and so do our suppliers and their suppliers. Oddly, travel dollars and purchase price are often identified as cost drivers, but the largest dollar investment is the burdened cost of our experts. The roughly $100-per-hour expert who spends 3 or 4 weeks per year—at his desk, in the air, or at committee meetings—working on standards represents an investment of $12,000 to $16,000, exclusive of travel costs.

We were using NGSs even when budgets were comparatively generous and DoD was the breeding ground for many high-tech developments. The issue then was not to try to replace technical know-how, but rather

Gregory E. Saunders
Director, Defense Standardization Program Office

to leverage it. Our scientists, engineers, and technicians knew then, and still know today, that the best way to leverage their talent and their knowledge is to team with others intent on doing the same. Conferences and workshops provide opportunities for sharing research and findings, but no venue offers a more collegial opportunity to put research to practical use than does a standards development committee. The benefit to DoD and to the nation is the great leveraging that occurs when experts from laboratories, manufacturers, users, academia, consumers, and others come together to cooperatively apply their knowledge. The result is usually a better standard than anyone could have produced alone. The result is almost always a standard that has better marketplace acceptance than it would have had without such participation. The result is a standard that achieves excellence and balance of competing interests that may not have been possible without input from a diverse group of experts, each looking out for their own interests. And unquestionably, the result is a standard with better buy-in from the various interest groups involved. OK, there are times when we don't reach this ideal state. But that is always the goal.

What is the "value" of NGSs, or of the NGS development process? Over the past few years, much has been written about some standards either costing too much or having distribution that is too restrictive or, conversely, getting standards for free and having easier access to standards. I believe that the vast majority of standards managers and standards users recognize that free standards are a mirage. Even those who thought of MilSpecs as being free were only seeing the very end of an expensive process and infrastructure. They were not, are not, and never will be free; in one way or another they are paid for by the American taxpayer. But from the customer viewpoint, standards range from no cost to the user to more than $500 per copy. Some may seem expensive, but their cost may reflect how they were developed, how many pages they have, how they are distributed, or what topic they cover. The true value of an NGS is not measured by the number of pages, the number of drawings, or the technology used for distribution. Its value is measured by the agreements documented, the consensus achieved, and the intellectual property recorded. It would be a foolish engineer who decided what part, manufacturing process, or inspection protocol to use based on the cost of the standard that describes it. DoD's decision to use NGSs, a decision made long before there was an Office of Management and Budget circular or a law on the subject, was based on the long-term benefits of leveraging technical expertise and aligning defense needs with those of the commercial marketplace. It was not a decision based on getting cheaper standards.

At the same time, however, it is clear that standards developers need to price standards fairly and to make them easily available to legitimate users. While users recognize the need to fund the standards development infrastructure, they also want standards to be affordable and "one-click" available. It is certainly not beyond the realm of possibility that standards managers, engineers and scientists who participate in development, and standards users will turn away from organizations that appear to unduly limit distribution options or charge too much for the standards or licenses. Through participation in numerous conferences, boards, and committee meetings, I have gotten a new appreciation for some of the pricing, licensing, and distribution issues that NGSBs face. I have heard stories of large sums of money being scammed from standards development organizations in uncollectible credit card purchases; I have heard of corporations putting NGSB standards on their websites and encouraging their subcontractors to get the standards for free from the website; and I have heard of NGSBs adopting encryption schemes and seeing their sales skyrocket, suggesting that there had been a large amount of pirating (yes, it's a dirty word, but it is also an accurate description) prior to the encryption. So I am sympathetic with the NGSBs. We need better controls, and we need better compliance. But we also need easier access, and we need to control cost growth. Users are the fuel of the NGSBs' engines. Without volunteer efforts to develop the standards and without large quantities of users paying for the process, the whole equation falls desperately out of balance.

There is a growing opportunity—in fact, a crying need—for all of the subcommunities that make up the standards community to work together. We need to find ways to solve users' needs for access at fair prices without undermining the ability of NGSBs to support the infrastructure on which we rely. We are an amazingly codependent set of subcommunities. We have had a symbiotic relationship that has allowed us to grow and prosper and to create a standards system that is the envy of the world. We must not allow anything to threaten the health and well-being of that system.

Risky Business

Legal Implications of Standards Development

By Amy Marasco

The use of standards can help solve issues of product compatibility and alleviate consumer safety and health concerns. A standard is a fundamental building block for interoperability and cost reduction, and for simplifying product development. While many of the organizations participating in the process of developing standards understand that the "game rules" often provide for fairness and due process, most are not aware of the legal issues that can arise when the rules are not properly followed or when antitrust and copyright implications come into play. This article looks at some of the implications of those issues for the standards community.

Setting the Stage

The American National Standards Institute (ANSI) serves as the coordinator of the voluntary, consensus-based standardization system in the United States. ANSI also accredits organizations that develop standards. Its accreditation of developers is based on their adherence to the principles of balance, openness, due process, and consensus among a diverse range of stakeholders, often from both the private and public sectors. ANSI requires that access to the standards process, including an appeals mechanism, be available to anyone directly or materially affected by a standard that is under development.

Although due process is not a defense to legal claims, it is a safeguard that helps prevent mischief from improperly influencing the resulting standard. As a result, the public interest is both served and protected if the developer of a standard is accredited and regularly audited by ANSI to ensure compliance with its requirements for due process and the safeguards built into those requirements.

Applying a Duty of Care

Even with this emphasis on due process, personal injury claims periodically are asserted against developers alleging that they promulgated an unsafe or otherwise insufficient standard. Historically, most courts have dismissed these types of claims on the ground that a developer of a standard does not owe a "duty" to a person injured by a product or set of circumstances that conforms to the standard. Courts generally have held developers liable only when shown that they acted in bad faith or they mandated conformance to the standards.

These last two exceptions typically do not apply to developers of ANSI-approved standards because such standards are voluntary, consensus documents akin to guidelines. If a developer follows its ANSI-accredited procedures, the inherent due process features of those procedures and the ANSI oversight function virtually preclude any allegation of bad faith on the part of the developer.

As an example, in *Commerce and Industry Insurance Co. v. Grinnell Corp.*, 1999 U.S. Dist. LEXIS 11269 (D. La. July 14, 1999), the plaintiffs asserted that the National Fire Protection Association (NFPA) was liable for the damage resulting from a warehouse fire. Among other things, the plaintiffs alleged that NFPA was negligent in promulgating safety standards relating to the storage of warehouse merchandise. The court granted NFPA's motion for summary judgment and dismissed the plaintiffs' claims that NFPA was negligent in developing the standards in question. The court further stated that

> Most courts have focused on the amount, if any, of control a trade association wields over the behavior of its members concerning, for example, the proper implementation of its standards… By contrast, the NFPA does not list, inspect, certify or approve any products or materials for compliance with its standards. It merely sets forth safety standards to be used as minimum guidelines that third parties may or may not choose to adopt, modify or reject.

Thus, NFPA has no control over whether or which jurisdictions adopt its voluntary standards…. Finally, even if plaintiffs could establish a duty on the part of the NFPA, they point to no evidence that the NFPA failed to exercise reasonable care in promulgating its standard….

Promoting public safety by developing safety standards is an important, imperfect, and evolving process. The imposition of liability on a nonprofit, standards developer who exercises no control over the voluntary implementation of its standards under circumstances like those presented here could expose the association to overwhelming tort liability to parties with whom its relationship is nonexistent and could hinder the advancement of public safety. (Emphasis added.)

against the American Association of Blood Banks (AABB) alleging that he had contracted AIDS from a transfusion of blood received during open-heart surgery. At the time of the plaintiff's operation in the early 1980s, the precise cause and transmission modes of the AIDS virus were still matters of debate within the scientific and medical community. In holding AABB liable for failing to set an adequate standard for testing blood, the court relied in part on the fact that AABB was the governing body of a significantly self-regulated industry. AABB dictated how its accredited members should obtain, screen, and distribute blood by mandating compliance with its standards; AABB also audited all members to ensure compliance.[1]

A jury directed the National Spa and Pool Institute to pay 60 percent of damages in a torts case in Washington because they set residential pool safety standards.

Since late 1996, at least three court decisions have held that a developer of standards owes a duty of care to those affected by the application of the standards. (None of these decisions involved an ANSI-approved standard.) One of three decisions was *Snyder v. American Association of Blood Banks*, 676 A.2d 1036 (N.J. 1996). In this case, the plaintiff brought claims of strict liability, breach of warranty, negligence, and consumer fraud

In another case, this one in 1998, a jury in the Superior Court of the State of Washington for the County of Benton awarded the plaintiff in *Meneely v. S.R. Smith, Inc. et al.* $11 million in damages. The jury also directed the National Spa and Pool Institute (NSPI) to pay 60 percent of those damages. The plaintiff in this case became a paraplegic after diving into a backyard pool. He alleged that NSPI was negligent in setting residential

pool safety standards. The Washington State Court of Appeals, which upheld the verdict, described the primary issue on appeal as "whether a trade association such as NSPI owes a duty of care to the ultimate consumer. We hold that it does when it undertakes the task of setting safety standards and fails to change those standards or issue warnings after it becomes aware of a risk posed by the standards."[2] In holding NSPI liable, the court appears to have relied extensively on two factors: (1) NSPI received a study indicating a possible risk, and (2) NSPI knew that its members would rely on its standards in building and installing their products even though the standards were voluntary.

The Meneely court also concluded that if someone is injured in a pool conforming to an NSPI standard, then there is a duty and enough of a nexus to justify finding that NSPI's conduct "caused" the injury. The court drew this conclusion even though it acknowledged that

- the excavation contractor did not rely on the NSPI standard,
- the pool in question did not conform to the NSPI standard, and
- the diving board installer did not measure the depth of the pool.

Although infrequent, these types of liability and negligence decisions are of concern to ANSI-accredited developers in part because they could encourage plaintiffs to include them as defendants in personal injury lawsuits. Even if the developers ultimately are able to extract themselves from such lawsuits and have the claims against them dismissed on legal grounds (such as they do not owe a duty of care to remote end users of products or their voluntary standards are protected from challenge under First Amendment principles), they still have to incur the related expenses and expend significant resources to bring about that result.

Antitrust and Embedded Intellectual Property

In June 2002, the Federal Trade Commission (FTC) filed a lengthy complaint and commenced an enforcement action against Rambus, Inc. The FTC alleges that Rambus committed an antitrust violation by virtue of its conduct in connection with a standards-setting activity at the Joint Electron Devices Engineering Council (JEDEC). Rambus had developed and patented its SDRAM architecture for random access memory. The FTC alleges that JEDEC's patent policy first implicitly and then later expressly required the disclosure of any knowledge of patents or pending patents that might be necessary to implement the standard under development.

According to the complaint, Rambus had patents and pending patent claims on the standard, and it deliberately chose not to disclose them, in part because it was concerned that the standard would then be revised to avoid the patents. In addition, the complaint alleges that Rambus intentionally amended its patent claims so that they would continue to map against the evolving standard without advising the JEDEC standards committee.

Although the hearings in this matter are not expected to conclude until late summer of 2003, they are likely to address whether Rambus failed to comply with the JEDEC patent policy. The judge who denied Rambus's motion for summary judgment explained that this issue, while relevant, is not dispositive. The judge further characterized the dispositive issues as being "far broader" and focusing more on whether Rambus generally engaged in bad faith and deceptive conduct to gain an unfair competitive advantage irrespective of the terms of the JEDEC patent policy.

Throughout most of 2002, the FTC and the Department of Justice jointly conducted a series of hearings on "Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy." These hearings included several sessions dealing with the intersection of antitrust law, intellectual property rights, and standards-setting activities. Some of the recent events (such as the litigation surrounding Rambus) prompted questions in connection with the hearings as to whether stricter "rules" should be instituted or greater obligations imposed on the developers of standards and participants with regard to patent policies. ANSI has taken the position that such a "one-size-fits-all" approach would eliminate the flexibility that standards organizations require to devise individual patent policies that best accommodate their objectives and the consensus of their participants. This flexibility, in turn, helps to enhance competition and maximize the overall results for the U.S. community as a whole. In addition, the recent FTC enforcement actions have highlighted that patent policies and compliance with their terms do not fully define proper or improper conduct from an antitrust perspective.

On March 4, 2003, the FTC filed an enforcement complaint against Union Oil Company of California (Unocal) for al-

legedly committing fraud and violating Section 5 of the FTC Act in connection with regulatory proceedings before the California Air Resources Board (CARB). Those proceedings addressed the development of regulatory standards for low-emissions gasoline. Since CARB apparently did not have a patent policy with regard to its regulatory standards development process, the FTC has asserted more generalized allegations of fraudulent conduct as the underlying basis for its antitrust claims.

The FTC complaint alleged that Unocal repeatedly represented that its emissions research results were "non-proprietary" and "in the public domain." The FTC asserts that, at the same time, Unocal intentionally failed to disclose that it had pending patent claims on the research results and that it was seeking to induce the regulators to use those results in the CARB standards so it could realize significant future licensing income.

Copyright in the Standards As Document

Standards organizations also are concerned whether a developer's assertion of copyright is emasculated when a government entity at any level adopts or references the standard and it becomes "the law."

In early 2001, the Court of Appeals for the Fifth Circuit first addressed this issue and resolved it in favor of the developer. See *Veeck v. Southern Building Code Congress International, Inc.* (SBCCI), 241 F.3d 398 (5th Cir. 2001). SBCCI develops, publishes, and copyrights building codes that frequently are made mandatory through legislative action by state and local governments. Mr. Veeck purchased a copy of certain building codes from SBCCI (which came with a shrink-wrap license agreement) and then posted the codes on his website—making them freely available—as the law of the cities of Anna and Savoy, TX (which had referenced the standards into local law).

The court weighed the public interest in encouraging innovation through copyright against ensuring unfettered access to the law.

SBCCI develops, publishes, and copyrights building codes that frequently are made mandatory through legislative action...

Among other things, SBCCI and supportive *amici* argued that not-for-profit organizations that develop these much-needed standards would be unable to continue to do so if their private work enters the public domain when adopted or referenced by a public authority, resulting in the imposition of a tremendous burden on government bodies to fill the resulting void.

After issuing its decision in 2001, the Court of Appeals for the Fifth Circuit decided to hear the appeal again, but this time as a full bench. The court issued its *en banc* decision on June 7, 2002, ruling narrowly in favor of Mr. Veeck.[3] The court held that SBCCI retains the copyright in its standard, but that

"when those codes are enacted into law…they become to that extent 'the law' of the governmental entities and may be reproduced or distributed as 'the law' of those jurisdictions." The court further noted that laws are not subject to federal copyright law, and that "public ownership of the law means that 'the law' is in the 'public domain' for whatever use the citizens choose to make of it."

SBCCI petitioned the U.S. Supreme Court to hear an appeal of this decision. On December 2, 2002, the Supreme Court invited the U.S. Solicitor General to file a brief expressing the views of the United States. The Solicitor General filed a brief on May 30, 2003, and opined that review by the Supreme Court is "not warranted" because "the court of appeals reached the correct result in this case, and its decision does not conflict with other decisions addressing significantly different uses of copyrighted material by the government." Yet it appears that the Solicitor General's supporting rationale in this brief conflicts with the views that the Solicitor General expressed in connection with the petition for *certiorari* filed in connection with the *Practice Management Information Corporation v. AMA*, 121 F.3d 516 (9th Cir. 1997). On June 27, 2003, the Supreme Court issued its decision that it would not hear an appeal in the Veeck case, possibly because it is awaiting further development of the related issues in the lower courts.

Conclusion

The developers of standards—and the experts that populate their technical groups—serve an important public interest function. The public interest is both served and protected if the developer is accredited by ANSI and meets its requirements for openness, balance, consensus, public notice and review, opportunity to appeal, and other due process safeguards. Unfortunately, the recent increase in legal challenges to the use of standards may serve to deter the developers and their participants from engaging in this valuable work.

About the Author

Amy Marasco is vice president and general counsel at ANSI. She serves as ANSI's chief legal officer and corporate secretary. She helps ANSI's governance bodies fulfill their roles and meet their objectives effectively and meaningfully. She also oversees ANSI's procedures and domestic standards administration activities, including the accreditation of standards developers; the standards developer audit program; and the development, coordination, and approval of national standards.

[1]In a similar case involving AABB, a court in California ruled the other way. See *N.N.V. v. American Association of Blood Banks*, 89 Cal. Rptr. 2d 885 (October 28, 1999). Another more recent decision holding that developers do not owe a duty of care is *Bailey v. Edward Hines Lumber Co.*, 308 Ill. App. 3d 58, 719 N.E.2d 178 (Ill. App. 1999).

[2]See 101 Wn. App. 845; 5 P.3d 49 (August 3, 2000).

[3]See 293 F.3d 791 (5th Cir. 2002). This finding is contrary to those issued by the U.S. Court of Appeals for the Second and Ninth Circuits. Those Circuit Courts have held that a government body's referencing of a privately authored standard does not relegate that standard to the public domain. See *CCC Information Service, Inc. v. Maclean Hunter Market Reports, Inc.*, 44 F.3d 61 (2d Cir. 1994), and *Practice Management Information Corporation v. AMA*, 121 F.3d 516 (9th Cir. 1997).


ANSI
American National Standards Institute

The DoD Partnership with ANSI

By Joseph Delorie

Background

The American National Standards Institute (ANSI) is a private, nonprofit organization that administers and coordinates the voluntary standardization system within the United States. Its mission is to enhance both the global competitiveness of U.S. business and quality of life by promoting, facilitating, and safeguarding the integrity of the voluntary standardization system. ANSI is the official U.S. representative to the world's leading standards bodies—the International Organization for Standardization (ISO) and, via the U.S. National Committee, the International Electrotechnical Commission (IEC).

ANSI is an organization of diverse constituents working together to promote a strong U.S. voice and a solid framework of standards and conformity assessment agreements. The diverse constituents include the following types of members:

- Company members—corporations, partnerships, or other entities created under the laws of the United States or one of the 50 states
- Government members—departments or agencies of the U.S. government or any state
- Organization members—not-for-profit scientific, technical, professional, labor, consumer, trade, or other organizations involved in standards, certification, or related activities
- Educational members—U.S.-based not-for-profit institutions of higher learning, not otherwise eligible for membership
- International members—entities engaged in the activities of a company, educational, or an organizational member not created under the laws of the United States or any state.

Instructions for Receiving Discounts on Standards

1. Go to http://webstore.ansi.org.

2. Search by using the drop-down category menu and selecting the standard grouping that displays a list of standards; or perform a keyword/designator number search by clicking Standards Search located on the sidebar menu.

3. After finding the desired document, click the document title and then the Add to Basket button.

4. New shoppers will be asked to register. Click Register Now, which will take you to a registration form. Enter all required information, including your member discount code (for DoD, the code is 478). If you are a current ESS-registered shopper with your cookies enabled, you will be directed to your shopping basket, which is where you will enter your member discount code. Your member discount code will be stored on your profile for future use.

5. For credit card orders, click Purchase. The ANSI End User License Agreement will display for you to read. A purchase detail page will appear. Fill in your credit card information as it appears on your billing statement. Verify your billing information and then click Purchase.

6. After clicking the Purchase link, your order will be processed immediately online. When the processing is complete, a purchase confirmation page will display, and you will be taken to a download screen, which will list the documents you have available for download. You will have 7 days to download your purchase. This step completes the ordering process.

7. You will receive an e-mail confirming the details of your transaction. Because of the differences in web browsers and protocols, the use of a "left" or "right" click button on a mouse varies. When you click to download, you should see a Save As dialog box. Verify that the file type is either a PDF or ZIP. Select the location and file name to save the file. If you do not see a dialog box or if the file extension is other than PDF or ZIP, click Cancel and retry using the opposite click button.

DoD, through the Defense Standardization Program Office (DSPO), is a member of ANSI. Through that membership, all active military and civilian DoD employees have access to the benefits accorded members. Besides maintaining a DoD membership with ANSI, DSPO participates in ANSI-led initiatives that support national standardization objectives, such as the development of the NSSN website.

NSSN: A National Resource for Global Standards

During the mid-1990s, DSPO participated in a cooperative partnership with ANSI, numerous U.S.-based and international standards organizations from the private sector, and other government agencies to establish an online database for standards and related information. That effort has since evolved into an online resource known as NSSN: A National Resource for Global Standards. With a master index of information on more than 300,000 standards, maintained by ANSI along with an extensive network of standards developers from around the world, NSSN has become one of the world's most comprehensive online search engines for standards and technical data. Serving as a "virtual shopping mall" that can deliver electronic access to standards and technical documents directly to a user's desktop, the search engine can be accessed on the Web through two URLs: www.nssn.org and www.StandardsMall.com. (Eventually, ANSI plans to transition away from the NSSN name.)

Through DoD's active participation in the development, and continuing maintenance, of the NSSN, ANSI now receives and posts periodic information updates about defense specifications, standards, handbooks, and other DSP documents from the Acquisition Streamlining and Standardization Information System (ASSIST) database.

Participation in Standards Development Activities

In May 2003, NSSN listed nearly 900 organizations in the United States involved in standards activities. This list includes both private-sector organizations, such as trade associations, professional societies, and labor unions, and many agencies of the federal government. More than 190 of the private-sector organizations have been accredited by ANSI to develop American National Standards (ANS).

ANSI does not write standards. Rather, it accredits qualified organizations to develop standards in their technical areas. ANSI's role is to administer the voluntary consensus standards system, providing a neutral forum for the development of policies on standards issues and serving as an oversight body to the standards development and conformity assessment programs and processes.

Experts participating in standards development activities have an opportunity to influence domestic and international policy, benefit from unique networking opportunities, and learn from their colleagues. Participation also provides an opportunity to present U.S., corporate, or, perhaps, personal positions and the opportunity to comment upon pro-

Documents in ISO 9000 Collection

ISO 9000:2000	Quality Management Systems—Fundamentals and Vocabulary
ISO 9000-3:1997	Quality Management and Quality Assurance Standards—Part 3: Guidelines for the Application of ISO 9001:1994 to the Development, Supply, Installation and Maintenance of Computer Software
ISO 9001:1994	Quality Systems—Model for Quality Assurance in Design, Development, Production, Installation and Servicing
ISO 9001:2000	Quality Management Systems—Requirements (2000[S] is the Spanish version)
ISO 9002:1994	Quality Systems—Model for Quality Assurance in Production, Installation, and Servicing
ISO 9003:1994	Quality Systems—Model for Quality Assurance in Final Inspection and Test
ISO 9004:2000	Quality Management Systems—Guidelines for Performance Improvements
ISO 10005:1995	Quality Management—Guidelines for Quality Plans (formerly ISO/DIS 9004-5)
ISO 10006:1997	Quality Management—Guidelines to Quality in Project Management
ISO 10007:1995	Quality Management—Guidelines for Configuration Management
ISO 10012-1:1992	Part 1: Quality Assurance Requirements for Measuring Equipment—Metrological Confirmation System for Measuring Equipment
ISO 10012-2:1997	Part 2: Quality Assurance Requirements for Measuring Equipment—Guidelines for Control of Measurement Processes
ISO 10015:1999	Quality Management—Guidelines for Training
ISO/DIS 10012	Measurement Control Systems
ISO 19011:2002	Guidelines on Quality and/or Environmental Management Systems Auditing (under development)
ISO/IEC 17025:1999	General Requirements for the Competence of Testing and Calibration Laboratories
ISO/TR 10013:2001	Guidelines for Quality Management System Documentation
ISO/TR 10014:1998	Guidelines for Managing the Economics of Quality
ISO/TR 10017:1999	Guidance on Statistical Techniques for ISO 9001:1994
ISO/TS 16949:1999	Quality Management Systems—Particular Requirements for the Application of ISO 9001:2000 for Automotive Production and Relevant Service Part Organizations

Documents in ISO 14000 Collection

ISO 14001:1996	Environmental Management Systems—Specification with Guidance for Use (1996[S] is the Spanish version)
ISO 14004:1996	Environmental Management Systems—General Guidelines on Principles, Systems and Supporting Techniques
ISO 14010:1996	Guidelines for Environmental Auditing—General Principles
ISO 14011:1996	Guidelines for Environmental Auditing—Audit Procedures—Auditing of Environmental Management Systems
ISO 14012:1996	Guidelines for Environmental Auditing—Qualification Criteria for Environmental Auditors
ISO 14015:2001	Environmental Management—Environmental Assessment of Sites and Organizations (EASO)
ISO 14020:2000	Environmental Labels and Declarations—General Principles
ISO 14021:1999	Environmental Labels and Declarations—Self-Declared Environmental Claims (Type II Environmental Labelling)
ISO 14024:1999	Environmental Labels and Declarations—Type I Environmental Labelling—Principles and Procedures
ISO 14031:1999	Environmental Management—Environmental Performance Evaluation—Guidelines
ISO 14040:1997	Environmental Management—Life Cycle Assessment—Principles and Framework
ISO 14041:1998	Environmental Management—Life Cycle Assessment—Goal and Scope Definition and Inventory Analysis
ISO 14042:2000	Environmental Management—Life Cycle Assessment—Life Cycle Impact Assessment
ISO 14043:2000	Environmental Management—Life Cycle Assessment—Life Cycle Interpretation
ISO 14050:2002	Environmental Management—Vocabulary
ISO GUIDE 64:1997	Guide for the Inclusion of Environmental Aspects in Product Standards
ISO/TR 10013:2001	Guidelines for Quality Management System Documentation
ISO/TR 14025:2000	Environmental Labels and Declarations—Type III Environmental Declarations
ISO/TR 14032:1999	Environmental Management—Examples of Environmental Performance Evaluation
ISO/TR 14049:2000	Environmental Management—Life Cycle Assessment—Examples of Application of ISO 14041 to Goal and Scope Definition and Inventory Analysis
ISO/TR 14061:1998	Information to Assist Forestry Organizations in the use of Environmental Management System Standards ISO 14001 and ISO 14004
ISO/TS 14048:2002	Environmental Management—Life Cycle Assessment—Data Documentation Format

posals submitted by others. The benefits from participation include meeting with industry leaders, developing business opportunities, obtaining advance information on new technologies, gaining intelligence on competitors, and getting informal benchmarking information.

Membership in ANSI also has a more tangible benefit: members receive discounts when purchasing standards. ANSI members receive up to 10 percent off the single-user purchase of thousands of qualified standards within the ANSI online Electronic Standards Store (ESS) inventory.

DoD Access to ISO 9000 and ISO 14000 Series Documents

The National Technology Transfer and Advancement Act (NTTAA) reinforced the importance of public- and private-sector partnerships by requiring federal agencies to increase their reliance upon and participation in the voluntary consensus standards and conformity assessment systems. A revision to Office of Management and Budget Circular A-119 guides federal agencies in implementing the provisions of NTTAA.

DoD Acquisition Reform has always encouraged greater use of industry standards to strengthen the industrial base and increase access to the latest technology. Unfortunately, the move from government specifications (which were readily available and free to DoD users) to industry standards (which are often expensive to procure) made it difficult for some DoD users to obtain timely access to needed documents.

Standards That Qualify for Discounts

ISO	International Organization for Standardization
IEC	International Electrotechnical Commission
INCITS	International Committee for Information Technology Standards (an ANSI-accredited standards committee administered by the Information Technology Industry Council)
X9	ASC X9—Financial Services
AMT	Association for Manufacturing Technology
AGMA	American Gear Manufacturing Association
I3A	I3A, Inc. (formerly Photographic and Imaging Manufacturers Association)
OLA	Optical Laboratories Association

Some of the key standards needed for use within DoD are those published by the ISO, particularly those that deal with quality (ISO 9000 series) and environmental management (ISO 14000 series). To facilitate access to these ISO documents, as well as to future changes, DSPO solicited for an enterprise-wide license to the ISO 9000 and 14000 series documents. On August 20, 2001, DoD awarded a contract to ANSI for that license, with an effective date of August 27, 2001. The contract was for a period of 1 year, and included quarterly updates, as necessary. DSPO had an option to extend the contract each year for up to 4 additional years. In August 2002, DSPO exercised the first option to extend the contract, and in August 2003, it exercised the second option, extending the contract until August 26, 2004.

Accessing ISO 9000 and ISO 14000 Collections

DoD employees may access the collection of ISO 9000 and ISO 14000 documents through ASSIST-Online (http://assist.daps.dla.mil). If not already registered for an ASSIST-Online account, DoD employees must first complete the online registration form to receive a user account name and password.

Once logged in to ASSIST-Online, users must click the NSSN Search menu option in the lower left frame, which links them to the DoD NSSN portal. On the NSSN search screen, search for a specific document by entering the document number (e.g., “9000”) and click Start Search. (For faster searches, check only the ISO/IEC/ITU Approved Standards database.) The Search Results screen should contain a Download icon next to the document retrieved.

If the Download icon is not present, it may mean that the document is not covered by DoD's license. To verify, please consult the document collection descriptions. If the document is part of the covered collection, but the Download icon is still not visible, then report the problem to DSPO@dla.mil.

Licensing Restrictions Covering Document Access and Use

Under the terms of the ANSI contract, qualified DoD users have access to all covered ISO documents online and should be able to download a copy in PDF format. A user may also print one copy for personal use and reference. Although ANSI has the U.S. distribution rights for these ISO documents, ISO owns the copyright, and DoD users must abide by the terms of the copyright restrictions printed on the inside cover of each document. Those restrictions include not giving copies to non-DoD employees, or allowing non-DoD employees to use your ASSIST-Online account to gain access to the DoD NSSN portal.

From January 1, 2002, through March 17, 2003, DoD employees downloaded 1,323 individual standards. If these standards had been purchased separately, they would have cost $79,560. But, the actual cost to DoD during this 15-month period was substantially lower, $22,864. As a consequence, DoD has all the benefits of an ANSI-managed networking site license at a fraction of the cost of individual purchases, while DoD employees can access current documents, as needed, at their desktops.

NSSN STAR Service

DoD's contract with ANSI also includes several subscriptions to the Standards Tracking and Automated Reporting (STAR) service available through the NSSN website. A "personal research assistant" for members of the standards community, the STAR service is an automated e-mail-based alerting service and data management system that allows users to establish profiles for tracking changes to a specified collection of documents. Whenever new or updated information about a document or specified technology area is posted to NSSN's database, an e-mail message containing hyperlinks to abstract information about the updated document on the NSSN website is automatically sent to the profile owner. To review existing profiles created by DoD employees, see http://www.nssn.org/star_intro.html. DoD employees interested in using the STAR service to create new profiles should request instructions and a password from DSPO by sending an e-mail request to DSPO@dla.mil.

About the Author

Joe Delorie is a member of the Defense Standardization Program Office staff.

Public/Private Partnering

A Vital Link to Building Consensus for Voluntary Standards

By Francis Dietz, June Ling, and Steve Weinman

The voluntary consensus standards development system in place in the United States is an excellent example of a successful public/private partnership. In this case, "public" refers to federal, state, and local governments, and "private" refers to the many not-for-profit standards development organizations, of which the American Society of Mechanical Engineers (also known as ASME International) is a major one.

Standards are developed in the United States using the voluntary consensus process. Private not-for-profit organizations, like ASME, use experts from industry, academia, and government to develop safety standards for use by manufacturers; federal, state, and local governments; designers and builders; insurance and inspection agencies; laboratories and testing facilities; and owners and operators of industrial facilities. The process used is open and transparent, providing for consensus building among the various interest groups and ensuring that no one interest group dominates the setting of standards requirements. A rigorous issue-resolution process is employed, and all affected stakeholders are afforded the opportunity for a fair and impartial hearing of concerns or issues.

In contrast to the standards development systems of most other industrialized nations, the U.S. government does not provide direct funding to private organizations for developing standards used by the government and others. In fact, since the enactment of Public Law 104-113 in 1995, federal government agencies are required to use privately developed standards except in cases where it would not be practicable. This public law effectively got the government out of the standards development business, saving untold millions of taxpayer dollars and freeing government employees to implement the core missions of their agencies.

In its Circular A-119, the Office of Management and Budget delineated the positive effects of federal agencies using voluntary consensus standards:

- Eliminate the cost to the government of developing its own standards and decrease the cost of goods procured and the burden of complying with agency regulation
- Provide incentives and opportunities to establish standards that serve national needs
- Encourage long-term growth for U.S. enterprises and promote efficiency and economic competition through harmonization of standards
- Further the policy of reliance on the private sector to supply government needs for goods and services.

The DoD and ASME Partnership

Just because government agencies, for the most part, no longer develop their own standards does not mean that government employees are not involved in the standards development process. Quite the contrary. Nearly 40 employees of DoD alone participate on ASME code-developing committees. If you multiply that number by the number of major private standards developers and then multiply that by the number of other government agencies that rely heavily on standards, such as the Department of Energy, Department of Transportation, and the Nuclear Regulatory Commission, you get an idea of how involved federal agencies are in the process, without having to provide direct funding or develop the standards themselves.

It is noteworthy that DoD's drive to use private-sector consensus standards preceded the enactment of Public Law 104-113 and was formally initiated with a five-page memo signed by the Secretary of Defense on June 29, 1994. Since then, DoD, working closely with ASME, has made considerable progress in replacing MilSpecs with ASME standards.

One of the most widely used groups of ASME standards is the ASME Y14 series on geometric dimensioning and tolerancing standards. Many of the Y14 standards spun out of MIL-STD-100, Engineering Drawing Practices. In addition, the Y14 series provides a prime example of the long-term efforts that go into ensuring that the needs of a federal agency and industry are fulfilled through the voluntary consensus process.

In September 1972, the ASME Y14 Committee on Engineering Drawings and Related Documentation Practices formed Subcommittee 34 to develop a standard on parts, lists, data lists, and index lists. The basis for the Y14.34M standard was Chapter 700 of MIL-STD-100. Every effort was made to emphasize practices common to industry at large and documented by MIL-STD-100. Y14.34M, Parts Lists, Data Lists, and Index Lists, was first published in 1982; the second edition was published in 1989, and the third, in 1996.

In June 1973, the ASME Y14 Committee formed Subcommittee 24 to prepare a standard that defines the accepted drawing types used to establish engineering requirements in the production and procurement of hardware. The basis for the standard was Chapter 200 of MIL-STD-100. Work on this standard considered the types of engineering drawings used most frequently by business, industry, and government communities in the United States. Meetings were held to identify, select, and prepare proposed text and illustrations. Y14.24M,

Types and Applications of Engineering Drawings, was published in 1989, and in September 1991, DoD referenced the standard as a replacement of the majority of Chapter 200 of MIL-STD-100E. However, input received from the DoD user community indicated that additional detail and clarification were needed to ensure understanding and application of the requirements when the standard is invoked on a government contract. Therefore, in October 1991, Subcommittee 24 was reactivated and began revising the standard. The revision of Y14.24M was published in 1999 and contains many enhancements because of this coordinated effort.

In November 1981, the ASME Y14 Committee formed Subcommittee 35 to prepare a standard that establishes methods for identifying and recording revisions to original drawings and associated documentation or digital data files. Every effort was made to emphasize those practices common to industry at large and are documented by MIL-STD-100, Chapter 600. In the interest of promoting the widest possible application of the standard, some government-unique practices were documented and identified accordingly. The first edition of Y14.35M, Revision of Engineering and Associated Documents, was published in 1992; a second edition was published in 1997.

In February 1993, DoD's Drawing Practices Group (DRPRG) was chartered under the Defense Standardization Program as a cooperative effort between DoD and industry to codify and standardize engineering drawing practices, to promote applicable nongovernmental standards, and to foster liaison between DoD and industry associations and government agencies. The effort prompted an agreement to convert MIL-STD-100 to a nongovernmental standard under ASME. In 1998, ASME published the first edition of Y14.100M, Engineering Drawing Practices.

The initial attempt to convert MIL-STD-100 to a nongovernmental standard resulted in the existence of two drawing practices standards: ASME Y14.100M-1998, which consisted of basic practices common to DoD and industry, and MIL-STD-100G, which consisted of those practices and requirements unique to DoD. Consequently, the community had to make judgments concerning when to use which standard alone or in combination. The consensus was that one standard was needed.

Accordingly, ASME began revising the standard immediately after it was first released. The revised standard was published in 2000. It contains appendixes that may be invoked and tailored by DoD, thereby making possible the cancellation of MIL-STD-100. Changes contained in the 2000 edition of Y14.100 are intended to improve standardization and to harmonize practices and methods between industry and government.

Strengthening the Partnership

Standards developed in the United States by international organizations such as ASME are often widely used in countries around the world. For example, ASME's pressure equipment standards are the dominant standards in the global marketplace and are accepted by regulatory authorities in more than 80 countries. However, foreign government acceptance of international standards produced by U.S.-based developers often faces serious challenges. This is a result of increased global competition in the marketing of goods and services, the rise of national standards and conformity assessment systems, and the differences between the way standards are developed in the United States and the way they are developed in the European Union and elsewhere. The U.S. employs a market-driven open process for standards development that is in stark contrast to the process used in other regions of the world. Recognizing the importance of standards as "crucial factors in our international competitiveness," the U.S. Department of Commerce, in March 2003, issued an eight-point initiative to "augment current activities as an effective framework to address the relationship between foreign standards and the international competitiveness of U.S. companies." The document recognizes that "standards and standards-related technical regulations are pervasive features of global commerce, affecting an estimated 80 percent of world commodity trade." It notes that "foreign standards and methods used to assess conformity to standards can either facilitate efficient international trade and its resultant benefits, or they can impede access to export markets. Divergent standards peculiar to a nation or region, redundant testing and compliance procedures, unilateral and non-transparent standard setting exercises, and a confusing thicket of other standards-related problems are now recognized as major impediments to free trade."[1]

The initiative tasks the National Institute of Standards and Technology with assessing the standards activities of all Commerce Department programs, as well as their efforts to reduce standards-related barriers in foreign markets. This will include input from the American

National Standards Institute, which is the U.S. member to the International Organization for Standardization, and also from U.S.-based international standards developers such as ASME.

In addition, the initiative will enhance training programs for standards liaisons and foreign commercial service officers posted at embassies abroad, require the appointment of a liaison at the International Trade Administration, and develop a dialogue on standards within the proposed President's Export Council subcommittee on technology and competitiveness.

The Commerce Department's initiative is a welcome and important element in the public/private partnership that is the U.S. standards development system. Recognition by the government of the importance of standards to enhancing U.S. competitiveness abroad further cements the mutually beneficial relationship between the public and private sectors in the United States with regard to standards, and it acknowledges that neither the public nor the private sector can alone successfully combat "the barriers to export markets caused by foreign governments' adverse policies on standards and technical regulatory requirements."

Summary

The public/private partnership is a vital link in the consensus-building process for ASME standards. ASME standards have benefited both industry and government with a cost-effective means of improving competitiveness while protecting the safety of the public. In many cases, these benefits have been recognized by governments and consumers outside of the United States, which greatly increases the importance of ASME standards to U.S. companies engaged in international trade.

The Commerce Department's eight-point initiative recognizes the threat that foreign governments pose when they use their standards as strategic tools to gain an advantage in the world market. ASME welcomes the opportunity to work closely with the department and other U.S. government agencies to ensure that standards used to support international trade continue to be judged by their technical relevance and acceptance by industry and regulators—a true public/private partnership.

About the Authors

Francis Dietz is a government relations representative for technology policy at ASME.

June Ling is ASME's Associate Executive Director, Codes and Standards, and is an ASME Fellow and SES Fellow. She serves on the Board of Directors of the American National Standards Institute and on the Industry Functional Advisory Committee on Standards, which supports the Department of Commerce/Office of the United States Trade Representative.

Steve Weinman directs ASME's Codes and Standards, Standardization and Performance Test Codes departments. In addition, he serves on the International Advisory Committee Forum of the American National Standards Institute.

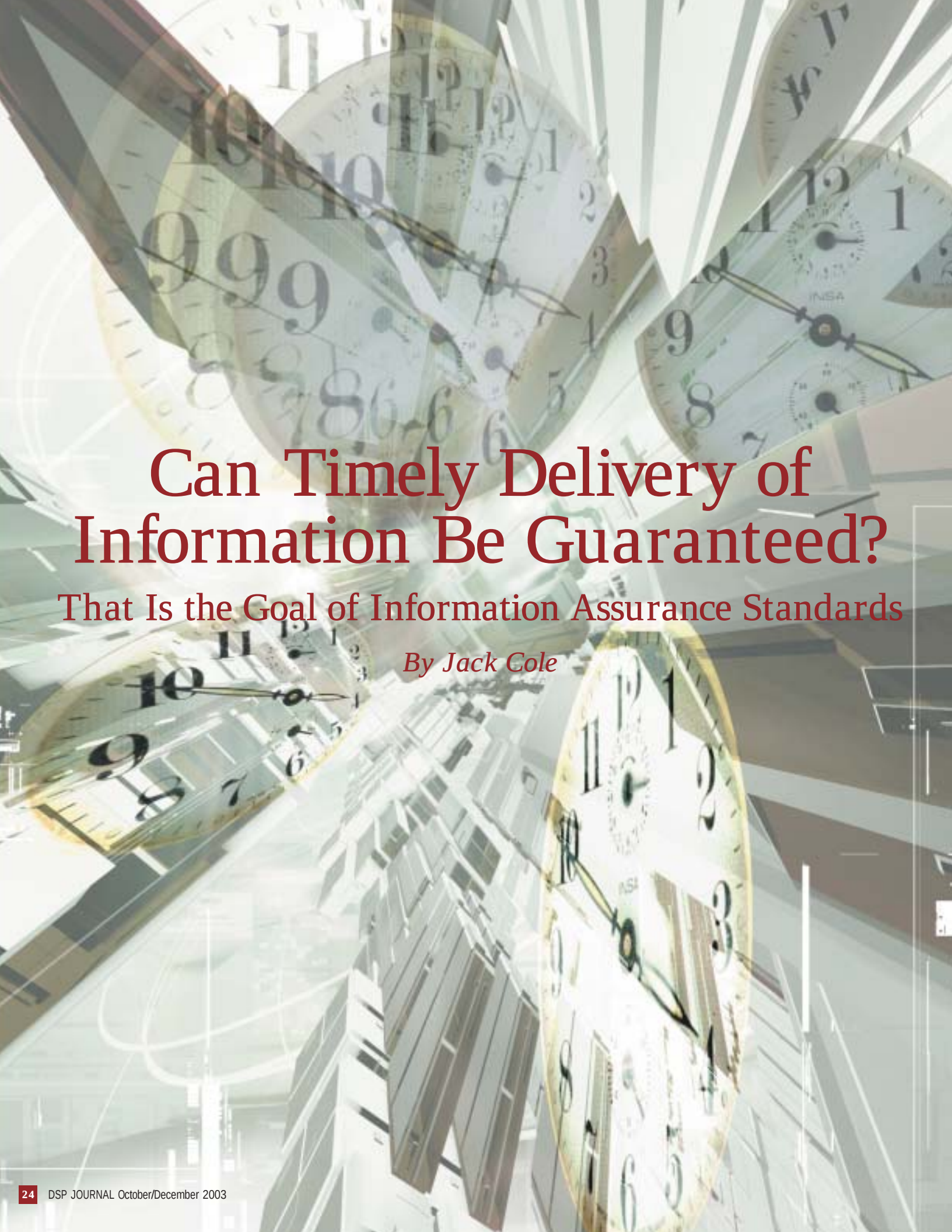
[1]See www.commerce.gov/opa/press/2003_releases/march/19_standards.htm.

ASME Standards Replacing Federal/Military Standards

ASME standard	Federal/military standard to be replaced	Status
ASME Committee A112, Plumbing		
A112.18.1 Plumbing Fixture Fittings	Commercial Item Description A-A-240A Shower Head, Ball Joint	Completed
ASME Committee B18, Fasteners		
B18.2.1 Square and Hex Bolts and Screws and B18.18.1M Inspection and Quality Assurance for General Purpose Fasteners	FF-B-561D Bolts, (Screw), Lag	Completed
B18.5 Round Head Bolts, B18.9 Plow Bolts, and B18.18.1M Inspection and Quality Assurance for General Purpose Fasteners	FF-B-584F	Completed
ASME Committee B40, Gauges		
B40.1 Appendix C, Supplemental Requirements	MIL-G-18997 Gauge, Pressure, Dial Indicating	Underway
B40.3 Appendix A, Bimetallic Actuated Thermometers (Supplementary Information)	MIL-I-17244 Indicators, Temperature, Direct-Reading, Bimetallic, (3 and 5 inch dial)	Underway
B40.4 Appendix A, Filled System Thermometers (Supplementary Information)	MIL-T-19646 Thermometer, Gas Actuated, Remote Reading	Underway
B40.5 Appendix A, Supplemental Requirements	MIL-S-2940 Snubbers, Fluid Pressure, Instrument Protection	Underway
B40.8 Liquid in Glass Thermometers for Industrial Application	GG-T-321D Thermometers, Self-Indicating, Liquid-in-Glass for Machinery Piping Systems	Underway
B40.9 Appendix A, Thermowells for Thermometers and Electrical Temperature Sensors (Supplementary Information)	MIL-T-24270 Thermowells for Thermometers and Electrical Temperature Sensors, General Specification for	Underway
ASME Committee B46, Surface Quality		
B46.1 Classification and Designation of Surfaces Qualities	MIL-STD-10A Surface Roughness, Waviness and Lay	Completed
ASME Committee B94, Cutting Tools		
B94.51 Specifications for Band Saw Blades (Metal Cutting)	Commercial Item Description A-A-51125B Blades, Band Saw, Carbon Steel, Metal Cutting; A-A-51134B Blades, Band Saw, Carbon Steel, Metal Cutting M2 High Speed Steel; A-A-51147A Blades, Band Saw, Carbon Steel, Wood Cutting; and A-A-51185 Blades, Band Saw, Composite Steel, Metal Cutting, Matrix High Speed Steel	Completed
B94.54 Specifications for Hole Saws, Hole Saw Arbors, and Hole Saw Accessories	Commercial Item Description A-A-51135A Hole Saws, Hole Saw Arbors, and Hole Saw Drive Plates	Completed
B94.9 Taps–Ground and Cut Threads	GGG-T-70B Tap, Thread Cutting (Standard, American National Form and Metric Spark Plug Thread, High Speed Steel, Ground Thread, Hand)	Completed
ASME Committee B107, Hand Tools		
B107.11M Diagonal and End Pliers	GGG-N-350A Nippers and Pincers	Completed

ASME Standards Replacing Federal/Military Standards

ASME standard	Federal/military standard to be replaced	Status
ASME Committee B107, Hand Tools, continued from p. 22		
B107.14M Hand Torque Wrenches	Commercial Item Description A-A-1274A Wrench, Torque, Indicating, Deflecting Beam; A-A-2411 Wrench, Torque, Indicating, Rigid Housing; A-A-24 13 Wrench, Torque, Limiting, "t" Handle; and A-A-24 14 Wrench, Torque, Screwdriver Grip, Graduated, and GGG-W-686E Wrench, Torque, Unidirectional	Completed
B107.17M Wrench Opening Gages	Fed. Std. 346C Gages, Wrench Opening	Completed
ASME Committee HST, Hoists		
HST-1M Performance Standard for Electric Chain Hoists	MIL-H-15317C Hoists, Chain or Wire Rope, Electric Power Operated, Lug, Hook, or Trolley Suspension and Base Mounted	Completed
HST-3M Performance Standard for Manually Lever Operated Chain Hoists	MIL-H-904J Hoists, Chain, Hand-Operated, Hook and Trolley Suspension	Completed
HST-4M Performance Standard for Overhead Electric Wire Rope Hoist	MIL-H-19925D Hoists, Wire Rope, Electric Powered	Completed
HST-5M Performance Standard for Air Chain Hoists and HST-6M Performance Standard for Air Wire Rope Hoist	MIL-H-28538BD Hoists, Wire Rope or Chain, Air Motor Powered with Trolley	Completed
HST-5M Performance Standard for Air Chain Hoists, New Appendix and Revision	MIL-H-2813 Hoists Chain and Wire Rope, Pneumatic and MIL-H-24591 Hoists, Chain, Pneumatic, Low Headroom, Trolley Type	Underway
HST-6M Performance Standard for Air Wire Rope Hoist, New Appendix and Revision	MIL-H-2813 Hoists Chain and Wire Rope, Pneumatic	Underway
ASME Committee MH1, Pallets		
MH-1 Pallet, Slip Sheets, and Other Bases for Unit Loads	Part of NN-P-71 Pallets, Material Handling, Wood, Stringer Construction, 2-Way and 4-Way and MIL-P-15011. Pallet, Material Handling, Wood, Post Construction, 4 Way Entry	Underway
ASME Committee Y14, Geometric Dimensioning and Tolerancing		
Y14.13M Mechanical Spring Representation	MIL-STD-29A Springs, Mechanical; Drawing Requirements for	Completed
Y14.18M Optical Parts	MIL-STD-34 Preparation of Drawings for Optical Elements and Optical Systems; General Requirements for	Completed
Y14.38M 1999 Abbreviations and Acronyms	MIL-STD-12D Abbreviations for Use on Drawings, and in Specifications, Standards and Technical Documents	Completed
Y14.100M 2000 Engineering Drawing Practices, Y14.24 Types and Applications of Engineering Drawings, Y14.35M Revision of Engineering, and Y14.34M, Associated Lists	MIL-STD-100G Standard Practice for Engineering Drawings	Completed
Y32.2.6 Graphic Symbols for Heat-Power Apparatus	Part of MIL-STD-17/1B Mechanical Symbols (Other than Aeronautical, Aerospacecraft and Spacecraft Use)	Completed



Can Timely Delivery of Information Be Guaranteed?

That Is the Goal of Information Assurance Standards

By Jack Cole

Business continuity and mission completion rely on timely delivery of information for the well-being of society's economy and defense. Yet information technology (IT) is incapable of guaranteeing that delivery in the face of multiple sources of failure. This inability has a number of causes, including the following:

- Developments in IT are unbalanced and isolated from one another.
- Technology communities are insulated from one another.
- The goal of information delivery does not pervade technological developments or communities.
- Obsession with protecting information from a single cause of failure—malicious human acts—distracts technologists and decision makers from the higher goal and from addressing other serious causes of failure.

Standards can impact all of these areas and are important to guarantee this delivery. But standards traditionally suffer from development that fails to cross lines of technology. A new approach is being taken to develop standards and related agreements within a community of communities, leveraging the special knowledge that each technology area has.

This article briefly describes the information assurance (IA) activities of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) to produce IA-related standards ("shall"), recommended practices ("should"), guides ("may"), workshop ("light-weight") agreements, and working group notes leading up to standards.

An IA community has begun to coalesce around IEEE's core activities, which include the IA Standards Committee (IASC), the Task Force on IA (TFIA), a growing list of collaborations and cooperative efforts, and a long-standing base of related IEEE groups and projects. IEEE is joining disparate communities of technologists and others outside of IEEE in a common effort to make IA part of the fabric of society and more closely approach the full potential of IT to deliver the information it generates, gathers, and stores.

To be effective, this community must properly define information assurance. IEEE considers that

> Information Assurance guarantees the timely delivery of information, conditioned by requirements for confidentiality, data integrity, authentication, authorization, and non-repudiation.

Defining IA as a higher-level goal (timely delivery of information), rather than as a limited subset of all of the methods and threats affecting delivery, is a positive change that was sorely needed to develop information technology meeting the goal.

IA no longer is considered an activity preventing failure, but a positive activity pursuing mission completion and continuity of business through timely delivery of information. The goal of IA is no longer narrowly defined as simply security relating to malicious human actions.

Prior to this, the most referenced definition of information assurance, one published by DoD, focused strongly on information operations (IO), and this had multiple effects. Because the DoD definition was

operations centric, it largely ignored the goal of IA to guarantee delivery of information; it blinded IA efforts to sources of failure other than malicious human acts; it deprived IA of support by misrepresenting methods and means as the goal; and it promoted confusion among technologists and managers alike. In short, it was not a consensus definition and had the effect of equating IA to IO with a single threat source.

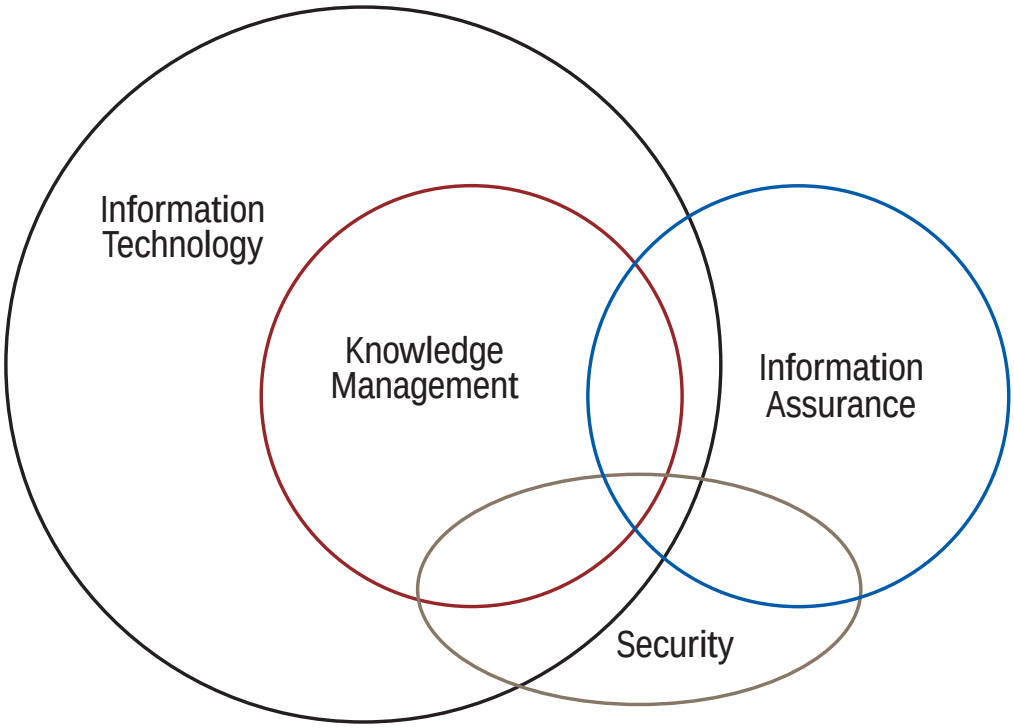
The IEEE working definition is unsettled, and argument exists about separating "timely" from the other conditions, treated collectively as a quality of service set. The basis for the definition is discussed by Jack Cole and Stephen Wolthusen in "Challenges for Information Assurance," an unpublished draft used to generate discussion at the first IEEE International Workshop on Information Assurance in March 2003.

The distinction between IA and areas such as information security is noted by many. For example, in his 2001 testimony to the House Science Committee on Infosec, Dr. Eugene Spafford stated that "information assurance issues are really larger than simply computer security. Information assurance covers issues of building safe and reliable information systems that are able to weather untoward events no matter what the cause—whether natural disaster or caused by a malicious individual."[1]

Information delivery failures are caused not only by malicious human acts and natural disasters, but by intrinsic flaws in IT and, from the fault-tolerant community perspective, design-induced failures. Intrinsic flaws result from unbalanced developments in IT rather than from design. For example, Jim Gray, in "Rules of Thumb," cites the fact that storage capacity grows at 10 times the rate of improvement in storage throughput, resulting in a ship-in-a-bottle problem for information delivery: most information cannot be delivered on demand. Inordinate attention has been given to faster processors, to faster and wider networks, to greater storage capacity, and to cyber attacks rather than to information delivery as the primary goal, the raison d'etre for information technology, and to the full range of failure sources.[2]

IA is further defined by its strong relationship to knowledge management in ways that are not well understood or developed, but promise to further enhance the delivery of information.

Interrelationships of Information Assurance, Information Technology, Knowledge Management, and Security



And this relationship further highlights the need to bring the efforts of technologists in disparate IT communities to bear on IA challenges.

In this pursuit, IEEE sponsors workshops, publishes refereed papers, enters into standards projects, and forms alliances with other communities. And while the IEEE generally treats its "technical" activities (conferences, workshops, publication of papers) and "standards" activities as separate realms, the IEEE IA community bridges this artificial boundary for maximum effect in its efforts.

The best example of this integration is the security-in-storage subcommunity in which the storage systems and "crypto" communities are brought together within a standards working group (http://siswg.org) and together hold security-in-storage workshops (http://ieeeia.org/sisw2003/).

Standards Activities

IEEE's information assurance standards activities cover a wide range. Some projects are already formally approved by IEEE. Other projects are planned that have sufficient definition that formal approval will be sought and is likely to be given. And there are several potential projects identified and being defined at this writing. Here is a list (in no particular order) of approved or planned projects sponsored by the IASC (http://ieeeia.org/iasc):

- Definition of IA terms (planned). There are many active and inactive efforts to define IA terms, but these are not generally sanctioned by nor do they follow the imperative principles (such as openness) of the International Organization for Standardization (ISO). One inactive project that did follow the ISO principles of standards development is the "IEEE Standard Glossary of Computer Security and Privacy Terminology." The IASC will build on this incomplete project and draw from the many others to define IA terms.
- Baseline operating system security (approved). Project 2200 is developing an IEEE Standard for Baseline Operating System Security (http://bosswg.org). This standard identifies reasonable security expectations for general-purpose, commercial off-the-shelf operating systems. Essential security and enhanced interoperability of such operating systems will benefit both producers and consumers by enabling mass-produced technology that is resilient in the face of threats.
- Certificate-issuing and management components (CIMCs), (approved). Project 1618 is the IEEE Draft Standard for Public Key Infrastructure CIMC (http://cimcwg.org). The CIMC is a family of four protection profiles defining requirements for components that issue, revoke, and manage public key certificates. Four different protection profiles of increasing levels of security are specified due to the variety of environments in which CIMCs operate, the sensitivity of information/material protected, and the risk that CIMC users assume.
- Software engineering standards (planned). The IEEE Software Engineering Standards Committee—which develops, among other things, software reliability and testing standards—is beginning work with IASC.
- Security in storage (architecture for encrypted shared media) (approved). Project 1619 specifies the architecture for protection-use data in sector-level storage devices, describing the methods, algorithms, and modes of data protection to be used. The end-to-end argument is a fundamental design principle of the architecture, which describes both media security and enabling components.[3] Use of this standard will guarantee that keys and applications remain available to information owners and that their information will be protected even when storage is managed by others.[4]
- Standard security architecture for certification and accreditation of information systems

(approved). Project 1700 specifies the architecture of a systematic approach to security certification and accreditation of information systems, providing the general schema and description of related components, which are detailed in companion standards.

Technical Activities

The TFIA (http://ieee-tfia.org) sponsors an International Security in Storage Workshop and an International Workshop on Information Assurance (http://iwia.org), and it cooperates in or cosponsors other events in the United States, Germany, and Australia. These activities enable discussions across technology communities and further expose ideas needed in the standards process.

Collaborative Efforts and Supporters

Conferences and workshops are sponsored or held in cooperation with several IEEE Technical Committees, with the Association for Computing Machinery Special Interest Group on Security, Audit and Control, and with the Australian Computer Society in the Australasian Conference on Information Security and Privacy (http://www.itacs.uow.edu.au/research/NSLabs/acisp03).

Standards are developed jointly with multiple IEEE standards committees with a potential participant pool of thousands of technologists from groups such the IEEE Technical Committee on Operating Systems. And collaborations are being developed with a number of other standards development organizations, including the International Committee for Information Technology Standards, and industry consortia such as BITS, a nonprofit industry consortium of the 100 largest financial institutions in the United States.

IEEE meets with individuals from the National Institute of Standards and Technology, from the U.S. Department of Homeland Security, and from other U.S. government agencies to develop IA consensus standards instead of edicts arising from closed committees.

Examples of the supporters of IEEE IA activities are the Johns Hopkins University, the U.S. Military Academy, the Fraunhofer-Gesellschaft, and the University of North Carolina at Charlotte.

Contributing to the Advancement of Information Assurance

In a world so dependent on information technology, IA is essential to preservation and enhancement of infrastructures critically needed by societies for defense and maintenance of their standards of living.

In contrast, little is done to balance IT developments, to make technology communities aware of the need for integration with other communities, and to effect timely delivery of information.

Existing efforts in these directions operate on a shoestring, so that relatively minor contribution of resources—human, fiscal, political—can result in huge improvements in information technology benefiting society.

About the Author

Jack Cole works at the Army Research Laboratory, Aberdeen Proving Ground, MD, as lead for technology exchange within the Information Assurance Center. Previously, he served as a senior-level analyst/engineer for the center and as task leader in the government-contractor team providing network intrusion detection analysis and security support services.

[1]See http://www.cs.purdue.edu/faculty/spaf.html. Dr. Spafford, director of the Purdue University Center for Education and Research in Information Assurance and Security, was recently appointed by President George W. Bush to the President's Information Technology Advisory Committee.

[2]See http://research.microsoft.com/~gray. Mr. Gray, director of the Microsoft Bay Area Research Center, is an ACM Turing Award Winner for Database Work.

[3]See Jerome H. Saltzer, David P. Reed, and David D. Clark, "The End-to-End Argument" [online document], 1981. Available from www.reed.com/Papers/EndtoEnd.html and lawschool.stanford.edu/e2e/about.html.

[4]Jim Hughes and Jack Cole describe this situation in "Security in Storage," *IEEE Computer*, January 2003.

One Size Fits All? Not in the Standards World

By Teresa Cendrowska

The strength of standardization in the United States is the sectoral focus supported by a dynamic infrastructure:

> The sectoral focus comes from participants…who understand what is needed in their sector, and the standards developers through which they work to meet those customer needs. The sectoral approach allows interested parties to address their own issues and develop working methods that fit the problems at hand, since no single standardization system can satisfy all needs. This allows efficient standards development and fosters innovation and competition.[1]

ASTM International is one place where the diversity of sectoral standards development approaches is evident. Serving more than 100 market sectors as a voluntary consensus standards development organization, ASTM demonstrates that there are several approaches to international standards development, all dependent upon the standardization objectives of the technical committee and the market sector served by the committee.

ASTM International's overarching objective is to provide an excellent, efficient, and inexpensive international forum for the development of voluntary consensus standards that are technically sound and globally relevant. In striving to achieve that objective, the organization complies with a set of principles for developing international standards. The principles, defined by the World Trade Organization, include transparency, openness, impartiality and consensus, effectiveness and relevance, coherence, and development dimension.[2]

Although ASTM International provides a convenient, efficient, and effective forum for international standards development, the organization does not prescribe the approach that different sectors should take when developing sector-specific standards. Instead, each technical committee formed to develop standards for a particular sector establishes its own approach—one that best addresses the needs and capabilities of the industry affected by the standards. This article provides examples of the various approaches different ASTM technical committees are taking. Specifically, it discusses four approaches that various sectors have taken toward international standards: establishing a memorandum of understanding (MOU) with other internationally recognized technical committees to eliminate duplication of effort, forming a multinational task group, enabling collaboration between ASTM International and ISO, and selecting ASTM International as the forum for the development of globally relevant international standards.

Memorandums of Understanding

The effort of two internationally respected committees to develop globally accepted standards for the same market sector can only be described as duplicative and wasteful of limited resources. Added to the duplication and waste is the marketplace's confusion about which standard is preferred, the contradictions between the standards, and the constant attempt to harmonize the standards. This was the scenario in the paints and coatings sectors.

The paints and coatings sectors are served by ASTM International Committee D01 on Paints and Related Coatings, Materials and Applications and ISO Technical Committee (TC) 35 on Paints and Varnishes. Duplication was evidenced in the fact that members from ASTM D01 and ISO/TC 35 joined each other's organizations to participate in developing hundreds of similar standards, knowing that they would do the work twice! Joint committee meetings were held in an effort to minimize the time spent on harmonization, but still, standards and their attendant development efforts were duplicative.

The MOU represents a first step for the paints and coatings sectors to collectively develop and maintain globally relevant standards, whether in ASTM International or ISO.

In an effort to avoid the duplicative use of human, monetary, and time resources in the development of harmonized international standards, the leadership of each technical committee signed an MOU in June 2001. The MOU notes that both technical committees will work to

- eliminate duplication by agreeing not to develop a standard when an existing standard already meets the needs of the international marketplace and
- determine which standards should remain when two standards exist.

The MOU represents a first step for the paints and coatings sectors to collectively develop and maintain globally relevant standards, whether in ASTM International or ISO, through a unified and strategic effort that combines the expertise and resources of both committees.

ASTM International Committee D35 on Geosynthetics and ISO/TC 221 on Geosynthetics have signed a similar agreement. This approach is also being taken by ASTM International Committee D02 on Petroleum Products and Lubricants, ISO/TC 28 on Petroleum Products and Lubricants, and European Commission for Normalization TC 19 on Petroleum Products and Lubricants and Related Products.

Multinational Task Group

The International Association for Amusement Parks and Attractions (IAAPA) is a nonprofit association that was founded in the early 20th century. IAAPA has long recognized that amusement venues must

be safe and perceived as such by the public to ensure that the public uses and enjoys the rides and parks and to ensure that the amusement industry is preserved and prospers.

To accomplish those objectives, IAAPA determined that international standards would promote safe rides and attractions worldwide. IAAPA also recognized that developing such standards would require input from as many sources as possible without regard for borders. In this specific case, ASTM's openness and electronic tools were a strong inducement for joining forces to accomplish one sector's international standards objective.

From its initiation, the World Standards Task Group within Committee F24 on Amusement Rides and Devices has enjoyed participation from international representatives. Meetings typically include up to 50 representatives from North and South America, Asia, Europe, and Russia. The task group's success is illustrated in the development of such standards as the Standard Practice F2137 for Measuring the Dynamic Characteristic of Amusement Rides and Devices and Standard Practice F2291 for Design of Amusement Rides and Devices. Each is considered a "first of its kind" standard that reflects the benefits of global collaboration in standards development.

ASTM/ISO Collaboration

Subcommittee E10.01 on Dosimetry for Radiation Processing is contained within the structure of ASTM International Committee E10 on Nuclear Technology. The subcommittee establishes, maintains, and encourages the use of standards and guidelines for dosimetry in ionizing radiation processing, including processing of medical products, pharmaceuticals, foods, polymers, and other consumer products. The subcommittee also develops methods for characterizing and operating gamma ray, x-ray, and electron beam irradiators. Committee E10 has 170 members who represent 40 nations.

Subcommittee E10.01 has developed approximately 30 standards. Of those, 25 had no counterpart standards in ISO/TC 85 on Nuclear Energy. An attempt was made to "fast-track" the standards through ISO in 1995. This effort was initiated because, at the time, there existed a common perception that international standards were developed by organizations with member body participation rather that individual technical expert participation. The fast-track effort concluded in 1998 without success.

Subsequently, ASTM International and ISO conceived a pilot project in which ASTM International agreed to serve as the lead developer with open procedures for input by ISO member bodies. This means that ISO member bodies receive all the ASTM ballots and technical information and are free to distribute the information to whomever they desire. Both ASTM and ISO/TC 85 can propose revisions at any time, and the standards must be reviewed every 5 years at a minimum. In the pilot project, ASTM publishes the jointly copyrighted and designated standards. The standards contain the logos of each organization, a cover page, and an explanatory foreword. Both organizations are permitted to sell the standards.

Overall, the pilot project can be considered successful for having enabled collaboration and provided valuable experience on the joint development of international standards. At the same time, project participants identified some issues to be addressed to improve future collaborative efforts. For example, ASTM International and ISO have different requirements for the time that a ballot is open for review; consequently, the ASTM and ISO standards are not always harmonized. In addition, ASTM's and ISO's business models for sales and distribution are different.

Views of Other Standards Development Forums

In the past year, various market sectors have selected ASTM to serve as the forum for their respective international standards development activities. Committee F36 on Technology and Underground Utilities and Committee F37 on Light Sport Aircraft are two examples.

Committee F36 is focused on

- use of underground utilities and their pertinence for uses other than their originally intended function,
- application of current technology for the maintenance and repair of underground utilities, and
- additional design considerations for unique environments.

Committee F36 has about 200 members, from 25 nations, who represent telecommunications companies, underground utility owners, regulators (municipal engineers), fiber-optic cable manufacturers, the civil engineering community, chemical grout producers, robotics manufacturers, pipe manufacturers, designers of civil software applications, utilities contractors, and fiber-optic deployment technology companies.

Committee F37 is developing consensus standards related to design, performance, quality acceptance tests, and safety monitoring for light sport aircraft. For the committee of 180 members who represent 10 nations, the standards are intended to support new regulations for light sport aircraft. This effort is consistent with regulatory activities underway around the world and is aimed at developing standards that can be applied internationally.

These sectors have determined that their objectives of developing one collection of international standards can be met within ASTM International.

Summary

ASTM International's objective, across the broad spectrum of market sectors it serves, is consistent. The overarching objective is to provide an excellent, efficient, and inexpensive international forum for the development of voluntary consensus standards that are technically sound and globally relevant. However, the different ASTM technical committees use different approaches to developing effective international standards for the sectors they serve. By using the sectoral approach, the committees can address their own issues and develop working methods that fit the problems at hand. As noted in the quotation at the beginning of this article, "this allows efficient standards development and fosters innovation and competition."

About the Author

Teresa Cendrowska is ASTM International's Director for External Relations. Her responsibilities include understanding and resolving the needs of the U.S. Congress and federal agencies regarding the development and use of ASTM standards and supporting the initiatives and objectives of ASTM's global cooperation and outreach.

[1]American National Standards Institute, *National Standards Strategy for the United States*, August 2000.

[2]World Trade Organization, *Second Triennial Review of the Operation and Implementation of the Agreement on Technical Barriers to Trade*, Annex 4, November 2000.

Principles for Developing International Standards

The World Trade Organization (WTO), in its November 2000 *Second Triennial Review of the Operation and Implementation of the Agreement on Technical Barriers to Trade*, defined the principles for developing international standards, guides, and recommendations as follows:

Transparency—All essential information regarding current work programs, as well as on proposals for standards, guides and recommendations under consideration and on the final results, should be made easily accessible to at least all interested parties in the territories of at least all WTO members. Procedures should be established so that adequate time and opportunities are provided for written comments. The information on these procedures should be effectively disseminated.

Openness—Membership of an international standardizing body should be open on a nondiscriminatory basis to relevant bodies of at least all WTO members. This would include openness without discrimination with respect to the participation at the policy development level and at every stage of standards development.

Impartiality and Consensus—All relevant bodies of WTO members should be provided with meaningful opportunities to contribute to the elaboration of an international standard so that the standard development process will not give privilege to, or favor the interests of, a particular supplier, country, or region. Consensus procedures should be established that seek to take into account the views of all parties concerned and to reconcile any conflicting arguments.

Effectiveness and Relevance—To serve the interests of the WTO membership in facilitating international trade and preventing unnecessary trade barriers, international standards need to be relevant and to effectively respond to regulatory and market needs, as well as scientific and technological developments in various countries. They should not distort the global market, have adverse effects on fair competition, or stifle innovation and technological development. In addition, they should not give preference to the characteristics or requirements of specific countries or regions when different needs or interests exist in other countries or regions. Whenever possible, international standards should be performance based rather than based on design or descriptive characteristics.

Coherence—To avoid the development of conflicting international standards, it is important that international standardizing bodies avoid duplication of, or overlap with, the work of other international standardizing bodies. In this respect, cooperation and coordination with other relevant international bodies is essential.

Development Dimension—Constraints on developing countries, in particular, to effectively participate in standards development, should be taken into consideration in the standards development process. Tangible ways of facilitating developing countries' participation in international standards development should be sought. The impartiality and openness of any international standardization process requires that developing countries are not excluded de facto from the process. With respect to improving participation by developing countries, it may be appropriate to use technical assistance, in line with Article 11 of the Technical Barriers to Trade Agreement. Provisions for capacity building and technical assistance within international standardizing bodies are important in this context.

Aerospace Standards

Foundation for the Past, Enablers for the Future

By Laura Hitchcock

An airplane has often been described as millions of parts flying in close formation (a Boeing 777 has 3 million parts, including 3,000 pieces of tubing, 1,300 wire bundles, 14 tires, and 2 huge engines). Put another way, an airplane could be thought of as thousands of standards flying in close formation.

The F-22 Raptor

The aerospace industry and standards have been inseparably linked since the beginning of flight. For The Boeing Company, standards provide the essential language of technical precision, quality, and performance, and they are the single largest source of technical data used to design and build our products. They are also key to achieving our goals of lean, efficient design and production systems. Boeing believes strongly in the benefits of standards and standardization and has been participating in the creation of standards for the aerospace industry since the company began in 1916.

Company in Concert with Industry

Boeing has one of the largest internal standards systems in the world. But in addition to its extensive set of company standards, Boeing is probably the largest user of externally developed standards—industry, government, national, and international. Tens of thousands of standards govern the parts, materials, tests, and engineering and manufacturing processes we use to design, build, and support our aerospace products. Although technology allows you to jump on an airplane and get off a few hours later halfway around the world, the use of global industry standards helps ensure that the cockpit understands the landing beacon, the gateway ramp lines up with the airplane, and the ground support crew services the airplane in the same way, with the same parts, no matter where you landed.

To ensure that Boeing products, services, and technologies are able to travel around the world, we utilize standards from more than 120 different standards development organizations. In addition, hundreds of our technical experts participate on a multitude of standards development committees and subcommittees. Even a Boeing company standard is built upon a foundation of external standards.

There is strategic value in using industry standards where it makes good business sense. Customers and regulatory agencies rely on voluntary standards to demonstrate compliance to design and safety requirements and to support regulations that are reasonable and globally harmonized. By participating in the

The 707 AWACS

neutral forum provided by standards development committees, our personnel have the opportunity to work with both customers (airlines and DoD) and regulatory agencies such as the Federal Aviation Administration (FAA) to define the appropriate standards that have consensus acceptance by all interested parties.

External standards, used in concert with our internal standards, ensure that we have the most reliable and the highest quality products available. Our planes are bought by the government or certified by the FAA based on our product definition—in other words, our drawings. And standards, by virtue of the fact that they're called out on all our product drawings, form part of our product definition. Since certification of every Boeing plane rests on standards, we've built a robust, company-wide standards system to ensure the integrity of our standards, whether they are developed in-house or through an external standards organization.

Delivering Value Through an Integrated Framework

Boeing has a significant investment in the standards used to define and build its products. We spend millions of dollars annually in dues, travel, and other activities associated with the business of developing standards, and hundreds of millions more to procure and use parts governed by these standards. To protect and leverage that investment, we recognize that our external standards development activities are a key component of a corporate initiative to manage external technical affiliations. Our goals for managing relationships with technical organizations include

- creating a consistent image and voice for Boeing,
- establishing external technical affiliations as a core resource for our technology and business strategies, and
- integrating and leveraging strategic and technical opportunities, people, and knowledge.

Translated into standards development activities, our goals mean

- providing an infrastructure to coordinate and establish a single set of Boeing requirements for a standard,
- ensuring a linkage between our external standards activities and our technology and business strategies,
- ensuring that our technical requirements are met by the external standards we help to develop,
- leveraging the technical knowledge and relationships gained through participation in external standards activities, and
- promoting Boeing and our technical experts as leaders in aerospace and in the standards community.

Managing Our Standards Investment

To support our goals for managing and leveraging standards activities, Boeing has strategic, company-wide activities in five key areas:

- *Coordination.* Drafts of new and revised industry, government, and international standards are coordinated throughout the enterprise. Our objective is to establish a single Boeing position on the technical requirements contained in the standard and to ensure that industry standards will meet the needs of all our products and business units.
- *Visibility.* Internal websites provide visibility and status on Boeing's participation in external standards development activities. Any employee can quickly determine who in the company is participating on which standards committees and can access trip reports and news of standards activities and issues. In addition, weekly reports provide visibility for all changes to external standards that are referenced by Boeing standards.
- *Policy.* Boeing supports and encourages employees to hold leadership positions on the standards governing boards and policy committees of our key standards organizations such as the American National Standards Institute (ANSI), Society of Automotive Engineers (SAE), American Society for Testing and Materials (ASTM), Institute of Electrical and Electronics Engineers (IEEE), and ISO. Boeing considers it an important part of protecting our standards assets to influence and monitor the external standards environment through these boards and committees. By working through the corporate External Technical Affiliations Process Council (the body overseeing our relationships with external technical organizations), we can establish an integrated strategy and participation infrastructure to meet the changing external standards challenges.
- *Access.* Boeing provides enterprise-wide web-based access to external standards and standards information. We maintain licensing agreements with a number of standards development organizations for the rights to create special derivative works of industry standards. Boeing also uses a third-party vendor to integrate and provide access to all the external standards used by the company. A recent upgrade to our system allows an

employee to link from inside a Boeing company standard directly to a referenced external standard without having to exit one system and enter another.

- *Training.* Boeing provides training, both classroom and online, in the value and use of standards. All of our new engineers receive instruction on standards as part of their orientation training. We offer web-based training on the use of different types of standards, and our central standards organization also provides training and will help build a business case for a particular standards activity.

Forging a Shared Destiny

Through active management of our external standards affiliations, Boeing is working to build stronger relationships with our key standards providers. If you think of the entire life cycle of a standard, industry is at the beginning and the end of the standards "food chain." We begin the standardization process by identifying the need for a standard. Industry donates the technical expertise, the technical requirements, and the intellectual property. And industry is at the end of the chain, giving the standard life by incorporating it into the product definition or making it a requirement for use in the manufacture or support of our products. In the middle is the standards development organization. The standards organization provides that critical neutral forum where industry, customers, and regulatory agencies can hammer out a consensus set of requirements acceptable to all. They facilitate and administrate the standards development and maintenance processes. The standards organization takes care of publication, distribution, and configuration management of the technical data. And they ensure openness, balance, due process, and the right of appeal.

The F/A-18 Hornet

However, as part of the standards value chain, it's incumbent upon the standards developers to ensure that what they bring to the process truly adds value. Boeing has been working with our key standards developers to forge a sense of shared destiny—a "working together" attitude rather than a "throw it over the fence" mentality. This means working with standards organizations to ensure that they understand our processes and business drivers: the way we use standards, our current economic environment, impacts of technology changes, and changes in standards needs.

The other side of this relationship means we also work to understand the standards organization's processes and business drivers: the products and services they provide, their business process and governance structure, funding issues, and the way industry can in-

fluence the standards process. Those standards development organizations that are willing to work together with industry—with a sense of common goals—will quickly become the standards developers of choice. Industry does have a choice where it takes its standards needs.

Global Is the Way to Go

The aerospace industry is a truly global one. The majority of Boeing jetliners are sold to overseas customers, and our aerospace products orbit the earth and fly across the skies 24 hours a day. We have customers, design partners, and suppliers all over the world. Our focus is global rather than just local, regional, or national. And while our world has grown smaller because of advances in both transportation and communication, we are part of a world that has grown larger and stronger in trade.

So more than ever, standards are vital to facilitating global trade. Standards can open new markets, reduce trade barriers, and assure our customers consistent quality, interchangeability, and maintainability. And for industry to realize the greatest benefits from standardization, the industry standard must be a global standard. Global standards form a common language that allows us to integrate our products and services more effectively into international markets. They help define new emerging technologies, establish global requirements, set criteria for international quality assessment systems, and meet a fundamental need as the international language of trade.

Boeing's use of the term "global standard" is deliberate. A global standard is one that is recognized, accepted, and used globally. This is independent of whether it was balloted to nations, industry, or individuals. There are "international" standards that have been developed under the "one country, one vote" system that are not the preferred standards for the aerospace industry. There are also U.S. military specifications that are called out on aerospace manufacturers' drawings from Brazil to Canada to France. In other words, they're functioning as global standards—recognized, accepted, and used throughout the world.

The aerospace industry uses many paths for achieving a global standard:

- The International Civil Aviation Organization (ICAO) is an international agency that has been developing international (or global) standards covering such areas as licensing of aerospace personnel, rules of the air, aeronautical meteorology, operation of aircraft, aeronautical communications, and aircraft noise and engine emissions for over 50 years.
- The International Air Transport Authority (IATA) is another "international" organization that develops standards for passenger and cargo services.
- The International Aerospace Quality Group (IAQG) brings together all the major industry players to develop globally harmonized quality standards.
- Key industry standards organizations (including SAE, ASTM, IEEE, and the American Society of Mechanical Engineers), while domiciled in the United States, allow participation of materially interested parties from all

over the world to develop global standards for use in aerospace.

Boeing will continue to work through all value-added paths to ensure that global standards exist and continue to be the common language for even more communications and commerce.

Global Standards—Global Access

Global trade depends not only on global standards, but on global access to those standards. In the 1960s, airplanes were designed in two dimensions using pen and ink on big sheets of Mylar. Now our people create airplanes entirely electronically. They work and rotate colorful, solid three-dimensional models to see all dimensions of their design. We need to recognize and adapt to changes happening in how industry is accessing and using technical data. The world of paper has become a thing of the past. Manufacturers, suppliers, and customers now create and share technical data electronically. The challenge for the standards community is to work to shed the paper-based paradigms, to move beyond site licenses and server-based models to allow users enterprise-wide, global go-anywhere use of standards. A standard only has life if someone uses it. But if it's not available in a way that it can be easily accessed and integrated into the corporate design tools, global companies will be forced into developing their own standards or be driven to those standards organizations that support the new information age.

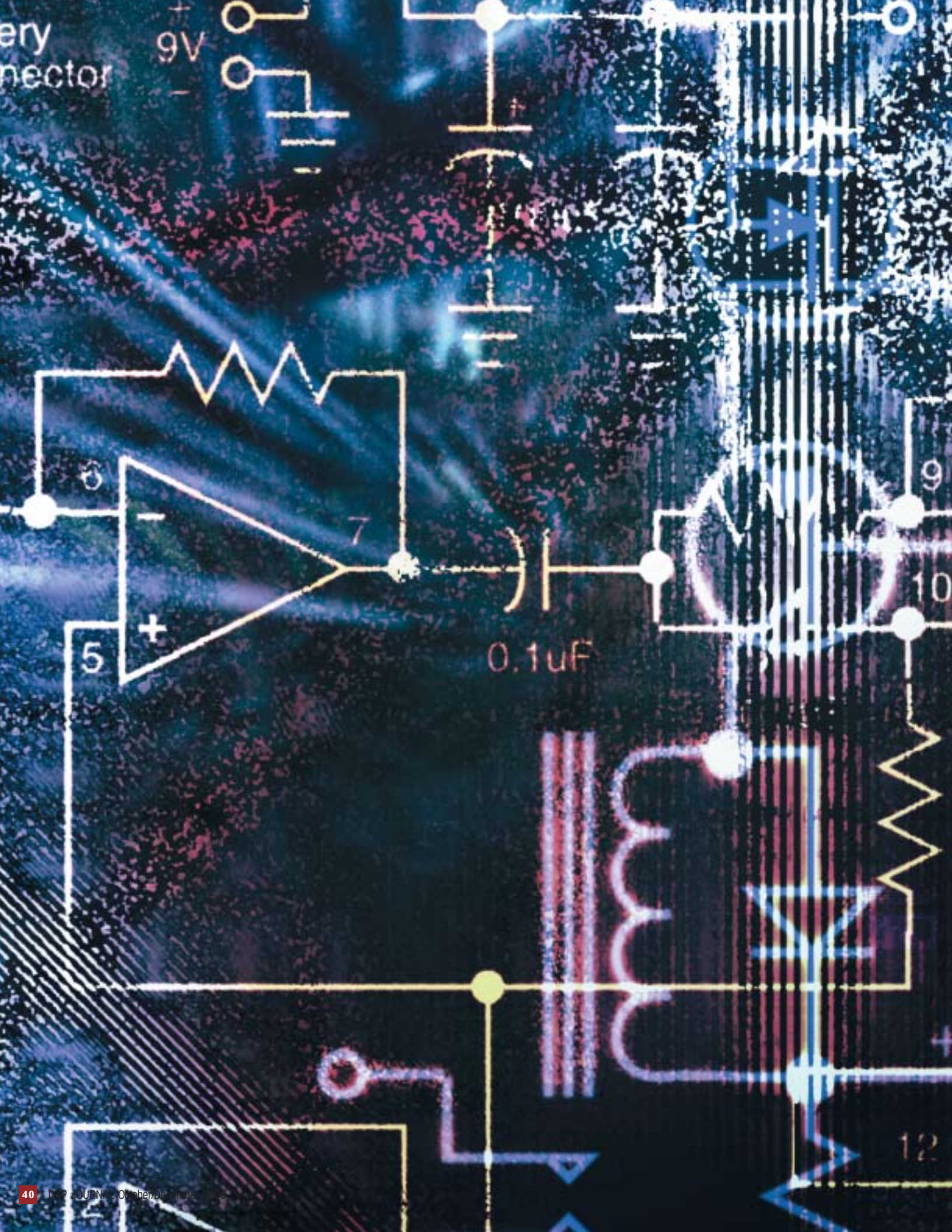
Boeing is working to reformat its internal standards in such a way that the technical data can be integrated into our electronic design tools. We've also begun to explore pilot programs with a few key industry standards organizations to look at moving the technical data contained in standards beyond the "locked" document format. If standards are to continue to enable global trade, they must adapt to the changing trends of e-business. The Boeing Company of the 21st century is not a factory, an office, or a service depot. It's wherever a Boeing person is doing business, whether it's Seattle, St. Louis, Beijing, or Bogotá, or even onboard one of our planes at 40,000 feet. And all our technical data need to be there, including the standards.

Enabling the Future

Boeing is committed to working with the voluntary consensus standards community to continue making the changes necessary to support a robust and viable set of global aerospace standards. This includes working together to make the necessary changes to the business of how we achieve standardization—how we develop, distribute, and use standards as strategic tools. This is not a small investment, nor one we take lightly. Boeing has built amazing aircraft and spacecraft using industry standards, and we will rely on standards to define even more amazing products in the future. We believe we can work together with industry, government, and the standards community to ensure that the standards of the future meet the needs of the future.

About the Author

Laura Hitchcock is Senior Standards Specialist, External Standards Management for The Boeing Company, Seattle, WA. She has more than 20 years of experience in standards, standards administration, and management. Ms. Hitchcock chairs the U.S. Technical Advisory Group for ISO/TC 20 on Aircraft and Space Vehicles and is vice-chair of ANSI's Company Member Forum.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The MultiView Program

Managing and Exchanging Complex Systems Data Throughout Life Cycles and Between Programs

By John Reber

Enterprises that acquire and sustain modern, complex weapons systems face unprecedented challenges in containing costs while taking their systems through concept, design, development, deployment, and retirement. The schema and associated data set required for specifying, developing, operating, maintaining, and disposing of such systems is extremely large and involves myriad subtle relationships among seemingly disparate domains. Added to this complex reality, contractors and program offices must develop, deliver, and manage systems meeting aggressive readiness requirements and shifting mission objectives within stringent budget constraints. Affordability has become as important as mission performance when developing and sustaining such systems.

Similarly, product customization to satisfy specialized customer requirements, time-to-market, and affordability has become as important to the industrial world as product performance is for commercial complex systems. Commercial companies are increasingly operating in a virtual extended enterprise environment striving to share selective information with their disparate distributed stakeholders.

Program offices for military weapons systems must be able to define technical or fiscal metrics to assess total system ownership costs. Traditional system acquisition and life-cycle management practices include the use of automated tools for modeling and simulation, configuration management, and supply support systems to create and manage technical data for systems both in development and in the field. However, each tool uses its own data representation and storage mechanism, causing major problems in communicating between systems.

With a few exceptions, mostly in the commercial industrial world, no real interoperability exists among tools, even for exchanging data concerning the same technical area of the system. Human operators most often reenter data for each tool employed in the process. Interoperability problems grow with automated support. As program management offices use advanced process modeling and planning techniques and work with complex sets of data across multiple databases, this "Tower of Babel" increases. This presents a growing challenge to programs to effectively integrate complex system data.

There is significant commonality of interest between DoD and U.S. industry in trying to achieve a high degree of interoperability among their information technology (IT)

systems for complex engineer-to-order systems, products, and processes over their life cycle. Success in doing so minimizes the number and cost of transactions and results in a lean, more affordable operating mode for all involved. The path to achieving this objective is the MultiView approach. That approach uses

- existing commercial enterprise software and standards,
- a single schema for seamless integration of broad and varied data sets, and
- a framework or architecture for the communication and access to the data, over the life cycle of the system or product involved.

MultiView Approach to Problem Solution

Meeting the challenge to effectively integrate complex system data is a key to ensuring that DoD complex systems (such as the Abrams Tank, the Navy's 21st Century Destroyer, and the Joint Strike Fighter) and commercial complex systems (such as wide-body airplanes, automobiles, trucks, ships, trains, offshore oil rig platforms, satellites, and so on) are both mission and performance effective and affordable. The response to the challenge involves three principal elements:

- Organization of the system data through an integrated multi-domain data schema for representing system product and process data. This will be essential to developing and operating an advanced integrated environment.
- Integrated environment that employs formal methods and automation to support the full range of data manipulation and communication required by complex system life-cycle activities. This environment will enable a broad spectrum of life-cycle participants to evaluate alternatives in multiple domains simultaneously, provide a way for stakeholders to understand their needs in relation to the enterprise as a whole, and provide a continuous proactive means of identifying and successfully addressing key challenges for a complex system over time.
- Evolved culture in which enterprise-wide cooperation is the rule and individual contributions are encouraged and efficiently managed.

Working within an integrated environment based on these three elements will provide a common frame of reference in which sophisticated relationships across technical domains, and between these domains and a system's affordability, can be

The JSF X-35C demonstrates the integrated systems approach used by DoD and manufacturers.

explicitly identified and analyzed. The key to realizing gains from the combined elements is the data schema, which is essential to integrating the disparate data sets in use by complex system program offices and other related enterprises.

Schema

A conceptual schema is a depiction of the entities representing types (or classes) of data and the relationships that exist among them. Example entities are person and organization. A relationship may exist between these entities that indicates that a person may be a member of an organization. A schema also contains attributes for classes of data. For example, the class of person may have attributes of name and title.

The MultiView schema will be a conceptual schema. Tailoring for each program that uses the schema will create the mappings between the conceptual entities and that program's data.

Standardization

To achieve the long-range program objectives, organizations that constitute the complex-systems industry must reach consensus on and adopt the MultiView data model. This will occur when organizations, not just individuals within the organizations, have incorporated the MultiView data model into their strategy, architecture, and IT applications toolkit and use the MultiView data model in their everyday operations. This pertains especially to IT suppliers and engineering and manufacturing companies of complex systems.

Promulgation of the MultiView schema as a standard that is sought after, endorsed, broadly accepted, and maintained and used by industry and DoD is essential. In January 2002, the Electronic Industries Alliance (EIA) Government Electronics and Information Technology Association (GEIA) authorized a project to develop a standard called "Common Data Schema for Complex Systems." The standard—EIA-927—will be available for public use by the end of 2004. DoD funding for initial implementations in FY05 is under consideration.

To ensure that the schema is adopted and used by a significant portion of the aerospace and defense industry, GEIA has formed an EIA-927 Advisory Group consisting of representatives from government and industry. The activities of the team will include reviewing the work products from the project and helping to prioritize the integration work so that the interests of the represented organizations are best served. If the organizations' needs are met, then it maximizes the likelihood that they will adopt and use the resulting schema standard.

EIA-927 Schema Development Process

To reduce the time necessary to develop the EIA-927 schema standard, avoid duplication of effort, and accelerate industry usage, the MultiView team agreed on a strategy of reusing existing schemas that cover some portions of the program scope rather than developing the data schema from scratch. Such reuse will take two forms: integration into the actual schema and reference from the schema.

Essential to the process of integrating data models into EIA-927 is the selection of appropriate data models to be integrated. The selection of candidate standards for integration is based on a priority scoring

algorithm that weighs client needs, the urgency of integrating the domain covered by a data model, and several other lower priority considerations.

EXPRESS (ISO 10303-11) was selected as the modeling language for MultiView. The development of the EIA-927 schema is an iterative process, based on ISO 18876 (Integration of Industrial Data for Exchange, Access and Sharing—IIDEAS), consisting of first selecting an integration model and methodology, then of repeated data model integration activities.

The Integration Model

The integration model chosen for the schema development is the data model from ISO 15926 (Industrial Automation Systems and Integration—Integration of Life-Cycle Data for Process Plants Including Oil and Gas Production Facilities), also known as the EPISTLE Core Model, version 4.0. The model provides the high-level information viewpoint, the breadth, and the generality needed to capture the expanse of the EIA-927 domain of interest, while providing a framework capable of preventing redundancy and ambiguity in the resulting schema.

Iterative Integrations

The activities of the standard integration process occur in three integration phases: requirements analysis, mapping and integration, and verification and documentation. In the requirements analysis phase, the most recent version of the EIA-927 schema undergoes a gap analysis with respect to prioritized stakeholder needs and available data model candidates to apply to those needs. During mapping and integration, the use of a selected government or industry standard is planned and executed to fill any information gaps identified in the previous phase. Finally, in the verification and documentation phase, the results of the integration activities are checked for correctness and completeness, any impacts on prior integrations are investigated, and all results are captured for use in applying the schema as well as in applying future schema enhancements.

About the Author

John Reber is the lead for EIA-927 schema standard development at Trident Systems, Inc. He has been deeply involved in data management and interoperability for the past 15 years and has more than 30 years of experience in data modeling and database system development.

Voluntary Standards—Why Engage?

Standards encourage interoperability, create markets, and facilitate change.

By Richard Forselius, Sc.D.

The undisputable fact is that standards add value to our lives every day. Standards create efficiencies, and they create markets for manufacturers. Standards allow interoperability between otherwise dissimilar pieces of equipment. Standards are facilitators for change. Implicitly, standards pervade our society, and we submit to their requirements in every waking hour.

Standards are based on the soundest technical judgment of subject-matter experts from "materially affected parties." The consensus opinions of technical experts are captured in published standards. Those standards are widely available to all.

Standardization is a natural consequence of the manufacturing process, borne out of manufacturing necessity. It has deep historical roots in the industrial revolution, when both mass production and interchangeability became essential and when agreements within industrial competitors in the area of general product attributes commenced. The use of standards allows organizations to manufacture faster, better, and cheaper. Written industry-wide agreements, recorded as standards, have allowed the achievement of economies of scale.

Often, industry agreements have preceded national or international policy. The standards that are the result of these agreements, developed by the consensus voice of materially affected parties, have

preceded law or international convention. Through the consensus development process, standards allow industries to self-regulate and, often, present an opportunity to promote industries as self-regulating entities. Further, competition is then based on performance to technical documents, not the differences in technology.

Genesis

Standards have evolved over many hundreds of years in response to ever-growing needs. Many everyday standards we conform to have deep roots. I provide a few examples:[1]

- Railroad track. The development of a standard railroad track gauge made possible the interchangeability of railroad cars. Most early American railroads had their own gauges, but finally, President Lincoln ordered that all gauges be 5 feet. Although the railroad industry did not agree on this standard at the time, an eventual agreement stated it should be 4 feet 8 1/2 inches throughout the United States. However, this does not agree with the track gauge of some other countries, such as in South America where the distance between rails is 5 feet 6 inches, or in South Africa where it is 3 feet 6 inches.
- Standard parts. At the end of the 18th century, in New Haven, CT, Eli Whitney, the "father of standardization," received a contract from Thomas Jefferson to produce 10,000 muskets. To demonstrate interoperability, Whitney appeared before Congress with a pile of parts and assembled 10 muskets by picking standard parts at random.[2]
- Interchangeability. In the 19th century, Joseph Whitworth, an engineer and toolmaker, promoted standardization as a means of obtaining interchangeability, illustrated by a simple candlestick and candlestick holder. In an 1841 paper presented to the British Institution of Civil Engineers, he urged adoption of uniform pitches and dimensions of screw threads. His thread design, known as the Whitworth thread, became widely adopted. He also developed a system of standard gauges, a pioneering feat.
- Safety. In 1922, a safety code for grinding wheels was developed to succeed 14 different regulations from 14 states regarding the use of abrasive wheels. This code stated the requirements for storing, handling, operating, and mounting wheels, as well as the requirements for flanges, hoods, chucks and guards for protection, and other suitable materials.
- Global standardization. Today's global standardization initiatives had their genesis at the first formal conference on international standards held in Paris in 1875. Of 19 nations attending, 17 signed a covenant on weights and measures. This provided for the French government to declare neutral territory in the Park of St. Cloud for the International Bureau of Weights and Measures.

These few vignettes of the history of standards illustrate how ubiquitous the use of standards has become in our daily lives. One can also imagine the difficulties we would encounter in today's world had it not been for the development of such standards.

Evolution

Until the 1990s, for government contractors, standards meant MilSpecs and MilStds, which were developed as an acquisition vehicle. The acquisition reform initiative meant prescriptive MilSpecs and MilStds would be replaced by performance-related documents and handbooks. Many former MilSpecs and MilStds are now managed by standards development organization (SDO) committees, industry consortia, and others. The government's role in managing these documents has diminished from what it was historically.

To create government influence in voluntary SDO committees, it is necessary to actively engage in dialogue and participate. Participation allows for influencing the requirements in standards and provides a forum for dialogue about new industry developments. Participation also sends a message to industry that your organization is a serious player in the field and identifies you as a viable partner.

When there is a rationale for creating new standards, a leading role can be played in the development of those standards. Development of new necessary standards, as well as

confirmation of and modifications to existing standards, enhances the U.S. voluntary standards system as a whole. It is important to recognize where relevant work is occurring and to decide to engage or follow another strategy.

Value

Standards are invaluable. As pointed out by a National Research Council committee of 16 experts in the fields of engineering design, education, practice, management, and research,

> Use of standards can save design time, reduce uncertainty in performance, and improve product quality and reliability. It can also lead to economies of scale. Companies often define standard component lists and procedures with the goal of obtaining these advantages and then fail to enforce their use. New designers, failing to recognize the advantages of standards, tend to choose parts from their own knowledge or from the most familiar or convenient catalog. Unless a firm establishes standards and makes their importance known, any benefits that might result from their use will almost be foregone.[3]

U.S. policymakers and arms of the U.S. government, such as the National Institute for Standards and Technology, should be concerned about international barriers to entry for U.S. products. Barriers to entry make it more difficult for industry to provide a product to a particular country or trading block. A released standard, for example, might contain a requirement for all products to be manufactured to the metric system. This may require reengineering of products designed domestically for export to Europe, as an example. This will cause inefficiencies in creating truly global products and, therefore, add to design and manufacturing costs. Where practical, it is important to recommend and conform with international standards and work to eliminate barriers to entry, to enhance the value of the U.S. national voluntary standards system.

Impact of Acquisition Reform

In the 1990s, acquisition reform took on preeminent importance in DoD. Walter B. Bergmann, chairman of the Defense Standards Improvement Council and director of DoD Acquisition Practices, said:

> The reform achieved during the first Clinton Administration, by far the most effective of the many attempts at acquisition reform, is now in the hands of the DoD acquisition work force. Certainly in the areas of specifications and standards reform, the goals, principles and rules are pretty much laid out. We can fine tune them, make changes where we've made misjudgments, but to do more would be counterproductive.
>
> Now we are down to the business of translating the principles into the specifications and standards that we shape and apply as we go about the business of acquisition. Most important to achieving accuracy in that translation is an understanding of the goals we are trying to achieve. In June of 1994, we began the process of changing the default way we describe requirements to performance for some compelling reasons.
>
> We can't afford to buy the systems we need tomorrow without minimizing today the cost of system development, acquisition and support.
>
> We need to tap the state-of-the-art technology in the commercial market and reduce the time to field new systems to avoid fielding systems with grossly outdated technology.
>
> We need to broaden the industrial base from which we draw in meeting defense requirements in times of peace and conflict.
>
> Writing specifications in performance terms and eliminating manufacturing and management standards are means to an end. We intend to give our suppliers flexibility in the way they produce and our work force flexibility in the way they buy—so that the goals of our reform are achieved.
>
> Recognizing performance specifications and knowing the new rules is not enough; we must also have a clear vision of what we are trying to achieve. As you go about your daily business, reworking specifications and developing alternatives to military standards, let

> the framework for your decisions be achievement of the goals. A military standard published as a non-government standard, not embraced by commercial industry, does not achieve our goals. A performance specification containing overwhelming or unique testing requirements does not advance our goals.[4]

The flip side is that the government's role in the voluntary standards system is also assessed continually by U.S. business. In testimony before Congress, U.S. business leaders state strong support for continuing the present voluntary standards system. Testimony at Department of Commerce hearings reaffirmed the need for better cooperation between the private sector and the Department of Commerce to strengthen and improve participation in international standardization and to increase U.S. competitiveness globally.

Success in Committees

A key element of strategic standardization is to involve company representatives in industry SDO committees to ensure that adopted standards represent the organization's strategic interests for important products in emerging markets.

The concept of strategic standardization is broader than a commitment to industry design specifications. It also recognizes that product design, manufacture, and assembly is a systems process in which many different pieces have to be assembled to produce a working unit. When all components and equipment meet interchangeability and compatibility standards, enormous advantages may be realized in areas such as manufacturing, repair, servicing, and upgrading.

Most products might be described as bundles of copyrights, patents, and licenses. Having a company's intellectual content accepted by industry SDOs increases its value and facilitates the assembly of key licenses required to produce (or manufacture) a product. Often, certain proprietary manufacturing techniques enhance the value of a product. Both design and manufacturing involve processes of identifying key patents and licenses to ensure compliance with technical specifications. Companies also strive to hold investment cost at affordable levels in product design, development, and manufacturing through standard, repeatable processes.

Standardization strategies are not limited to manufacturers or manufacturing processes. There are many standardization issues for service organizations and governmental activities (for example, health care, education, financial transactions, transportation and aviation, and building codes). These standards are also very important commercially.

Since markets have become more global, standardization issues have become more important in successful competitive entry. Compliance with the diversity of local standards is more efficiently resolved if products are designed and produced to specifications recognized not only by firms worldwide, but also recognized as compliant by third-party testing organizations (such as Underwriters Laboratories or the Performance Review Institute) through conformity assessments.

Strategic standardization is the way business leaders leverage standards, both technical and management, to build and sustain a competitive advantage...

The development of global standards is not a new process. For decades, the International Organization for Standardization, or ISO, founded in 1946, and its sister organization, the International Electrotechnical Commission, founded in 1906, have endorsed standards for all kinds of products and processes. These organizations should be thought of as central clearinghouses where standards developed by technical committees from many different nations are resolved and harmonized.

Strategic Standardization Management

It is impossible for an organization not to be at least implicitly involved in standards in some way. However, considering the availability of widely recognized SDOs and the global pressures for standardization, it is a superior business strategy to address standardization tasks explicitly. The activities involved in addressing the management of standardization efficiently have been labeled as strategic standardization management, or SSM®, a registered trademark of the American National Standards Institute (ANSI). This concept was first advanced by Robert Walsh at ANSI and published in a 1993 paper by Diego Betancourt of Polaroid Corporation. Strategic standardization management is a macro process and management leadership discipline that investigates, defines, recommends, and implements standardization strategies and policies. Through SSM, managers assess and optimize their organization's influence in industry SDO committees.

To achieve desired results in international bodies such as ISO's technical committees, the SSM process must work efficiently in relevant organizations, such as manufacturers and other companies, within industry technical advisory groups and SDO committees, as well as ANSI. Exceptions to this rule exist; for example, manufacturers that dominate worldwide markets. These standards are developed by other than the consensus of all materially affected parties through non-ANSI-accredited organizations and are also widely accepted (for example, aerospace and the Aerospace Industries Association's National Aerospace Standards).

Several successful U.S. businesses credit the strategic adoption of standards in processes and products, or strategic standardization, with helping them achieve industry leadership. Strategic standardization is the way business leaders leverage standards, both technical and management, to build and sustain a competitive advantage or avoid a competitive disadvantage.

The SSM process suggests the use of a systems approach to managing standardization activities within an organization. SSM is an ongoing philosophy that it is in the organization's best interest to influence SDO committees through informed representation and to modify or initiate standards that reflect evolving technologies and the optimum business and product plans of the organization. Influence is accomplished through participating, increasing technical and management competencies, gaining competitive information, assigning metrics to key processes, and managing achievements against goals.

SSM is a full-time activity in which an organization creates structures and designates personnel as subject-matter experts to complete needed tasks. The following are dominant activities in an organization's SSM process:

- Identify standardization opportunities that will increase organizational advantages in the global marketplace in concert with business and strategic plans
- Develop appropriate SSM assessment and implementation models
- Ensure active, integrated, and efficient participation in leadership positions in SDOs and other standardization activities worldwide
- Continually assess the organization's SSM activities and their impact on organizational businesses and products
- Coordinate design, manufacturing, environmental, and quality planning and practices internally
- Investigate the approaches of organizations competing within an industry to identify best practices (benchmarking)
- Monitor emerging management systems standards worldwide
- Promote SSM as a key business strategy.

These activities affect almost all parts of an organization and require a system of management to ensure that they are adequately performed. Because SSM tends to be diffused within the organization and focuses on the core competencies of the organization, it requires continual monitoring; it cannot be left to chance. A level of organizational commitment beyond just "hiring better engineers" is warranted.

Summary

The historic and consensus-based and voluntary U.S. national standards system adds considerable value in defining the parameters under which conforming products operate. Acquisition reform has changed the model under which the government speci-

fies and procures products from industry. Many former MilSpecs and MilStds are now maintained by private-sector SDOs. SSM is recommended for ensuring effective influence in SDO committees. To influence the voluntary standards system, it is essential to actively engage and participate. Without informed participation, the standards system will lose its viability. It is important to study where technical work is occurring, to keep abreast of emerging issues, and to provide influence.

About the Author

Richard Forselius, Sc.D., is Manager, Engineering Records, at Hamilton Sundstrand, a United Technologies Company, in Windsor Locks, CT. He is a member of ANSI's Board of Directors and the ANSI Company Member Forum. In 1997, ANSI presented Dr. Forselius with its Meritorious Service Award for his exemplary contributions to ANSI. Dr. Forselius also is active in numerous professional organization such as the Aerospace Industries Association's Engineering Management Committee.

[1]Examples were adopted from "Through History with Standards," an American Standards Association document reprinted in Rowen Glie, *Speaking of Standards* (Boston: Cahners Books, 1972).

[2]*Defense Standardization Program Journal*, March/June 2003, p. 2.

[3]National Research Council, Committee on Engineering Design Theory and Methodology, *Improving Engineering Design: Designing for Competitive Advantage* (Washington, DC: National Academy Press, 1991).

[4]*The Standardization Newsletter*, February 1997, pp. 1–2.

Some Definitions

A number of definitions of "standard" exist:

- A document, established by consensus and approved by a recognized body, that provides for common and repeated use, rules, guidelines, or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context (ISO/TC 115).
- A document that establishes engineering and technical requirements for processes, procedures, practices and methods that have been decreed by authority or adopted by consensus (EIA-632 V0.9).
- A document that establishes uniform engineering or technical criteria, methods, processes, and practices (MIL-STD-100G, MIL-STD-962).
- A set of technical definitions and guidelines developed so that items can be manufactured uniformly and provide for safety and reliability (Y14.100M-1997).
- A standard that controls the medium or process of exchanging data between a sending and a receiving system. Data exchange is defined in terms of presentation formats and transformations of those presentation formats (MIL-HDBK-59B).

Bio-Based Alternative Fuels Standardization

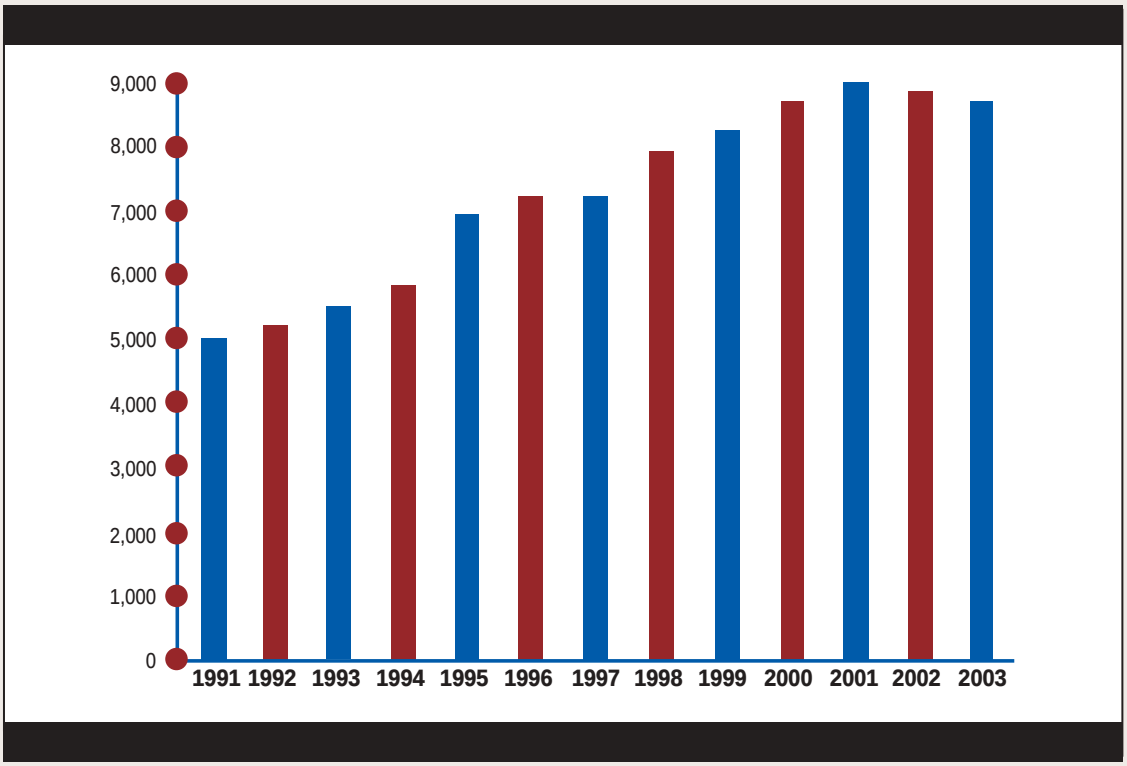
The Defense Energy Support Center (DESC) won the 2003 White House Closing the Circle Award for promoting the use of bio-based alternative fuels in federal government fleets. These fleets include administrative and emergency vehicles, some tactical vehicles, and generators.

In accordance with the bio-based alternative fuel goals in the 1998 Executive Order 13101, Greening of Government Through Waste Prevention, Recycling, and Federal Acquisition, DESC has led the way for the military services and federal civilian organizations in procuring E85 (a blend containing 85 percent ethanol and 15 percent gasoline) and B20 (a blend containing 20 percent long chain fatty acids derived from vegetable oils and 80 percent low sulfur diesel fuels). As a matter of fact, in 3 years, the federal government has gone from using almost no bio-based fuels to using approximately 6 million gallons (B20 and E85 combined).

Because a commercial specification for E85 already existed, DESC partnered with industry to establish requirements for B20 use that would comply with the Executive order's goals and at the same time, not have a negative impact on vehicles or equipment using this petroleum-vegetable oil blend. This specification, in the development stage, will address such issues as storage stability, cold weather concerns, and elimination of problematic products. Until the commercial specification is available, DESC ensures compliance with the Executive order through a procurement clause listing a set of requirements the B20 product must meet.

DoD-Adopted Nongovernment Standards

The following is a graph of nongovernment standards that the government has adopted since 1991.



I-Codes Work for Standardization and Building Safety

By the ICC Public Policy Department

The construction industry has had a long-standing requirement for common building safety codes that could be used across the country. Until recently, a set of such codes was only a dream. But that situation changed when the International Code Council (ICC) developed the International Codes, or I-Codes. Now, any city, county, or state can use I-Codes to reduce its construction costs and ensure safer buildings.

I-Codes provide the minimum specifications for protecting people in residential, commercial, and public buildings, especially during natural disasters such as hurricanes, floods, earthquakes, and wildfires. Because I-Codes may be adopted by local jurisdictions throughout the United States, cities such as Honolulu, Nome, Dallas, and Detroit can adopt and enforce the same family of construction codes. I-Codes also make it more affordable for national companies that construct or renovate buildings to enter local markets, and they eliminate some of the barriers for local companies wanting to expand operations to other parts of the country.

I-Codes establish a common building regulatory focal point for public officials, builders, architects, engineers, building managers, and owners. A single code and support system enhances economic development and assists in the acceptance and use of technology in materials, research, design, and construction practices.

According to Sara Yerkes, ICC's Vice President for Public Policy, "It is a win-win solution for the regulated community and consumers." She also notes that professionals now can be trained and certified on one set of code documents instead of three or more. Materials suppliers can meet a single set of regulations. And, policymakers can be assured that public safety standards will be met regardless of where an architect, engineer, or contractor is based.

John Nachbar, City Manager for Overland Park, KS, adds: "As these codes become widely used across the country, the industry will have a clearer understanding of what is expected in Overland Park. We're excited about the potential these codes offer to our local economy and the public." Indeed, the I-Codes, developed as a successor to three regional construction codes that were the foundation for building regulations in the United States, are considered a coordinated, comprehensive family. Tim Ryan, Codes Administrator for Overland Park, concludes: "The I-Codes are probably the most technically proficient construction codes on the planet, and they're all compatible with one another." Not only are the I-Codes more advanced than prior, regional construction codes, they can be implemented without having every local building department fund, write, and update individual code documents. Whenever an I-Code

The ICC Performance Code for Buildings and Facilities incorporated strengths from each of the legacy codes and advanced them so they could be applied nationwide. As a result, construction codes have achieved consistency.

is updated, local jurisdictions can simply adopt the new documents.

Since adopting construction and safety codes into law is the responsibility of city managers, county planners, mayors, governors, and other elected officials, policymakers in each jurisdiction must be aware of local construction codes and their effectiveness in protecting the public.

Behind the Codes

Although most public officials agree on the need for consistent, updated construction codes, I-Codes took nearly a decade to develop and involved the combined efforts of many organizations, associations, and individuals.

ICC spearheaded this effort. It developed the new construction code family, incorporating strengths from each of the legacy codes and advancing them so they could be used and applied nationally. The first I-Code, the International Plumbing Code, was published in 1995. By 2000, a family of 11 construction codes was available. The ICC Performance Code for Buildings and Facilities joined the I-Code family in 2001, and two more codes have been included in the 2003 editions.

In addition to developing I-Codes in an open process and securing industry support, ICC maintains the codes through the use of public hearings. "This helps adopting jurisdictions feel comfortable with the entire process and makes the transition from former codes easier," says Sara Yerkes. Voting

members emphasize that they are code enforcement and fire service officials with no vested interest. They review the recommendations of the ICC code development committee at their annual conference and determine the final action. Following consideration of all public comments, each proposal is individually put to a vote. The final action on the proposals is based on the aggregate count of all votes cast. I-Codes are revised every 18 months. As Ms. Yerkes noted:

> This process ensures that the I-Codes will reflect the latest technical advances and address the concerns of those throughout the industry in a fair and equitable manner. It took a lot of hard work and the combined efforts of thousands of professionals to develop these codes. We honestly feel they are the best way policy makers can help protect the public and regulate their local building industry.

Economic Advantages

Many jurisdictions, large and small, throughout the United States have recognized the economic benefits of I-Codes and started the steps toward their adoption.

"Having one set of codes boosts the entire industry. People can move around more freely and build more economically," acknowledges Ron Nienaber, Director of Fire and Building Inspection Services for Maple Grove, MN. Maple Grove's building department has recommended adopting the International Building Code (IBC), International Residential Code, International Mechanical Code, and International Fire Code to replace the Uniform Building Code. This move is expected to benefit the local business economy and boost public safety.

In the case of Overland Park, which has adopted the IBC and other I-Codes, both the metropolitan area and state are using the same construction codes for the first time. "This puts us in a good spot with regard to economic development," John Nachbar explains.

In Nashville, TN, which formerly used the Southern Building Code, building officials and policymakers supported the I-Codes from an economic standpoint. "Whether you're located in Dallas or Detroit, you can design for a building in Nashville or Davidson County without having to stop and research local codes," adds Terry Cobb, Director of Codes Administration for the Metropolitan Government of Nashville and Davidson County.

Even the nation's largest city, New York, which is not subject to state authority in this area and has maintained its own code for nearly 50 years, has reviewed I-Codes as a way to open employment doors nationally while helping to generate more affordable housing. I-Codes also would make the city consistent in its construction rules with the rest of the state. The New York State Code, which does not apply to the city of New York, is based on the I-Codes. According to Mayor Michael R. Bloomberg, "By studying and potentially adopting the IBC, New York City will streamline one of the largest hurdles to construction: our current building code's complexity." Calling New York's building code the "largest and most complex in the country, taking up hundreds of pages in the City's Administrative Code," Mayor Bloomberg said adopting the IBC would help generate more affordable housing and make New York a more attractive place to do business.

"Adopting the IBC will be a tremendous boon to both construction professionals and the buildings department," added Department of Buildings Commissioner Patricia Lancaster. Based on city data, it's expected that adopting the I-Codes would

Mayor Bloomberg asserts that adopting the IBC would help generate more affordable housing and thus make New York a more attractive place to do business.

save up to 15 percent on building development costs. Based on that estimate, New York would save $350 million in commercial construction annually. The city also anticipates saving up to 13 percent in residential construction, in both single family and multifamily units.

Adopting the I-Codes would make the region a more attractive draw to relocating businesses and contractors, boosting the local economy. One multifamily builder pointed to the city's outdated building and fire codes as adding unnecessary costs. On a typical $20 million project, the extra time spent to comply with local codes adds approximately $6,000 to $8,000 per apartment unit. His company has only developed one such unit in the New York City area during the past 5 years, due in large part to the economic burden in meeting the former New York State Uniform Fire Prevention and Building Code.

Hoping to lower construction costs, reduce related insurance premiums, and boost the local economy, New York City formed a code commission in 2002 to study the feasibility of adopting the IBC. The commission reported its findings to the mayor this spring, recommending adoption of the I-Codes.

Smooth Transition

Because the I-Codes update and improve on the three former model building codes (National Building Code, Uniform Building Code, and Southern Building Code), which are used by many

U.S. jurisdictions, adopters report smooth transitions:

- "We found the I-Codes to be a natural advancement of the National Building Code. That code was good at recognizing new technologies and a lot of those philosophies have carried over to the I-Codes." Tim Ryan
- "From everything I've seen and heard, our transition has been extremely smooth." John Nachbar
- "The transition has been a real success for us. We've been impressed with the codes and the industry's fast acceptance of them." Terry Cobb

Multiple Benefits

With so many benefits in the offing, from improving public safety to bolstering local building markets, it's important for policymakers to aggressively adopt better construction codes, notes ICC's Sara Yerkes. "When policymakers are aware of the I-Codes, and their potential to protect the public's safety and well-being, they become avid proponents for their fast adoption," she said. "To facilitate widespread adoption, the ICC must demonstrate to the public and elected officials that its code-development process is objective and trustworthy and that it is not serving as a vehicle for monopolistic marketing practices under the guise of model public safety regulations."

Ms. Yerkes also points to the quick and ongoing adoption of the I-Codes by jurisdictions nationwide and the support from federal agencies like the Department of Defense, Federal Emergency Management Agency, and Department of Housing and Urban Development and from national organizations—such as the American Gas Association, American Institute of Architects, American Planning Association, American Seniors Housing Association, Building Owners and Managers Association, Institute for Business and Home Safety, Insurance Building Code Coalition, National Apartment Association, National Association of Home Builders, and National Multi Housing Council—as proof that the ICC has sustained industry support.

I-Codes have garnered wide support among industry groups, trade organizations, and federal agencies. Ms. Yerkes thinks their adoption will continue to escalate. She adds, "They are the most advanced construction codes ever written ensuring the safest building and occupancy practices, and if you are in the construction industry, you should insist on their adoption and use."

For more information on model construction codes and recent adoptions in your region, visit www.iccsafe.org.

Currently Available I-Codes

Code	Description
2003 International Building Code	Design and installation of building systems and requirements that emphasize performance
2003 International Fire Code	Fire safety in new and existing buildings
2003 International Residential Code	Construction of one- and two-family dwellings and townhouses up to three stories high
2003 International Plumbing Code	Fixtures, piping, fittings, and devices as well as design and installation methods for water supply, sanitary drainage, and storm drainage
2003 International Private Sewage Disposal Code	Septic tank and effluent absorption, and other disposal systems; it also contains provisions for evaluating site and soil conditions, outlines use of methods and materials, and includes tables for pressure distribution systems
2003 International Mechanical Code	Mechanical systems and equipment including HVAC, exhaust systems, chimneys and vents, ducts, appliances, boilers, water heaters, refrigeration, hydronic piping, and solar systems
2003 International Fuel Gas Code	Fuel-gas piping systems, equipment, and accessories; combustion air requirements, sizing tables for venting Category I appliances, and provisions that are coordinated with the National Fuel Gas Code
2003 International Property Maintenance Code	Maintenance requirements for the interior and exterior of structures, and space requirements for determining maximum occupancy, and requirements for heating and plumbing in existing workplaces, hotels and residential occupancies, and minimum light and ventilation criteria
2003 International Energy Conservation Code	Energy efficiency provisions for residential and commercial buildings, prescriptive- and performance-based approaches to energy-efficient design, and building envelope requirements for thermal performance and air leakage
2003 International Zoning Code	Requirements for use districts and five zoning classifications, consistent zoning requirements that can be tailored to specific jurisdictional needs, and coordinated requirements and definitions related to the International Building Code
2003 International Existing Building Code	Provisions for improving and upgrading existing buildings to conserve resources and history
International Urban-Wildland Interface Code	Fire spread, accessibility, defensible space and water supply for buildings constructed near wildland areas
2003 ICC Performance Code for Buildings and Facilities	Regulations based on outcome rather than prescription; it encourages new design methods by allowing a broader parameter to meet the intent of the I-Codes
2003 ICC Electrical Code	Administrative text necessary to administer and enforce the National Electrical Code and complies with electrical provisions contained in the other I-Codes

The Many Faces of SAE

One Size Does Not Fit All in Developing Standards

By Stephen Ezar Jr.

SAE International is a multifaceted organization, with the development of standards being a core component. One would assume that SAE's strength in the standards area comes from a unified body of work, signifying an efficient and effective process. It is variability, however, and not unity that provides the bedrock of the SAE standards process.

The diversified markets that SAE serves are as different in the realm of standardization as they are in the marketplace. SAE provides the standardization framework for the aerospace, construction/agriculture, heavy truck, and automotive industries. These industries differ not only in

their market-specific variables, but also in their use of standards and the processes they follow to develop standards. The roles of SAE in these different markets range from establishing a global standard to being a conduit to the International Organization for Standardization, or ISO.

This article takes a brief look at the roles that SAE plays in the standards processes of four widely different industries.

Aerospace Industry

The aerospace industry uses the SAE structure to facilitate the development of global standards. SAE's Aerospace Standards (AS) and Aerospace Material Specification (AMS) are globally accepted and referenced, making SAE the world's largest developer of aerospace standards.

SAE's status within the aerospace community is not an act of chance. The SAE Aerospace Council and the industry at large made a conscious decision to drive harmonization, through SAE, toward global market acceptance. An example of global unity of quality standards is SAE's facilitation of the International Aerospace Quality Group (IAQG).

The IAQG is made up of three regional standards development organizations: the JAQG (which represents Asia); the EAQG (Europe); and the AAQG (North America). The individual regions reach consensus on a particular standard and then elevate it to the IAQG. The IAQG resolves any regional differences, assigns the standard a number, and sends the final version back to the regional organizations for implementation. Each of the regional organizations can sell the standard and retain the intellectual property rights associated with their version of the technical equivalent document. SAE provides the staff for and administers both the IAQG and the AAQG, contributing significant value to the aerospace standardization community.

SAE favors this approach because the standards organization retains the intellectual property and receives the revenue associated with the sale of documents, which can then flow back into the standards system.

Construction/Agriculture Industry

Although both the aerospace and construction/agriculture industries have truly global markets, the differences in their origins and supply chains dictate how they permeate those markets and how they approach standardization.

Initially, North American manufacturers drove the aerospace industry, with SAE providing the market-accepted standard. Even though the aerospace industry now has numerous other players, the North American perspective is still favorably positioned. In contrast, the construction/agriculture industry's path to a global market grew from numerous fragmented regional markets. That growth prompted the development of global standards through ISO and a common standardization method.

The SAE process is an important step toward harmonization of standards at the ISO level. The SAE structure facilitates the formation of a consensus industry position before that position is presented to the ISO with its multiple geopolitical considerations. This consensus under the SAE structure often is the initial work item made available to the ISO committee, placing the SAE effort in position to dramatically affect the final ISO document.

Global acceptance of a standard in the construction/agriculture industry is crucial for an effective market strategy. The rela-

tively low volume, high capital nature of the industry makes local customization economically prohibitive, highlighting the importance of global standards. Most off-highway original equipment manufacturers have operations in many different countries, so the use of global standards ensures consistent quality, safety, and interoperability. Those manufacturers are also cognizant of the regulations that police their industry. The off-highway sector remains lightly regulated in comparison to the aerospace and automotive markets, and the manufacturers would like this situation to continue. They further recognize that to satisfy global regulators, they as an industry must voluntarily comply with standards that will make their products safe to their customers and the environment in which they operate.

As a consequence, the industry is diligent in its use of standards that satisfy regulatory thresholds, encourage growth and foster competition. This approach to industry standards, however, poses one primary challenge for SAE. Because SAE looses much of the intellectual property rights when standards move to ISO, it receives very little revenue to support the ongoing standards process.

Heavy Truck Industry

The heavy-duty truck market is more regional in nature than either the aerospace or off-highway industries. This regional focus also makes global standards difficult to develop and implement. A good example: the ISO standards for this industry are heavily weighted toward European interests that may not be appropriate for the North American market, where SAE's standards are preferred.

This focus on local sensitivity results in regional standards that are closely aligned with industry needs. Participants in the North American market use the SAE structure as a forum to discuss their individual needs and develop the best possible technical solution. In addition, the balance in the SAE committee structure further offers all of the views necessary to construct a standard that effectively addresses the regional issues.

The prevailing goal of standardization may be "one standard, one test, accepted globally," but it may not fit all market situations. All standards for this industry must be sensitive to the market realities of each sector and strive for the appropriate level of harmonization. At this point in time, the heavy truck industry is better served through regionally focused standards, but that may not always be the case. SAE must adapt the standardization strategy per sector so it matches the needs of industry today, but has the flexibility to realign with the goals of tomorrow.

Automotive Industry

The automotive industry—unlike the three industries discussed above—has considerable variability in its standards efforts. Much of that variability is dictated by the underlying individual technologies. For example, in some of the emerging technologies, such as 42-volt batteries and fuel cells, SAE standards are leading the world's global efforts.

In others, the automotive sector functions much like the construction/agriculture industry in its use of the SAE committee as a conduit to ISO.

The components or systems used throughout the automotive industry also drive the relationship between standards and regulations. Some systems, lighting as an example, spur the development of global standards by their focus on global regulations, which eventually leads to industry standards. Others, such as occupant positioning, have the opposite thrust: they begin with industry standards that ultimately result in international regulations.

The automotive industry is similar to that of the off-highway industry in that the global market sprung from many regional markets. But a regional market is no longer a valid model for the industry. Although manufacturing occurs regionally, it occurs under the direction of a parent, global organization. This situation presents an environment in which standards need to be both national and global in scope so the parent organization can realize economies from the standardization, but they also must allow flexibility to meet regional requirements. This complex web of regional, national, and global standards creates major challenges for both industry participants and the developers of those standards.

Conclusion

These examples lead to one clear conclusion: when developing standards, "one size does not fit all." SAE must continually examine how each sector is using our process and make adjustments to remain aligned to its needs. These evaluations must take place in all aspects of our standards process, including our position in the standards development value chain, funding model, and delivery mechanisms.

It is ironic that, in a business dedicated to standardization, the one thing that remains clear is that the markets are neither standard nor static, and changes are inevitable to remain relevant to the industries we serve.

About the Author

Steve Ezar is the manager of Government and Industry Standardization at SAE International. He is SAE's liaison with both government agencies and corporate entities to gain support for SAE's standardization program. He also manages several programs related to global harmonization of standards and regulations.

Setting the Standard

UL's Standards Technical Panels Offer Opportunity for Government Participation in UL Standards Development

By Sarah Brooks

Underwriters Laboratories Inc. (UL) is an independent, not-for-profit organization providing global testing and certification services. UL is also a world leader in standards development. Through more than a century of involvement in standards and conformity assessment, UL is recognized for its unrivaled technical expertise in the areas in which it develops standards. UL's safety standards are used throughout the world to evaluate and certify products and systems for the U.S. market. As UL's standards continue to be used as a basis for harmonization with other international standards, they will be used for markets around the world.

UL's standards are consensus documents used by many parties:

- Manufacturers, which use the standards to design products and systems that meet the requirements for certification
- Regulatory authorities, which reference the standards for products and systems used in their jurisdictions
- Code development organizations, which adopt and reference UL safety standards
- Certification organizations, which apply UL requirements for product evaluations.

Although deeply rooted in its public safety mission, UL has recently updated its process for standards development and maintenance to facilitate a broader range of participants and to reflect the changing needs of the standards community, including government agencies. UL's Standards Technical Panels (STPs) form the cornerstone of that process.

Standards Technical Panels

UL employs its STPs as its consensus bodies for developing and maintaining UL safety standards. Using this method, UL ensures that each proposed revision goes through the consensus process before it is adopted and published.

An STP is a group of individuals representing a balance of interests, formed to develop and approve proposals related to ANSI/UL safety standards. Three categories of individuals are represented on UL's STPs:

- *Producers.* This category consists primarily of manufacturers of the products covered by the standard. This category does not include trade associations, manufacturers associations, or producers of components of products covered by this standard.
- *Users.* This category typically includes consumers, authorities having jurisdiction, regulatory agencies, distributors, retailers, safety associations, certification organizations, and producers of components of products covered by this standard.
- *Others (General Interest).* This category typically includes trade associations, professional and lay people employed by academic and scientific institutions, experts, government agencies in a nonregulatory capacity, insurance companies, and utilities.

UL's goal is to have equal representation for each of these three categories. UL routinely seeks a variety of participants. STP membership is open; there are no dues or requirements for attending meetings.

Essential Process Elements

The STP process is based on the essential elements of ANSI's standards development criteria. The process incorporates the following concepts:

- *Continuous maintenance and open participation*. UL continually monitors the input from the various users of UL standards and other interested groups addressing particular issues. Input is provided by industry, consumer groups, insurance representatives, and government agencies, as well as by regulatory authorities, trade associations, and advisory groups. Anyone materially affected by a UL standard is encouraged to submit proposals. STP meetings that result from proposals or otherwise convened by UL are open.
- *Consensus body review and ballot*. Proposals to develop or revise a standard are balloted by the STP. Proposals must reach consensus—approval by two-thirds of returned votes—before UL publishes the requirements.
- *Public review.* UL provides public notice of, and opportunity to comment on, all proposals.
- *Comment resolution and circulation of substantive changes.* All comments received on proposals are given due consideration. The disposition of comments is shared with participants, and substantive revisions to proposals resulting from the comments, along with continuing objections, are circulated. Consensus is verified during this phase.
- *Opportunity for appeal*. STP and public review participants with continuing objections have the right to appeal UL's intention to publish proposals that have completed the consensus process.
- *Publication of revisions to the standard*. UL notifies STP members and provides public notice of this phase of the process.

Organizational Roles

U.S. government and commercial organizations rely increasingly on the work of standards organizations like UL. DoD, for example, has replaced more than 9,000 military specifications with voluntary consensus standards. DoD's greater use of voluntary standards is due in part to MilSpec Reform and the National Technology Transfer and Advancement Act of 1995.

DoD has adopted 165 UL standards covering product categories such as portable electric fans, industrial control equipment, and information technology equipment. UL standards adopted by DoD are used to qualify manufactured products developed by the "legacy" military service suppliers and also to open the door to commercial markets for new manufacturers to now comply with government requirements and bid on government supply contracts.

DoD personnel participate on voluntary consensus standards committees for categories involving DoD-adopted nongovernmental standards. Many of the UL standards adopted by DoD address critical government and commercial cross-cutting arenas such as component material requirements and power generation, connection, control, and delivery systems.

UL's STP process for standards development and revision affords an increased opportunity for government participation in UL standards work. Working collaboratively with federal agency personnel helps to promote the public safety mission of UL and gain government advocates of UL's standards and related activities.

UL continues to encourage DoD involvement in standards development through STP participation. In addition, UL embraces DoD concepts of information sharing such as providing access to qualified manufacturer information in UL's online certification tools directory (http://www.ul.com/onlinetools.html). That information assists purchasers seeking to buy products that need to comply with appropriate safety standards.

UL sees many opportunities for enhancing the UL/DoD partnership through initiatives to assist government procurement and acquisition staffs with locating products or component parts suitable for government use, working on standards to address homeland security issues, and expanding UL safety standards to include applicable government performance requirements necessary to mitigate safety concerns in products found suitable for government use.

About the Author

Sarah Brooks manages the UL-Research Triangle Park standards operation. She has been with UL for 15 years, working directly with the development and maintenance of UL safety standards.

A Century of UL Standards for Safety

UL—one of the world's leading standards development organizations—is celebrating its 100th anniversary. Since 1903, UL has published more than 880 safety standards for products ranging from fire-rated building materials to information technology equipment to electrical household appliances.

"UL has played an integral role in establishing the U.S. safety system by bringing together experts from varied fields to develop product safety standards. As a result, UL Safety Standards are recognized for establishing the basic safety principles in North America," says Robert A. Williams, UL's director of Standards.

UL's first safety standard—UL 10A for Tin-Clad Fire Doors—started UL's standards development activities. UL engineers develop and maintain the standards in conjunction with industry, government agencies, regulatory authorities, members of academia, consumer advocates, and other interested parties.

According to Williams, UL's future as a standards developer will rely on keeping pace with emerging technology, anticipating new challenges and market demands, responding with flexible and efficient processes for developing standards, and remaining committed to UL's historic mission of public safety.

UL continues to focus on its public safety mission by participating in more than 200 international technical committees, serving in leadership positions on many. The committee work supports UL's effort to pursue harmonization of U.S. standards with international standards. The goal of these activities is to provide safe products to the global marketplace and global market access for UL's customers. Millions of products and their components have been tested to UL safety standards, which increase users' confidence in the UL mark on a product and result in a safer environment.

UL promoted its 100th anniversary in standards development during this year's World Standards Week, September 29 through October 2. For more information on UL safety standards, visit www.ul.com/info/standard.htm or contact Robert Williams at 919-549-1977.

Call for DoD Participation

Although DoD personnel participate in a number of UL STPs, increased participation is welcomed and needed. For more information on government agency participation on UL's STPs, contact Deborah Prince at UL's Research Triangle Park office: 919-549-1460 or Deborah.R.Prince@us.ul.com.

Events

Upcoming Meetings and Conferences

March 15–18, 2004,
Leesburg, VA

DSPO Holds Its Annual Standardization Conference

The Defense Standardization Program Office is hosting a conference at the National Conference Center, Leesburg, VA. Panels will include the following:

- Standardization Executive Panel
- Keeping a Pulse on Other Key Defense Acquisition Initiatives
- Product and Process Certification
- Standards Initiatives at Other Federal Agencies
- Non-Government Standards Initiatives
- Defense Standardization Program Automation.

The next issue of the *DSP Journal* will contain an expanded list of agenda topics. Updates will be posted at dsp.dla.mil.

People

People in the Standardization Community

The standardization staff has five new members:

Mr. Nick Kunesh
Navy Standardization Executive

Mr. Jeff Allan
Navy Departmental Standardization Officer

Mr. Roy Rogers
NAVSEA Command Standards Executive

Mr. Gerry Ring
DISA Departmental Standardization Officer

Mr. Mike Goy
Defense Standardization Program Office staff.

We bid farewell and extend best wishes to the following people:

Ms. Christine Stelloh-Garner
former Navy Standardization Executive

CAPT Michael Ahern
USN, former Navy Departmental Standardization Officer

Ms. Carlotta White
former Navy Departmental Standardization Office staff

Ms. Janet Jaensch
former NAVSEA Command Standards Executive

Ms. Dottie McDowney
former NAVSEA Command Standards Executive staff

Ms. Patricia Pearce
former Air Force Research Laboratories staff

Ms. Elaine Babcock
former DISA Departmental Standardization Officer

Ms. Sharon Strickland
former Defense Standardization Program Office staff

Mr. John Tascher
former Defense Standardization Program Office staff

Defense Acquisition University Standardization Courses—2003/2004

The Defense Standardization Program (DSP) sponsors several Defense Acquisition University courses covering many facets of standardization. The assignment-specific courses, designed primarily for DoD acquisition personnel, are offered to enhance the knowledge base of personnel tasked with setting requirements and making standardization decisions and for personnel responsible for developing or managing technical documents such as specifications, standards, handbooks, commercial item descriptions, and nongovernment standards, among other things.

DSP is offering the following courses:

PQM 103—Defense Specification Management. This course covers DoD policies and procedures for the development, management, and use of nongovernment standards, commercial item descriptions, specifications, and standards. Emphasis is placed on interoperability, market research, use of commercial/nondevelopmental item alternatives, use of performance specifications, International Standardization Agreements, and the Single Process Initiative. It is an 8 1/2-day course.

PQM 104—Specification Selection and Application. This course provides instruction on the appropriate selection and correct application of nongovernment standards, commercial item descriptions, specifications, standards, and related documents in the acquisition process. Emphasis is placed on current acquisition initiatives, such as interoperability, and the proper use of documents. It is a 2-day course.

PQM 202—Commercial and Nondevelopmental Item (C/NDI) Acquisition for Technical Personnel. This course focuses on tools and techniques used by engineering, logistics, and related technical personnel for identifying and evaluating C/NDI alternatives throughout the acquisition process. It provides instruction on requirements definition, acquisition strategy development, support planning, and the use of market acceptability criteria for C/NDI acquisitions. It is a 2-day course.

PQM 203—Preparation of Commercial Item Descriptions for Engineering and Technical Support. This course presents instruction on the preparation and use of commercial item descriptions, including characterization of commercial items, the development and use of market acceptability criteria, and the development of performance-based salient characteristics. Current policy on the use of commercial item descriptions and performance specifications is discussed. It is a 1-day course.

PQM 212—Market Research for Engineering and Technical Personnel. This course describes market research from the perspective of technical personnel. It explains the practical value and discusses the government mandate to conduct market research. The course addresses the memberships of a market research team, sources for market data, and techniques for technical evaluation and documentation of market information. It is a 2-day course.

The course schedules are located on the Defense Standardization Program home page: dsp.dla.mil. Contact the appropriate Director, Acquisition Career Management, for specific information regarding course registration.

Course Schedule

	Class	Start Date	End Date	Location
PQM 103—Defense Specification Management	001	02 Dec 2003	12 Dec 2003	Fort Monmouth, NJ
	002	03 Feb 2004	13 Feb 2004	Huntsville, AL
	701	27 Apr 2004	07 May 2004	Columbus, OH
PQM 104—Specification Selection and Application	001	18 Nov 2003	19 Nov 2003	Fort Belvoir, VA
	002	17 Feb 2004	18 Feb 2004	Wright Patterson, OH
	003	01 Jun 2004	02 Jun 2004	Huntsville, AL
PQM 202—Commercial and Nondevelopmental Item (C/NDI) Acquisition for Technical Personnel	001	03 Nov 2003	04 Nov 2003	Huntsville, AL
	002	20 Nov 2003	21 Nov 2003	Fort Belvoir, VA
	701	22 Jan 2004	23 Jan 2004	Patrick AFB, FL
	003	19 Feb 2004	20 Feb 2004	Wright Patterson, OH
	004	24 Feb 2004	25 Feb 2004	Fort Lee, VA
	702	01 Mar 2004	02 Mar 2004	Linthicum, MD
	005	05 Apr 2004	06 Apr 2004	Fort Monmouth, NJ
PQM 203—Preparation of Commercial Item Descriptions for Engineering and Technical Support	001	16 Oct 2003	16 Oct 2003	Fort Lee, VA
	002	07 Nov 2003	07 Nov 2003	Huntsville, AL
	701	14 Nov 2003	14 Nov 2003	Robins AFB, GA
	003	26 Feb 2004	26 Feb 2004	Fort Lee, VA
	702	03 Mar 2004	03 Mar 2004	Linthicum, MD
	703	25 Mar 2004	25 Mar 2004	Dumfries, VA
	004	07 Apr 2004	07 Apr 2004	Fort Monmouth, NJ
	005	04 Jun 2004	04 Jun 2004	Robins AFB, GA
PQM 212—Market Research for Engineering and Technical Personnel	001	14 Oct 2003	15 Oct 2003	Fort Lee, VA
	002	05 Nov 2003	06 Nov 2003	Huntsville, AL
	701	12 Nov 2003	13 Nov 2003	Robins AFB, GA
	702	18 Nov 2003	19 Nov 2003	Columbus, OH
	003	04 Dec 2003	05 Dec 2003	Kaiserslautern, Germany
	004	27 Jan 2004	28 Jan 2004	Warren, MI
	703	04 Mar 2004	05 Mar 2004	Linthicum, MD
	704	23 Mar 2004	24 Mar 2004	Dumfries, VA
	005	08 Apr 2004	09 Apr 2004	Fort Monmouth, NJ
	705	11 May 2004	12 May 2004	Columbus, OH

Upcoming Issues—
Call for Contributors

We are always seeking articles that relate to our themes or other standardization topics. We invite anyone involved in standardization—government employees, military personnel, industry leaders, members of academia, and others—to submit proposed articles for use in the *DSP Journal*. Please let us know if you would like to contribute.

Following are our themes for upcoming issues:

Issue	Theme	Deadline for Articles
April–June 2004	Logistics	November 15, 2003
July–September 2004	Standardization and Contracting	February 15, 2004
October–December 2004	Navy Standardization	May 15, 2004
January–March 2005	Defense Laboratories	August 15, 2004

If you have ideas for articles or want more information, contact the Editor, *DSP Journal*, J-307, Defense Standardization Program Office, 8725 John J. Kingman Road, Stop 6233, Fort Belvoir, VA 22060-6221 or e-mail DSP-Editor@dla.mil.

Our office reserves the right to modify or reject any submission as deemed appropriate. We will be glad to send out our editorial guidelines and work with any author to get his or her material shaped into an article.

Go to dsp.dla.mil and answer a few questions to complete an online subscription to this magazine.