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73-317PS

2001

*STANDARDS-SETTING AND
UNITED STATES COMPETITIVENESS*

HEARING

BEFORE THE

SUBCOMMITTEE ON ENVIRONMENT, TECHNOLOGY,
AND STANDARDS
COMMITTEE ON SCIENCE
HOUSE OF REPRESENTATIVES

ONE HUNDRED SEVENTH CONGRESS

FIRST SESSION

JUNE 28, 2001

Serial No. 107-21

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June 28, 2001

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Mr. Gerald H. Ritterbusch, Director of Standards and Regulations, Caterpillar, Inc.
Mr. Scott Bradner, Senior Technical Consultant, Harvard University
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Scaffolding the New Web: Standards and Standards Policy for the Digital Economy, Rand Publications, 2000

STANDARDS-SETTING AND UNITED STATES COMPETITIVENESS

THURSDAY, JUNE 28, 2001

House of Representatives,

Subcommittee on Environment, Technology, and Standards,

Committee on Science,

Washington, DC.

The Subcommittee met, pursuant to call, at 2:08 p.m., in Room 2318 of the Rayburn House Office Building, Hon. Vernon J. Ehlers [Chairman of the Subcommittee] presiding.

Committee on Science

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Subcommittee on Environment, Technology, and Standards

U.S. House of Representatives

Washington, DC 20515

Hearing on

Standards-Setting and United States Competitiveness

Thursday, June 28, 2001

Witness List

Mr. Oliver Smoot

Chairman of the Board,

American National Standards Institute

Mr. Carl Cargill

Director of Standards,

Sun Microsystems

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Mr. Gerald Ritterbusch

Director of Standards and Regulations,

Caterpillar, Inc.

Mr. Scott Bradner

Senior Technical Consultant,

Harvard University

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SUBCOMMITTEE ON ENVIRONMENT, TECHNOLOGY, AND STANDARDS

COMMITTEE ON SCIENCE

U.S. HOUSE OF REPRESENTATIVES

Standards-Setting and United States Competitiveness

THURSDAY, JUNE 28, 2001

2:00 P.M.–4:00 P.M.

2318 RAYBURN HOUSE OFFICE BUILDING

I. Purpose

The hearing will review the impact of standards on the United States economy and the ability of our nation to compete internationally. The hearing will also discuss reforms in the standards-setting process that could make American industries, such as the information technology sector, more globally competitive.

II. Background

Standards play a vital, yet largely unheralded, role in our nation's economy. They are fundamental components of our nation's technology base, essential to industry and commerce, crucial to the health and safety of Americans, and fundamental to the nation's economic performance.

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Over 30,000 voluntary standards have been developed in the United States by more than 400 organizations. Examples range from specifications for film speed, to software languages so that computer networks can communicate with one another, to manufacturing standards for large industrial machines. In addition, there are a large number of procurement specifications, mandatory codes, rules, and regulations containing standards developed and adopted by agencies of the Federal government. Standards can be simple or so extraordinarily complex that the specifications number hundreds or even thousands of pages.

In the United States, our standards system has evolved over the past hundred years to meet the needs of industry and society. Today, standards are developed through a complex system administered by the private sector, with participation by industry, academia, consumers, and government. The diverse U.S. standards community has developed rules for consensus, transparency, openness, balance, and due process. As a result, the American standards-setting system has been able to meet market needs, as well as government regulatory and procurement needs.

Our standards-setting system is rooted in the private sector and benefits from strong industry support and participation. The federal government participates as an equal to industry, acting through the National Institutes of Standards and Technology (NIST), which provides highly-specialized technical assistance to help industries develop voluntary, consensus-based standards.

The Science Committee played an important role in the enactment of Public Law 104–113, the National Technology Transfer and Advancement Act of 1995, Section 12 of which requires agencies to use and promote, to the extent possible, voluntary consensus standards.

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III. Standards in the Global Economy

Recently, as the pace of technological innovation has quickened, trade volumes have grown, and business operations have globalized, standards and the various standards-setting systems have become increasingly important. They have even greater economic implications than before—especially if they allow a company to increase its market share, or allow a country to block trade.

Since the World Trade Organization Agreement on Technical Barriers to Trade requires all participant countries to use international standards, standards play a central role in international trade. There has been growing concern by American companies, however, that our global trading competitors dominate international standards-setting organizations and use the process to protect their products from competition by United States companies.

Numerous foreign national, regional and international organizations produce standards of interest and importance to U.S. manufacturers and exporters. The International Organization for Standardization (ISO) is the largest producer of international standards. The work of ISO is carried out through a large number of technical bodies in which experts from all over the world participate annually in the development of their standards.

NIST serves as the Department of Commerce contact point for investigation of non-tariff trade barriers (standards) for non-agricultural products under the Agreement on Technical Barriers to Trade of the World Trade Organization, pursuant to the Trade Agreement Act of 1997. It also provides technical support in identifying relevant, requested information about domestic and international standardization activities, and coordinates the delivery of standards assistance to countries seeking to improve their national standards, testing, and/or certification systems.

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Last year, NIST and the American National Standards Institute (ANSI) worked together to develop a National Standards Strategy to strengthen U.S. participation in international standardization activities and provide a framework that can be used to address the challenges that emerging technologies pose to the development of standards. The executive summary from the conference to develop the National Standards Strategy and the Strategy itself are attached.

IV. Issues

Issues to be addressed include:

1. While voluntary consensus standards for products, processes, and services are the underpinnings of the United States economy, the current standards-setting system is now facing new challenges. Increasing pressures on trade and competition from our international competitors, in addition to rising global concern for health, safety, and environmental protection, are dramatically changing the current standards framework. In light of the dynamics that are altering the standards landscape, what measures can be undertaken to improve the American standards-setting system?
2. How do standards affect our ability to compete internationally? How can the United States enhance its leadership in the international standards-setting process? Would having standards officials based at American embassies abroad promote U.S. competitiveness?
3. Last year, RAND prepared a report entitled *Scaffolding the New Web: Standards and Standards Policy for the Digital Economy* (summary attached; the entire report can be found at <http://www.rand.org/publications/MR/MR1215/>) concluding that the convergence of new information technologies, including cellular, broadcasting, Internet, and intelligent transportation systems (ITS), present new challenges to industry and international standards organizations. The report noted that emerging information technology standards are increasingly being set not by traditional standards development organizations, but rather by such informal consortia and groups as the World Wide Web Consortium and the Wireless Access Protocol Forum (see, for example the attached "consortia white paper"). The report also noted that "open-source" software is growing popularity leading to the greater adoption of vendor-neutral standards. Does the information technology (IT) industry face special standards challenges that impairs its ability to compete domestically or internationally? Should the IT industry shift more towards using consortia-developed standards? Does the recognition of consortia-developed standards present difficulties for businesses outside IT-related fields?

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IV. Witnesses

There will be one panel of four witnesses.

Oliver Smoot is the Chairman of the Board of the American National Standards Institute (ANSI). ANSI promotes the use of U.S. standards internationally, advocates U.S. policy and technical positions in international and regional standards organizations, and encourages the adoption of international standards as national standards where these meet the needs of the user community. ANSI is the sole U.S. representative and dues-paying member of the two major non-treaty international standards organizations, the ISO and, via the U.S. National Committee (USNC), the International Electrotechnical Commission (IEC).

Carl Cargill is the Director of Standards for Sun Microsystems, headquartered in Palo Alto, CA. Sun is a leading global provider of hardware, software and services for establishing enterprise-wide intranets and expanding the use and power of the Internet. Sun has customers in 150 countries and is active in promoting the use of open-standards in the development and convergence of emerging information technologies.

Gerald Ritterbusch is the Director of Standards and Regulations for Caterpillar, Inc., headquartered in

Peoria, IL. Caterpillar is the world's largest manufacturer of construction and mining equipment, diesel and natural gas engines and industrial gas turbines. As a Fortune 500 company, Caterpillar sell products in nearly 200 countries.

Scott Bradner is a Senior Technical Consultant with Harvard University in Boston, MA. He has been involved in the design, operation and use of data networks at Harvard since the early days of the ARPANET. He is one of the founders of the Internet Engineering Task Force (IETF) and the Internet Society, where he still serves as the Vice President for Standards.

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Standards-Setting and U.S. Competitiveness

Chairman **EHLERS**. I am pleased to call this hearing to order. Mr. Barcia, the Ranking Member, is not quite here, but since we have already started and we are already somewhat late because of the vote, I will proceed with my opening statement and presume he will be here shortly. I also want to mention to all parties and with apologies to the Panel, I am also in a markup on another bill in another Committee. The markup means that you are getting ready to report it out and you have to vote on it. So I may be called out probably once—I don't think any more than once—to vote. But we have arranged for some other members to be here and take over the Chair when I am gone.

I would like to welcome everyone to today's hearing on the role that standards-setting plays in United States competitiveness. At the beginning of this Congress, Chairman Boehlert transformed the former Technology Committee, chaired ably for the past six years by my colleague from Maryland, Ms. Morella, and gave us added jurisdiction over environmental issues. To reflect this change, their Subcommittee was renamed the Environment, Technology, and Standards Subcommittee.

Thus far this year, we have held hearings covering the environment, on Strengthening Science at the EPA, and technology, on the Future of the ATP program. Today, we focus on the last leg of the three-legged stool on which this Subcommittee's jurisdiction rests, and that is, standards.

Standards play a critical, yet largely unheralded, role in helping support worldwide economic growth and competitiveness. What most people don't realize is that standards affect our lives every day. They are the foundation for manufacturing the cars that we drive, the homes in which we live, the televisions that entertain us, and the telephones and computers we use to communicate. And these examples just scratch the surface. I can't imagine what our world would look like without standards. And I say that particularly as a scientist because that is—standards are extremely important to the performance of science, particularly worldwide science.

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As a result of the advent of new technologies, the increasing pressures on trade and competition from our global competitors, and the rising global concern for health, safety and environmental protection, the

standards-setting process is now facing new challenges. This dynamic has placed a standards-setting community at a crossroads that can unalterably shape our future competitiveness for some time to come.

Perhaps the greatest problem is the immediate need for new standards to address rapidly developing technology, contrasted against the deliberate pace of government and much of the standards-setting process.

I believe it is time for a new standards-setting paradigm that accounts for these pressures and can respond rapidly to constant technical evolution.

A good first step in the creation of this paradigm is the National Standards Strategy unveiled several months ago by the American National Standards Institute, actually known as ANSI. The Strategy reflects a comprehensive 2-year ANSI effort, working in conjunction with the public and private sectors.

I am pleased that the National Institute of Standards and Technology has endorsed the Strategy and is working with ANSI to implement it. I am concerned, however, that the Strategy may not go far enough with respect to the new standards challenges of emerging technologies.

Some members of the information technology industry argue that the current standards-setting process may be too cumbersome and slow to meet the needs of an industry ruled by Moore's Law. The growth of the Internet and the industry as a whole are relying more and more on consortia for their hardware and software standardization needs.

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While I understand that there is concern that the consortia-development process may not have the same level of adequate transparency, openness, balance, and due process as the formal standards process, I believe we must have greater clarification about the legitimacy of consortia standards, especially for the IT industry.

I would like to discuss these and other pressing issues with our Panel today as we begin to attempt crafting a new standards paradigm.

I would also like to mention that the standards-setting process is not the only institution grappling with Moore's Law. Time and again, I have said that the Federal Government must also adopt new, more flexible rules for dealing with the rapidly changing information technology industry. Over the past decade, our government expert policies squelched new encryption policies—technologies, which, in turn, gave rise to a robust encryption industry in other countries. We must adopt new policies for dealing with these issues.

I look forward to hearing from the Panel and now that he has arrived, and I seek his apology for starting without him, but I was trying to move things along, Mr. Barcia. But I would like to now recognize the Subcommittee's Ranking Member, the gentleman from Michigan, Mr. Barcia.

Mr. **BARCIA**. Thank you, Mr. Chairman. I apologize for being a few moments late, as well. I was on the telephone with an interview in my district and couldn't break away for the beginning of the hearing. But I want to welcome our distinguished Panel to this afternoon's hearing on standards. Standards are one of those issues which are generally taken for granted until something goes wrong, like when Baltimore burned to the

ground early in the century because there were no uniform thread standards for fire hydrants.

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Michigan's auto industry is dependent on standards developed by the Society of Automotive Engineers. Consumers rely on SAE standards every time they buy a quart of oil with a familiar SAE 10W40. These SAE viscosity standards let us know that regardless of the brand of oil we buy, it is suitable for our engines' requirements.

Standards are equally important to the information technology industry. Nearly a decade ago, the economists stated the eyes of most of sane people tend to glaze over at the very mention of technical standards. But in the computer industry, new standards can be the source of enormous wealth or the death of corporate empires. With so much at stake, standards arouse violent passions.

Although I am not among those for whom standards raise violent passions, this Subcommittee recognizes the importance of standards to our economy and society.

Just yesterday, this Subcommittee marked up bipartisan legislation for the development of voluntary technical standards for voting products and systems. In addition, this is the tenth hearing on standards that the Subcommittee has held since 1995. These hearings always provide us with a snapshot on what is going on in the standards arena and some insight into this complicated issue.

We have a wide-ranging Panel of witnesses and I hope they will address what is the appropriate role for the Federal Government to play in the international standards-setting process? I want to thank our witnesses for appearing before the Panel today. And, lastly, with this being the Committee's last meeting prior to the 4th of July district work period, I want to wish my colleagues a productive time back in their districts and everyone safe travel and an enjoyable Independence Day celebration. Thank you, Mr. Chairman.

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Chairman **EHLERS**. And I thank the Ranking Member. If there is no objection, all additional opening statements submitted by the Subcommittee members will be added to the record. Without objection, so ordered.

At this time, I would like to introduce our witnesses. Mr. Oliver Smoot is Chairman of the Board of the American National Standards Institute, the organization that promotes the use of U.S. standards, internationally—pardon me—U.S. standards internationally and advocates U.S. policy and technical positions in that international standards organization. I also have received an e-mail from someone that indicates that a unit is named after you—something to have to do with the length of the Harvard Bridge. I understand it is 364.4 smoots long. So you have gone down in the history books.

The next witness will be Mr. Gerald Ritterbusch. He is the Director of Standards and Regulations for Caterpillar, Incorporated. Caterpillar is the world's largest manufacturer of construction and mining equipment, diesel and natural gas engines, and industrial gas turbines. They sell products in nearly 200

countries.

Mr. Scott Bradner is a Senior Technical Consultant with Harvard University. I presume that he also crosses that bridge once in a while. He is one of the founders of the Internet Engineering Task Force and the Internet Society, where he serves as the Vice President for Standards.

And then Mr. Carl Cargill, who is the Director of Standards for Sun Microsystems. Sun, of course, is a leading global provider of hardware, software, and Internet services. It has customers in 150 countries and that has led Mr. Cargill to, first of all, become extremely interested in the issue of standards, and, secondly, has caused him to become an agitator for some changes in the system. And he is one of those, but only one of several, to thank for this hearing.

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As our witnesses presumably know, testimony is limited to five minutes. The process here is that you will each be given five minutes to offer your testimony. At the conclusion of that, we will begin receiving questions from the Members of Congress on this Panel and each of them will be allowed five minutes for their questions and comments. We will first start with Mr. Smoot.

STATEMENT OF OLIVER SMOOT, CHAIRMAN OF THE BOARD, AMERICAN NATIONAL STANDARDS INSTITUTE

Mr. **SMOOT**. Thank you, Mr. Chairman, and members of the Committee. I am Oliver Smoot, Chairman of the American National Standards Institute, which we call ANSI. We did describe ANSI's mission and role at length in our formal statement, so I won't use your time in that here today. But rather, I would like to respond to the three questions raised by the Chairman in his letter inviting us to testify. I also, at the end of my statement, would like to raise a new issue for the consideration of the Committee.

ANSI agrees completely with the international standards—that the international standards landscape is changing and that we must rise to this challenge. However, the domestic standards landscape is also changing and we have to meet that challenge too. This is the reason why ANSI developed a National Standards Strategy in order that we could meet these challenges. This Committee held hearings last September that addressed the National Standards Strategy, but we have brought additional copies with us here today.

The central theme of the Strategy is—and I quote—"That the strength of standardization in the United States is a sectoral focus." That is because there are many methods of standards development and, in our view, each sector must decide for itself what methods best suit its needs. This is fundamentally different from the approach taken by those nations that adopt a top-down, one-process-for-all approach.

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We believe the U.S. approach to voluntary consensus standards, which has, as its hallmarks, openness, balance, due process, and consensus, has proven its value for almost 100 years. But we aim to further

improve the speed of development and the coherence of the available voluntary consensus standards to improve their usefulness domestically.

Standards are, of course, also used to access international markets. The World Trade Organization's Technical Barriers to Trade Agreement requires that voluntary standards be developed through processes that exhibit transparency, openness, impartiality, and consensus, effectiveness, and relevance, coherence, and, finally, concern for developing countries.

Observing the ANSI process for standards development assures U.S. industry and U.S. standards-developing organizations that their standards may be accepted in international markets. Our Standards Strategy focuses on further improvements in the international area, aiming at a smoothly functioning global standards system. So that is a little brief about our Standards Strategy.

The second question the Committee asked was about standards attachés. ANSI endorses the placement of standards attachés in key U.S. embassies. The standards attachés now in place have been extremely effective in overcoming standards-related barriers in foreign countries.

The Chairman cited a RAND report that discusses the challenges that the standards community must deal with in new information technologies. The circumstances of each one of the cited technologies is different and the standardization processes that each industry has selected are extraordinarily diverse. The good news for the U.S. economy is that industry and government are meeting the challenges in these areas.

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The information technology industry does have a special challenge because it uses every kind of standardization process imaginable, ranging from the most informal meeting possible to the very formal processes that result in an American National Standard. However, these challenges do not impair their ability to compete domestically or internationally.

Now, even within the subset of standardization processes called consortia, there is no single method of standards development, and it is this very flexibility that makes them useful. So the result is that IT managers have to decide what process is appropriate to the technology that they wish to standardize.

Because they meet real needs, consortia-developed standards are fully acceptable to, and widely used by, industry and the U.S. Government to procure and use advanced technologies and, in fact, to procure and use technologies of all kinds.

Now, the new issue I would like to bring to the Committee's attention is the existence of a law passed in 1912, 5 U.S.C., Section 5946, that could contradict the policy of the NTTAA that the U.S. Government participate in the development of private sector standards. While we still await a final determination, lawyers in the Department of Defense have interpreted this law as forbidding the U.S. Government from paying membership dues, travel costs, or salary, for its employees to participate in standards organizations that base their activities on individual memberships. I believe, and ANSI believes, this would be a terrible public policy and I recommend that the Committee follow this issue very closely. Mr. Chairman, members of the Committee, I thank you for your attention.

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Chairman **EHLERS**. And I thank you for your testimony. I should also mention to everyone present that it is my understanding you have been nominated for President of the International Standards Organization by the members of ANSI. And, on behalf this Committee, Subcommittee, I want to congratulate you for that. I don't know what the election process is. If you need any help with campaign contributions, we might help, and if you need any trouble regulating them, we have an expert on that—Congressman Says. So between the two of us, we could give you some help. But——

Mr. **SMOOT**. Thank you, Mr. Chairman.

Chairman **EHLERS**. But we hope to welcome you back in the new capacity after that election next September.

Mr. **SMOOT**. Thank you very much.

Chairman **EHLERS**. Thank you. Next, we have Mr. Ritterbusch.

STATEMENT OF GERALD H. RITTERBUSCH, DIRECTOR OF STANDARDS AND REGULATIONS, CATERPILLAR, INC.

Mr. **RITTERBUSCH**. Thank you, Mr. Chairman, for inviting me to participate in this hearing. I believe I have some information that might be helpful to the Subcommittee. I have prepared a commentary on—for the hearing, but I will limit my remarks in this session to the questions that you have presented.

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I might just add that for the 30 years or so that I have been involved in the standards activity, I have served in just about every Society of Automotive Engineer's Committee structure developing standards all the way through the Tech Standards Board. I am also Chairman of the ISO Technical Committee for Earthmoving Machinery. So my breath of experience in this area involves both domestic and international activities.

Regarding the first question, in light of the dynamics that are altering the standards landscape, what measures can be taken to improve American standards-setting? Well, that question is exactly why, for the last several years, we have been working on putting together the National Standards Strategy. And many of us labored very intensively in that process to develop that document, which develops really 12 key strategies that if American business will pick these up and work through those, along with partnering through the standards development organizations and assistance from the government, we really think we can make a difference to establish the National Standards Strategy.

The next question was how do standards impact our ability to compete internationally? From a manufacturer of products, when we have domestic standards that are different than international standards, everybody loses. We lose domestically because we must build a product that is different from the products we sell internationally. That raises the cost to the—in the international market, makes the U.S.-based

manufacturer less competitive in the market. So, therefore, our need to harmonize standards is a very high priority. And that is what we do at ISO. We try to develop the harmonization of standards.

Now, in order to be effective in ISO, what we need to do is we need to have the best technology developed from our standards experts. And in ISO, the whole standards development process is very competitive, so it requires some great deal of skill to sell our ideas and to build support for them. So the key point really is that we must have a vibrant domestic standards system that allows our good technical expertise from the United States to be brought into the internationally community. If we don't succeed in selling our technology, it is reasonable that we accept the technology that is accepted in other parts of the world so we do have the harmonization.

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The next question was, how can we enhance United States leadership internationally in standards-setting? We obviously need standards experts that are really in touch with the market needs. Many of the other countries, as Mr. Smoot already mentioned, have top-down standards-setting processes where people at the very high level decide what standards are to be developed. We do not believe that really satisfies the market need and that is why the U.S. system is a bottom-up standards development process where the people that are really in the trenches that are doing the work are developing standards.

I would like to talk a little bit about the standards officials based at American embassies abroad. I have used the standards officials in Brussels in Riyadh and I feel very strongly that they have been very helpful to me in achieving our goals and working and building harmonized standards opportunities around the world.

I would like to move on a little bit to the consortia standards. The question, would it be helpful to the IT industry to move towards consortia-developed standards? My view is that the IT industry needs the right mix of standards that are developed in both the formal and those that can developed through the consortia process. The IT industry has a definite need for speediness in bringing standards to the market so they can be used. Consortia provide speed while the formal standards system, through its openness and balance, takes a little longer, but I believe that there needs to be the right mix of using both the formal and the consortia and that that needs to be chosen by the users of the standards and the players in the process.

Are there difficulties with the recognition of consortia-developed standards? A consortia standard is not a consensus standard in my view and thus not all of the interests that may be out there have been satisfied in the development of the consortia standard. So if a standard is going to be spread across a broader range of users, there could well be push-back if those users have not had an opportunity to produce work in the standard.

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So I think there is a need to ensure that we have the opportunity to develop the right standards for the right use and not really worry about the source of them as long as they satisfy the need. Thank you very much for this opportunity.

Chairman **EHLERS**. And I thank you. And I have neglected to mention that the lighting system we have—it is green for four minutes; yellow for five, and when it turns red, you are in danger of drastic action. Mr. Bradner.

STATEMENT OF SCOTT BRADNER, SENIOR TECHNICAL CONSULTANT, HARVARD UNIVERSITY

Mr. **BRADNER**. Thank you, Mr. Chairman, and members of the Committee, for inviting me to participate in this hearing. I am Scott Bradner, Senior Technical Consultant at Harvard University, Office of the Provost. I am here to talk about the IETF, the Internet Engineering Task Force, the group that is generally considered to be the primary developer of, and keeper of, the basic standards for the Internet.

I am not here as an official representative of the IETF. The lead time for this session was too short for the IETF, as an international body, to form a formal opinion. But I am here as one with a long history of the IETF in various roles and with a long history in working in IT standards in general.

At the IETF, I am currently an area director, and, as such, a member of the Internet Engineering Steering Group, the IETF's consensus determination body. I was also the editor of the documents defining the standards process and the IETF Working Group guidelines and procedures and involved in working out the relationship between the IETF and the International Telecommunications Union, Telecommunications Standards Division, ITU-T.

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In addition, I do have some personal opinions about the questions in front of us, rather than IETF formal opinions, but I would like to take a couple of minutes to describe the IETF because it is not a—as well known as some of the other standards bodies that are represented here.

The IETF is the primary standards organization for the basic Internet technology. It is international, consensus-based, self-funded, open to all participants, transparent, allows appeals, vendor-neutral, with merit-based technical evaluation. Participation is free and all working and final documents are freely available over the Internet. It has advanced process for dealing with intellectual property rights and the relationship with many other international standards development organizations.

The work of the IETF is conducted primarily through the use of Internet mailing lists. Anyone, anywhere in the world, who is interested in the work of the IETF, can subscribe to, and participate in, any of the IETF mailing lists. There is no concept of membership and no participation fee is required.

The IETF also holds, three times a year, face-to-face meetings. The next meeting is in London, England, in August of this year. All decisions taken at the face-to-face meetings are tentative and must be ratified by the Working Group mailing lists so that people who are not at the face-to-face meetings can have their input to the process.

IETF standards are voluntary standards produced by a rigorous, well-defined, open public process. The

IETF does not, however, make any attempt to police or mandate the use of those standards. Companies and individuals decide whether or not the standards are useful to them; i.e., the free market decides whether a standard is adopted by the community or not, rather than government-imposed regulatory action.

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One of the most difficult areas in standards development these days is that of intellectual property rights. The IETF has seen many cases of submarine patents and other attempts to subvert the standards process. The IETF recently revised its IPR rules and now focuses more on ensuring disclosure of IPR conflicts rather than requiring statements pledging fair and non-discriminatory licensing from all IPR holders. It is left to the Working Group consensus to determine if a particular technology should be used in IETF standards.

Most IETF Working Groups tend to prefer solutions that have no known IPR encumbrances, but when encumbered technology is seen as the best option, most Working Groups expect that pledges of fair and non-discriminatory action will be—licensing will be included. But this only applies to the technology being offered to the Working Group. Technology that is—claims of intellectual property rights infringement from outside the Working Group do not—are less sure as to how they are handled.

IETF standards are now used by much of the data communications industry around the world and it is doubtful that anybody who gathered at the first IETF meeting in 1986 would have believed that all competing standards for communications technology, whether government-mandated or proprietary, will have gone by the wayside.

In a practical sense, users of the modern data technology cannot ignore the work of the IETF and the IETF will continue to serve an important facilitating role in the emergence of new technology standards.

I would like to quickly address the three—three of the questions. Measures will be taken to improve the American standards-setting system. The Federal Internet Requirements Panel in May of 1994 said, standards themselves are not a goal, but a means of achieving goals, for filling missions and etcetera. What is important for the IT industry, which is different than some of the physical types of standards, is that it is a global standards-setting process. We don't have a local U.S. Internet. We don't have something where the Internet changes track sizes as it goes across borders. It is important for the U.S. industry to participate in global standards-setting processes and it cannot be done by doing better local-standards-setting regimes. They have to be global standards.

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Standards officials in American embassies—it seems like a logical idea, but I don't have any particular opinion on it, nor do I have a particular opinion on the RAND report, other than the—it is very important for the IT industry to be seen as a global industry, not a local one.

Chairman **EHLERS**. Thank you. Mr. Cargill.

STATEMENT OF CARL CARGILL, DIRECTOR OF STANDARDS, SUN MICROSYSTEMS

Mr. **CARGILL**. Chairman Ehlers, members of the Committee, thank you for inviting me. I am Carl Cargill, the Director of Standards at Sun Microsystems. We are a multi-billion dollar multi-national company. My statement is based on my experience as a practicing member of the—of IT standardization for approximately the last, it seems like 25,000 years, but it has only been 20 years. And my full testimony is attached.

The theme of the hearing today, which is U.S. standards-setting and United States competitiveness—there is probably no more successful regime in influencing non-U.S. companies than the IT standards process, using both consortia and the formal process. We have driven IT, as it is right now, into every corner of the world. The Internet is everywhere. The web is everywhere. Computing, based on the U.S. model, is almost everywhere.

We rely on standards to do that. There is a tremendously heavy commitment to standards on the part of the IT industry, and that commitment grows every year. I can testify to that merely because my budget has grown every year and I fund many of the standards activities in which Sun engages.

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What is unusual about IT is our—the industry's ability and willingness to engage in different methods of standardization. As we change our technology, we change our standards groups to meet the needs of the technology for standardization. We use consortia, which are groups of like-minded companies who gather together to produce the specification usually to benefit the entire market. Very rarely do you get a captive consortia that is trying to prejudice the market in its own favor. Normally, consortia benefit the entire market. That is one of the requirements.

Consortia, over the past 5 years, have become dominant IT standards providers within the IT industry—the web, the Internet. Most of the activities that deal with communications—computer communications tend to come from consortia.

These organizations, however, are not part of the ISO–ANSI federation. They are pay-to-play. They are funded by their membership and they live and die by whether or not they can appeal to their membership. If they miss the market their members represent, they are gone. Members withdraw. These organizations die.

It is interesting to note that almost all of these organizations hold their meetings with English as the language, produce their documents in English, produce their specifications in English, and reflect a bias towards the American or U.S. positions, in many cases. Countries usually cannot reject such standards. You cannot have a unique Internet in China. You are either part of the Internet or you are not. You are either part of the standards or you are not. So we have managed to export our technology very well, as—in answer to the first question.

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However, over the last 10 years, as long as I have been concerned with it and working with it, since

consortia started, there has been a gap between consortia and formal organizations. And, at times, it has been no more than hearsay and rumors. At times, it has been much more direct. There have been attempts to open doors between the two organizations, but there is a belief that both sides have sternly clung to the belief that their processes are right.

There have been assertions that one form is more legitimate than the other. And if you stop and think about the assertion that something is more open than another and it is a standard, it is foolish on the face of it and unfortunately critical underneath.

One of the major deterrents has been A119, at least the rumors of A119. And this comes from consortia members who have been told that they produce inferior standards. If you go to the Sin ISS website, the European website, and look at their statement about consortia, there is—they are not like us, they are different.

Okay. We produce standards. We all use standards for the same fundamental things. This is a gulf, however, and it is not about what standards are use for, but it is how to produce standards.

As a standards professional, this bothers me. I want to see the gap healed. I would like, if possible, a request to OMB, since we are currently rewriting their A119 circular, to ask them to specify consortia requirements as what a—and define what a legitimate consortia is. That would go a long way to removing some of the stress in the system.

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I would also like a larger role for NIST, who is a neutral, embedded and empowered observer who can help us make sense of what is happening in consortia. There are several hundreds of consortia. I fund a lot of them. In many cases, I have a vague idea of what is going on. NIST could be a very great help in organizing some of the technologies so that we can structure the technologies and how to participate in it.

And, finally, I believe that the whole intent should be that we all are working together. We all believe in standardization. Standards are fundamentally what we believe in because they are good. They expand in open markets. Our concern should not be with one another as standardizers, but with people who do not standardize, because those are the people we really want to convert and we don't want to convert one another. Thank you.

DISCUSSION

Chairman **EHLERS**. Thank you very much. Before we begin the questions, I just wanted to mention that some things that are happening and will happen. First of all, that I will send—be sending a letter to OMB, presumably in conjunction with Chairman Boehlert, and Ranking Members Hall and Barcia, and that has to be determined yet whether they are willing to do so. But send a letter to OMB asking for clarification of the recognition of consortia-developed standards under Section 12 of the National Technology Transfer and Advancement Act of 1995. That—I don't know how long it will take them to answer that letter, but I wanted you all to be aware that I am sending that.

Furthermore, NIST has agreed to host a consortia standards conference that will invite all the major

players on the issue and attempt to work out a defined consensus policy and IT consortia standards recognition. So those activities are underway.

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I now yield myself five minutes to begin the questioning. Mr. Smoot, I have a little trouble phrasing this question precisely, but let me put it into context. I have often expressed to my colleagues considerable frustration about the legislative process, which, as you know, is very thorough and tends to grind rather finely and takes a long time. It is almost glacial in its pace, at times. We are ill-equipped, in the legislative body, to deal with the rapid changes in technological development, particularly in the information technology fields. And I have been berating my colleagues, asking them to help develop a system that we can move legislation along more rapidly to deal with those issues.

And I—the same problem occurs in standards, I think, not to as great an extent. But what do you see in terms of standards-setting in the future? Can we develop more rapid mechanisms to deal with the very, very rapid changes that take place in technology and can we—particularly can we do so on the international scene, because that tends to be where things really begin to slow down? I would appreciate your comments on that. I am trying to take care of the legislative problems. I hope you have some ideas on how we can deal with the more practical bureaucratic ones.

Mr. **SMOOT**. I would like to say a lot more and will, but I think that fundamentally the same criteria causes the slowness. And it is whether there is consensus among those who have power to make the decision. The virtue of the consensus standards method is that it empowers all materially interested parties to have a say in the final document. That is also the vice. If those parties are simply not interested in the document going forward, there are lots of ways to keep it from going forward.

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On a process level, both domestically and internationally, the formerly lengthy requirements have been significantly reduced and American National Standard can go from beginning to end in as little as four months if there is consensus. But the procedural gates are down to four months.

Most U.S. standards developers now use electronic technologies to the extent that their community is comfortable with them. Some are at the point where they don't even physically meet anymore. They use video conferencing and document-writing systems to write their documents. So a lot of these things have taken place domestically, in particular.

At the international level, there still is more of an emphasis on meeting physically, and so the process does tend to take longer. There is also more of an element—an overlaid element of, perhaps, national politics in some areas that go beyond the technical in writing these documents. But, again, that is a little like writing legislation in a legislature—you have to have a consensus.

For example, in our written statement, we tried to explain that the advantage of using a consortia approach can be—because there are no formal requirements on how you approach it—can be that you limit

the scope of the participants. You get like-minded people together from the beginning and, as long as the resulting document is used, then you have been successful. As I think Gerald said, this is probably not the approach we would like to use in a standard that involves health or safety. We would like to have more breadth in the input side so that the resulting document has a broader investment of all parties.

Chairman **EHLERS**. Thank you. You mention also the issue of having standards officials at various embassies. I don't want you to take time to answer this part of it now, but I would be—appreciate it if you could just send me a letter indicating which embassies you think should have such officials present.

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And another issue that—apparently there have been some problems in the Gulf countries about this. I wonder, are there enough people knowledgeable about standards that are willing to serve in these positions, individuals who can avoid some of the problems we have had?

Mr. **SMOOT**. I think you are giving me an easy question to answer. You know, there are never enough experts in your area of interest. The Gulf countries, for example, are sort of led by Saudi Arabia, the largest economy, and they have gotten very active in the standards and certification requirements in their area. Therefore, there is a standards attaché in Saudi Arabia. I think Gerald has had direct experience with that attaché and that person has been very helpful. We only have five or six—I never can remember them all—currently. We don't need 140 or however many embassies we have. But we will be glad to provide you a written response. Thank you.

Chairman **EHLERS**. I would appreciate it. And now a quick question for all of you. I happen to, as a scientist, think the metric system is considerably more convenient than the English system of units. Is there concurrence on that among this group or not? Mr. Ritterbusch, particularly, are all Caterpillar products now made in the metric system?

Mr. **RITTERBUSCH**. That is a little bit difficult—all new designs are in metric. We still have some legacy designs, as you know. We keep some of the products around for a long period of time and there are still some legacy designs that are in U.S. customer units. But as far as all of the new product designs, they are fully metric.

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Chairman **EHLERS**. Do you find that generally true across American industry?

Mr. **RITTERBUSCH**. No. It is only really those industries that have a real interest in doing export and satisfying a global market that really push that. Some of our suppliers, domestic suppliers, would still like to stay in U.S. customer—

Chairman **EHLERS**. Do you have any problems with your employees? Do you have to train them to use the metric system and are—is that difficult?

Mr. **RITTERBUSCH**. Well, we have been doing this for so long that I think we are really past the big

training effort, but, yes, there was a lot of training when we started. It took time to get people to be able to visualize a millimeter rather than 1/16 of an inch. And after a while they would learn how to do that and they understand the dimensions.

Chairman **EHLERS**. Mr. Bradner, I saw your hand. If you have a quick comment?

Mr. **BRADNER**. One of the lucky things about doing Internet technology is that you—the measurements tend to be in nanoseconds rather than millimeters. So we use a different view, we don't have as much of an issue with that. Most of the time when we are talking about length, we do talk about kilometers, but there is very few places in IT standards of the kind that the IETF works on where something is metric or nonmetric. So I can duck your question.

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Chairman **EHLERS**. Any other comments? Mr. Smoot.

Mr. **SMOOT**. This issue reached a crisis almost two years ago when the European Union moved to make only single-dimensioned products acceptable on their market, and there was a compromise reached to put that off for 10 years. So that tells us that now we have eight years to figure out once again how we are going to handle this issue.

Chairman **EHLERS**. Thank you. I must—it is interesting to find that Caterpillar is more advanced than Lockheed Martin in terms of their handling of satellite orbits, or I should say, spacecraft orbits. I am next pleased to recognize Mr. Barcia, the Ranking Member.

Mr. **BARCIA**. Thank you, Mr. Chairman. I want to thank the Panel for their testimony and mention I just have one question that if each panelist could respond briefly to. And it was a point that Mr. Smoot suggested and—during his testimony. And that was that, perhaps, one of the problems that we are facing relative to standards is a low level of industry executive awareness concerning the significance of standardization. Since standards are so important to competitiveness and international markets and, of course, profitability, why is there such a lack of awareness among industry executives? And I am just wondering if there is anything being undertaken to address that problem by the industry or by management of the various corporations? And if each panelist could respond just briefly, that would—I would appreciate it.

Mr. **SMOOT**. The most active part of implementing our standards strategy, surprisingly to me, has been to begin work on changing the role of standards in the undergraduate engineering and management curricula and the graduate managed business school curricula. I think there is a recognition on the part of leaders in the accrediting organizations that this is a subject that needs a tiny sliver of a credit hour, but at least an understanding for the graduates, which they don't get now, that standardization is something they have to pay attention to.

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Short term, we are very wary of seeking a meeting with, for example, the Business Roundtable, until we

have a presentation that will not cause their eyes to glaze over in the first 30 seconds. We know we will only get one chance, so we are not—we hope—not going to blow that. Thank you.

Mr. RITTERBUSCH. I think one of the reasons is that in many instances the standards have worked very well and, thus, the industry executives have not found problems that they really needed to spend their effort on. There has been a lot of other problems within running businesses.

Now, in organization, of course, we try to work very closely. Yesterday, we had our review with our executive office, which is our six top people in the company. We spent 30 minutes with them discussing standards and the role of how they fit together with regulations and how they support the safety of our products. So many companies, like ourselves, are doing that where we do have the opportunity to meet with the CEO and the top-level executive office people to discuss this.

Again, it is—as a company has an interest in global activities and a need for standards, I think they are doing it. But many of the smaller companies—and that is what we find in our industry, small companies—they simply don't have the resources or the time or the pressure to deal with standards.

Mr. BRADNER. One of the tremendous advantages, and in this context, perhaps, disadvantages, of the Internet, is that we have a fundamental layer of standards. And those fundamental layer—that fundamental layer includes the Internet protocol itself, the Transmission Control Protocol, TCP, also TCP/IP, and a few control protocols and routing protocols, and things like that, that support that infrastructure and make sure that data that is sent from your PC, e-mail to a friend, gets to the friend or sent to me.

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But it also means that you and I could go off and develop a new special application and that just the two of us exchange traffic on that without anything in the network being aware that we are doing it, other than it knows that there is traffic being exchanged, but it doesn't know what is involved in that.

That is how the world wide web came about, was there was no standards activity that created that. It was just Tim Burners-Lee worrying about the fact that some physicists didn't know how to type and they wanted to point and click instead. This has the advantage of facilitating tremendous innovation. We are not—we don't have to convince somebody in the infrastructure to enable something to make something work.

But it also allows a company or an individual to think that they can get by without doing standards, at least at the beginning, because they can distribute their software in diskettes, in magazines, or whatever, and it runs over the common Internet without having to modify anything, but it is a proprietary technology.

And so while it strongly pushes innovation, lets anybody invent anything, it doesn't encourage standardization easily. We have some significant issues, for example, in the Instant Messaging space, between three or four major providers who all have very successful individual Instant Messaging services. They all run over the Internet, but they don't interoperate because so far they have not seen it as their—in their business interest to do so. And, unfortunately, the Internet facilitates that in some circumstances.

Mr. CARGILL. There is a double bias here because I have only worked for companies that employ

standards professionals. Most of the companies I work for are interested in standards. However, the IT industry, as a whole, I believe, is investing more in standards. Chairman Ehlers pointed out the *Economist* Magazine from, I believe, it was 1993. They recently had another one in—this year—in April of this year that, again, brought up the concept of Java software. Standards are vital to the industry.

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In a consortia, the executives recognized it because when you asked them to sign a check for \$25,000 to join an organization, it gets their attention very quickly. So they are aware of it. We understand much of the rationale for doing it. It is a market creation. However, I work for a technology company and the technologists tend to be aware of this. We find the marketing people tend to be less aware, and that is where we get a lot of what I call spurious consortia from. And it is like, ooh, let us get together and do something.

If you would look at business books, such as *Crossing the Chasm* or the *Innovator's Dilemma*, they don't address the problem of standards. Now, the *Innovator's Dilemma* deals—in one of its chapters, deals with the disk industry and how large companies in the disk industry collapsed at certain times because of innovation. What the author never mentions, and this is the disk industry in 1983, '84, '85, was that was a time of magnificent standardization by X-3, the predecessor organization to NCITS, where the SCSI interface drive was developed, where the IPI drive was developed. All these things were standardized. That is what affected the companies. Not so much the *Innovator's Dilemma*, but suddenly the market opened up and people who could be clever could use a standard interface.

We are aware of that. We are aware of their tremendous power to create and break. But, as was pointed out, they are mind-glazingly dull. If you look at the billions of dollars that come as a result of them, there is not a business person in America who wouldn't love—or not a marketing professor in America who couldn't love to write them. But they are very pedestrian. There is very little excitement in a standard, unless you are really into it, and then it is a lot of fun.

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Mr. **BARCIA**. Thank you.

Chairman **EHLERS**. The gentleman yields back his time. I next recognize the gentleman from Connecticut, Mr. Shays.

Mr. **SHAYS**. Thank goodness for standards. And as I was taking down some old track lights, but keeping the tracks and keeping the lights, I am curious as heck—if I go and buy new track lighting, will it fit the old light? That is just a personal interest that I would like to know.

Mr. **SMOOT**. If you are lucky. It may be metric. We did that and we were lucky.

Mr. **SHAYS**. Okay. I would love to know—but I was thinking—I was thinking, though, before this hearing, that the logic of standards—I mean, it is just—for almost everything. I would like to ask, where—what industry do you have the least cooperation in developing standards? What industry would that be?

Mr. **BRADNER**. Just as a personal guess, it would be the consumer products space. It is things like the track lights where individual companies think that they can—they will put out a system. One answer to your question is that the old—your old tracks may be English measurements and the new ones may be metric. So you may run into a problem there.

But I think that in many spaces where you don't have to worry about interworking with something else in Christmas tree bulbs very much because you can build your own little light strings for that. There are many spaces where interworking is not objective. That is not the case with railroad cars or Internet or IT—information technology or anything in that space. Or in the car industry—they have—you have to deal with, you know, gas hoses, nozzles, in any place the car goes. But wherever it is isolated, there is very little incentive because you don't see a larger market overall just because your thing is the same shape as somebody else's.

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Mr. **SMOOT**. Scott's answer points up a dichotomy in thinking about standards. I agree with everything he said except that the whole electrical products sector and, in fact, the built environment sector is replete with standards for our safety and increasingly for the environment. So the question is, which aspects of a product are you looking at? They have paid relatively little attention to our being able to replace the bulbs in Christmas tree light strings. But at least in the United States, we can all plug them into the same plug in the wall and, by and large, they are safe. So it is a difference in focus.

Now, in the IT industry, for example, there are a very small number of safety and health-type standards, but they are accepted worldwide. So you have a very stable environment even though the technology up here is changing quite rapidly.

Mr. **SHAYS**. Yes, sir.

Mr. **CARGILL**. I believe it is certainly necessary, in answer to your question, to par standards, as Ollie has said, and to market driven standards by which you increase a market and the standards by which you protect. Safety environment standards are fundamental standards. You must do them. If you don't do them, you go to jail. It is fundamentally that simple. But market-driven standards are those that a company can use to create a market and there is a whole set of literature on. When do you become a standards driver versus when do you become a standards adopter? If you are a dominant participant in the market owning 80 percent share of market, you have no reason to standardize unless you want to commit—force the people to commit to your technologies and put up barriers and so on.

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And there are all sorts of interesting economic rationale behind that. But fundamentally, if you think you can own the market, there is no reason for you standardize. And that is where you see a lot of nonstandards activities.

Secondly, as Scott said, in places where you don't have to interoperate. Interoperation requires standards in some form, shape, or way. And so it is places where if you can control the market and continue to control it, you don't necessarily need standards.

Mr. **BRADNER**. I would like to follow that up just a second. I give you an example of where a company thought that they had 80 percent of a market and were mistaken because the market was the wrong size. This was in the twisted pair Ethernet business a few years ago. There were a number of companies in that space, each of which thought that their product was wonderful.

Mr. **SHAYS**. Twisted?

Mr. **BRADNER**. Twisted—it is computer networking over telephone wires.

Mr. **SHAYS**. Okay.

Mr. **BRADNER**. This was—there was a pre-standard phase of that where lots of individual companies brought their own products to market and sold them to organizations, such as Harvard. We bought a big system of this which allowed us to run the 10 million bit per second common data networking over phone wires. But it was a relatively small market. After standards activity, and it was not a quick standards activity, but it was one which, after a year or two, got finished. The market is now 1,000 times bigger. So that company that thought they had 80 percent of the great market, has almost nothing of the large market and is making much more money.

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And that is their—the—what Carl was just saying, yes, a company that thinks they have the big market is often mistaken when coming to standards. Standards most often increase a market rather than reduce it. They increase it locally, they increase it worldwide.

Chairman **EHLERS**. The gentleman yields back his time. And the next is the gentleman from Colorado, Mr. Udall.

Mr. **UDALL**. Thank you, Mr. Chairman. And I want to welcome the Panel and I have listened with great interest as to what you have to say. I also want to associate myself with the comments of my colleague, Mr. Shays, although I would acknowledge that in the west, there are some people who think real men don't use track lights. But we need to do something about that. I also thank him for—

Mr. **SHAYS**. If the gentleman would yield, I haven't yet bought the new tracks, so I will think about this.

Mr. **UDALL**. I also wanted to thank you as—along with my colleague, Mr. Shays, for clarify was it twisted ear or hair or—I, too, was puzzled by the reference.

Mr. **BRADNER**. Pair.

Mr. **UDALL**. It is pair—pair.

Mr. **BRADNER**. Pair, as in pair of wires.

Mr. **UDALL**. Pair. Okay.

Mr. **BRADNER**. Sorry.

Mr. **UDALL**. I——

Mr. **BRADNER**. This is unfortunately a jargon-rich environment.

Mr. **UDALL**. It is here, too, on the Hill. It is just different jargon here. But, thank you again. And I did also want to welcome, in particular, Mr. Cargill and note that in the second district in Colorado, we are very proud to host Sun Microsystems. And we also have the University of Colorado in the university community which does great work. And then we have a number of federal labs, including the NIST facility there and it is a great convergence of a lot of common interests.

And to that, Mr. Cargill, I note that you mentioned Sun's presence and the presence of NIST and you expressed an interest in, I think, additional collaboration or some things we might do together. Would you care to expound a bit more on what you envision?

Mr. **CARGILL**. Yes. Thank you. By the way, the University of Colorado does have a standards program and it is funded by the state and it is growing in acceptance. So I am very pleased with that since I graduated from the University of Colorado, as well.

The NIST—NIST has a unique opportunity of being seen as an independent, as I say, embedded and empowered participant. It has a great deal of technical capability. It has a great deal of respect in the world. It has the ability to call on its own right a meeting of people engaged in standardization. It is respected worldwide. And because of that respect, the call would probably be answered by a majority of people who would be interested in such participation. Because they are neutral—that is, they do not have their own agenda, their own technical agenda, to push, it is phenomenally helpful.

Mr. **UDALL**. Uh-huh.

Mr. **CARGILL**. They are going to take someone's technology and take it away and try and manipulate it. And they are empowered because they have the ability to judge that technology. So those three attributes—that they play, they have got knowledge, and they have the respect—may NIST an absolutely ideal place to call meetings to help understand the technology, to understand where the players are.

We are looking at wireless right now. And we just have done, within Sun, a list of players in the wireless arena. And they are about 40 players in the wireless arena. I would like to know exactly where there are

gaps in what they are doing, where they fit together, where they don't. NIST would be the ideal place to call that and have the wireless groups talk about what it is they are doing, where there are overlaps, where there are gaps. Most of these are consortia.

Mr. **UDALL**. Uh-huh.

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Mr. **CARGILL**. I help fund them. So we are interested in this for both technology reasons and economic reasons. So NIST has a role. NIST can do that. And——

Mr. **UDALL**. NIST can continue to be a convener, is what you are saying.

Mr. **CARGILL**. NIST could be a convener. It could be a sort of source of information, a source of knowledge of about what is going on. I would love to be able to go to the NIST website and say, ah, standards—here is the profile. Here is where all the—or wireless—here is where all the consortia are playing. Here is where the formal groups are playing. And then compare that against where I have deployed Sun's resources and standards.

Mr. **UDALL**. That is not presently occurring.

Mr. **CARGILL**. That does not presently occur, but that would be absolutely magnificent. And because that tells me what I need to know as a business person, where to deploy my resources.

Mr. **UDALL**. Uh-huh.

Mr. **CARGILL**. And I am deploying reasonably competent, very good engineers and they are scarce. So that is what I am—that is what I would really love to see——

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Mr. **UDALL**. Thank you.

Mr. **CARGILL**.—if I had my druthers.

Mr. **UDALL**. Well, thank you. We will note your idea and I think we should pursue it further. I noted in a briefing paper I have here about the prominent issues to be addressed—one of the concerns that is exposed, and perhaps this was discussed before I arrived, was—and I trust issues arising in consortia and somebody maybe trying to seize a competitive advantage or not. I don't know—Mr. Smoot, you might speak to how a formal process, with which you are so familiar, works with the antitrust issues and, again, gives people a sense that this is fairly being considered and that nobody is going to seize an advantage in the process itself.

Mr. **SMOOT**. A partial intent of the procedures under which ANSI accredits standards developers is to ensure that there is due process to all who might be affected by the standards that come out of the process.

Even though their application is voluntary, you still have a document. So this has historically been a significant area of attention and it, like any other set of procedures, can be abused in application and still expose the standards developers, the participants, to antitrust liability. There have been about two Supreme Court cases in the last 20 years in this area.

Mr. **UDALL**. Uh-huh.

Mr. **SMOOT**. But the same kind of attention to the legal requirements enable consortia, which don't use all of the procedures that ANSI would require, I think, basically to have about the same level of antitrust exposure. It depends on setting the process up well in regard to what the law is and then following your process once you have set it up.

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Mr. **UDALL**. Thank you for that response. I see my time has run out. I don't know if there is any interest in responding further. Maybe the Chairman would——

Chairman **EHLERS**. Yes. You may take a little more time if you wish.

Mr. **UDALL**. Thank you, Mr. Chairman.

Mr. **BRADNER**. This was a—as I mentioned in my opening statement, that the IETF, the Internet Engineering Task Force, revised its standards procedures within the last seven or eight years. And one of the areas that we took a great deal of care with is the establishment of rigorous set of processes to ensure that fairness is kept, that intellectual property rights issues are disclosed, in order to deal with those Supreme Court cases that were mentioned.

But I think that certainly the IETF processes, with the legal help we had in setting them up, and all the—and the other processes in other organizations that I have seen, such as the ATM forum, a consortium, are quite up to the task of ensuring a protection against antitrust activities, as long as the processes are followed rigorously.

Mr. **UDALL**. Thank you, Mr. Chairman, for the additional time and I thank the Panel again.

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Chairman **EHLERS**. Thank you. We will take a little time for a second round. I had never realized before, because I had never thought about it, that twisted pair could be misunderstood. And now that I have heard that, you know, my mind is running wild with all kinds of examples. So——

Mr. **BRADNER**. It is not a rock band.

Chairman **EHLERS**. No. I was thinking of perhaps two criminally insane people or perhaps a pair of expert gymnasts, a host of other examples. But we will get back to business.

Mr. **SHAYS**. Mr. Chairman, is this on the record or off the record?

Chairman **EHLERS**. In this Committee, you have to put up with comments like that once in a while. Let me just ask a question which is a little outside the domain of this. But is it possible to accelerate standards-setting or impose it, in a few cases, in such a way that serves that interest of consumers, but before you get too far down the road with an industry?

A good example might be the cellular telephone industry in America, which every company has set its own system in place and you sign up with a company and you are tied down to their particular area where they are—they have transmitters and so forth.

And it is my understanding in Europe, they have decided on standards ahead of time, or the government sets standards, so you can use any cell phone with any system anywhere. You pay the bill, of course, and then you set up a system for transferring funds back and forth.

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But you have coverage everywhere, whereas in this country, in Michigan, which is not heavily populated in northern Michigan, I have, for example, an assistant who when she wants to go to her—their weekend condo, she needs one cell phone. But if she wants to go visit her mother in a different part of northern Michigan, she has to use a different cell phone.

Could a problem like that be avoided by stepping in early and—on the part of NIST or some appropriate government agency and say, let us get together and let us decide on standardization? I would appreciate any comments. Mr. Smoot.

Mr. **SMOOT**. The standards on which U.S. cell phones are currently based were developed in voluntary standards bodies, including the service providers and the equipment providers, basically under direction from the FCC that, in this case, they didn't want to set a single result, but would let the materially interested parties decide.

I am not personally aware of the extent to which, say, consumers were directly present or the motivation that you said was present, except that, at the time, the industry was growing out of a focus on a limited area and a connection to the public switch network so that the mobility of your customer was considered to be quite low. So the result was agreement among all of these people that multiple standards would be published and perfectly legitimate to build to.

The difference between the U.S. and the European Union is that, at the time, the European Union was trying to make a single market out of its 14-member markets. And so having a single standard in many different areas was an overriding goal. So it was a natural evolution of what they intended generally, from beer laws to cell phones.

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So there—the outcome was, I think, very probably unforeseen synergy that got this—I don't know, Scott, if I can use network effects, which is an economic concept that, you know, every additional person who joins a network makes the network more valuable to everyone else. This type of effect was not perceived in the United States at that time when they were setting the standards. It is very much perceived now as they are setting the third generation standards.

Chairman **EHLERS**. Thank you. So you agree that the consumer benefits from the European type of approach.

Mr. **SMOOT**. I agree that in Europe you can have—you have pan-European cell phones. I don't know that the average U.S. citizen is better off or worse off because there are other variables in the answer. I don't know whether it costs more or less, for example, which might be very important to a lot of U.S. consumers who don't travel more than, say, around the beltway and don't have this problem. Now, an internationally traveling executive has a big problem. So I would pay a lot more.

Chairman **EHLERS**. Well, anyone traveling in Michigan does too. I would say anyone who just travels around the beltway has other problems that we can't solve. But, all right. Well, thank you for your comments. I turn to—once again, to Congressman Shays to see if he has any further questions. Okay.

Mr. **SHAYS**. Mr. Chairman, I just wanted to——

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Chairman **EHLERS**. Is your microphone on?

Mr. **SHAYS**. I am going to make it a habit to come to all your hearings given your humorous comments.

Chairman **EHLERS**. I appreciate that. My staff certainly doesn't appreciate them. I have no further questions. Oh. I am sorry. I do have a question to be asked at the request of Ms. Biggert, who is a member, but she is from Illinois. She could not be here. But she has concern about—represents an anchor bolt manufacturer, or fastener manufacturer in her district. And let me just give these out and get the answers for the record.

What procedures do ANSI and its credited organizations follow to ensure that standards they produce do not create unnecessary obstacles to international trade or that they are not more restrictive than necessary to fill a legitimate objective?

And the second question is, if an ANSI- accredited organization produces a standard that is challenged as not being consensus-based, what mechanisms exist to ensure that the organization followed the procedures for which it was accredited by ANSI? That sounds to me like those are questions for you, Mr. Smoot. You can either answer them here or you could answer them in writing later, if you wish.

Mr. **SMOOT**. I think it would be most helpful to the Committee if we were to give you a written answer because it is of necessity quite detailed and I would hate to say that my recollection of the ANSI processes is detailed enough to be accurate.

Chairman **EHLERS**. That was my impression too and that is why I gave you the option.

Mr. **SMOOT**. Thank you.

Chairman **EHLERS**. Obviously, these are very specific questions. We will give you the question in writing for your use. Any further questions from the Panel? Any further last comments you would like to make? I certainly want to thank the Panel for coming here. It has been extremely helpful to us. I—this is, in a sense, an extremely esoteric area understood by very few people in this Nation. I am always fascinated, for example—I get the question, honest, constantly because I have worked in atomic and nuclear physics research—why do we have to know the second to the 10 to the minus 19th or whatever it might be? And I got this question more frequently when we first worried about doing it 10 to the minus 9th accuracy.

And I would simply say to you, watch color television. And, yes, and you will like it better than the first television sets you saw. Now, of course, you know, you aren't constantly adjusting it. And I said, well, that is why you need that accuracy of frequency because that information, to adjust the color is contained in a side band on the TV signal and it has to be that precise to give you the right information.

The public is simply not aware of the many ways in which standards-setting affects them daily in terms of their health, their safety, and their general standard of living. And I appreciate that you gentlemen are aware of that and you dedicate a considerable amount of your time to it. And I really appreciate that you were here and shared your expertise with us. Thank you very much. And with that, I declare the hearing adjourned.

[Whereupon, at 3:20 p.m., the Subcommittee was adjourned.]

Appendix 1:

Opening Statements

PREPARED STATEMENT OF VERNON J. EHLERS

Welcome to today's hearing on the role that the standards-settings process plays in United States competitiveness.

At the beginning of this Congress, Chairman Boehlert transformed the former Technology Subcommittee, chaired ably for the past six years by my colleague from Maryland, Mrs. Morella, and gave us added jurisdiction over environmental issues. To reflect this change, the subcommittee was renamed the Environment, Technology and Standards Subcommittee.

Thus far this year, we have held hearings covering the environment, on strengthening science at the EPA; and technology, on the future of the ATP program. Today we focus on the last leg of the three-legged stool on which this Subcommittee's jurisdiction rests—standards.

Standards play a critical, yet largely unheralded, role in helping support world-wide economic growth and competitiveness. What most people don't realize is that standards affect our lives every day. They are the foundation for manufacturing the cars that we drive, the homes in which we live, the televisions that entertain us, and the telephones and computers we use to communicate. And these examples just scratch the surface. I can't imagine what our world would look like without standards.

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As a result of the advent of new technologies; the increasing pressures on trade and competition from our international competitors; and rising global concern for health, safety, and environmental protection; the standards-setting process is now facing new challenges. This dynamic has placed the standards-setting community at a crossroads that can in alterably shape our future competitiveness for quite some time.

Perhaps the greatest problem is the immediate need for new standards to address rapidly developing technology, contrasted against the deliberate pace of government and much of the standards-setting process.

I believe it is time for a new standards-setting paradigm that accounts for these pressures and can respond rapidly to constant technical evolution.

A good first step in the creation this new paradigm is the National Standards Strategy unveiled several months ago by the American National Standards Institute (ANSI). The Strategy reflected a comprehensive two-year ANSI effort, working in conjunction with the public and private sectors.

I am pleased that the National Institute of Standards and Technology has endorsed the Strategy and is working with ANSI to implement it. I am concerned, however, that the Strategy may not go far enough with respect to the new standards challenges of emerging technologies.

Some members of the information technology industry argue that the current standards-setting process may be too cumbersome and slow to meet the needs of an industry ruled by Moore's Law. The growth of the Internet and the industry as a whole are relying more and more on consortia for their hardware and software standardization needs.

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While I understand that there is concern that the consortia-development process may not have the same level of adequate transparency, openness, balance, and due process as the formal standards process; I believe we must have greater clarification about the legitimacy of consortia standards, especially for the IT industry.

I would like to discuss these and other pressing issues with our panel today as we begin to attempt crafting a new standards paradigm.

I would also like to mention that the standards-setting process is not the only institution grappling with Moore's Law. Time and again, I have said that the federal government must also adopt new, more flexible

rules for dealing with the rapidly changing information technology industry. Over the past decade, our government export polices squelched new encryption technologies, which, in turn, gave rise to a robust encryption industries in other countries. We must adopt new polices for dealing with this issue.

I look forward to hearing from the panel and would like to now recognize the subcommittee's ranking member, Mr. Barcia.

PREPARED OPENING STATEMENT THE HONORABLE JIM BARCIA

I want to welcome our distinguished panel to this afternoon's hearing on standards.

Standards are one of those issues which are generally taken for granted until something goes wrong—like when Baltimore burnt to the ground early in this century because there were no uniform thread standards for fire hydrants. Michigan's auto industry is dependent on standards developed by the Society of Automotive Engineers (SAE).

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I want to thank our witnesses for appearing before the panel today. And lastly, with this being the committee's last meeting prior to the 4th of July district work period, I want to wish my colleagues a productive time back in their districts and everyone safe travel and an enjoyable Independence Day celebration.

Although I am not among those whom standards raise violent passions, this Subcommittee recognizes the importance of standards to our economy and society. Just yesterday, this Subcommittee marked-up bipartisan legislation for the development of voluntary technical standards for voting products and systems. In addition, this is the 10th hearing on standards that the Subcommittee has held since 1995.

These hearings always provide us with a snapshot on what's going on in the standards arena and some insight into this complicated issue. We have a wide-ranging panel of witnesses and I hope they will address what is the appropriate role for the Federal government to play in the international standards setting process.

Consumers rely on SAE standards every time they buy a quart of oil with the familiar SAE 10w-40. These SAE viscosity standards let us know that regardless of the brand of oil we buy it is suitable for our engine's requirements.

Standards are equally important to the information technology industry. Nearly a decade ago, *The Economist* stated:

"The eyes of most sane people tend to glaze over at the very mention of technical standards. But in the computer industry, new standards can be the source of enormous wealth, or the death of corporate empires. With so much at stake, standards arouse violent passions."

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PREPARED STATEMENT OF REPRESENTATIVE CONSTANCE MORELLA

Mr. Chairman, thank you for calling this important hearing to once again review the role standards play in our national economy. Although they are often unrecognized, standards are vital tools of both industry and commerce providing commonly accepted protocols for the interactions between complex and diverse products and users.

Last September, as Chairwoman of the Technology Subcommittee, I held a hearing on this very subject and I am pleased to see this committee continuing to follow through on its oversight role. The Science committee has historically been an important player in this arena, most notably with our enactment of the national Technology Transfer and Advancement Act of 1995 which requires agencies to use and promote voluntary consensus standards. Given the incredible importance of standards to our nation's financial health, I am glad this issue is getting the attention it deserves.

In the U.S., the development of voluntary consensus standards is driven by industry. We have organizations like the American National Standards Institute (ANSI) to facilitate and coordinate standardization, but also free-forming consortia, which provide alternatives to the formal structures. This system has worked extremely well, but because of the diversity and number of participants, the process is not free from criticism. In part, certain problems result from the sometimes substantial costs of participation in standards development, making it difficult for small firms and non-industry representatives to be active in the process. The standards themselves may cause problems particularly in trying to satisfy the concerns of the many diverse interests active in the process. Finally, as part of the efforts to streamline business operation costs, companies and firms are concerned about their investments in developing global standards and would like a more efficient system.

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Two problems in particular have arisen, the ability of the standards development process to meet the needs of the shortened business cycle associated with the information technology industry and the interaction of U.S. standards with the global economy. With the frantic pace of the computer revolution, standard setting in the IT world has had to adapt new paradigms to meet its needs. We must evaluate to what extent these practices can be aided and legitimized in order to find wide-spread use and acceptance.

On the world scale, the situation is even more critical. Top-down approaches favored by our European friends can produce biases in the world marketplace, harming the competitiveness of American goods. American participation and leadership in organizations like the ISO and other international standards bodies is important in order to maintain a level playing field for U.S. industry.

As part of the Science Committee's legislative jurisdiction, we have oversight responsibilities for the programs and activities of the National Institute of Standards and Technology (NIST). NIST provides technical support in identifying relevant information about domestic and international standardization activities and coordinates the delivery of standards assistance. I am interested to learn what the panelists see as NIST's role in overcoming the difficulties ahead.

I hope our panelists will address these issues and help us formulate solutions and reforms. I thank them for their participation and look forward to their testimony.

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Written Testimony, Biographies, Financial Disclosures, and Answers to Post-Hearing Questions

PREPARED STATEMENT OF OLIVER R. SMOOT

Thank you Mr. Chairman and members of the Committee for inviting me here today to testify on "Standards-Setting and United States Competitiveness." I am Oliver Smoot, Chairman of the Board of Directors of the American National Standards Institute. The topic of this hearing is of great interest to us, as ANSI's mission is "to enhance both the global competitiveness of U.S. business and the U.S. quality of life by promoting and facilitating voluntary consensus standards([see footnote 1](#)) and conformity assessment systems, and safeguard their integrity."

ANSI's Role

For nearly 100 years, with the active support and participation of both the private sector and U.S. Government, ANSI([see footnote 2](#)) has administered and coordinated the voluntary consensus standardization system in the United States. We accredit standards developing organizations, and approve as American National Standards documents prepared by accredited standards developers that provide dimensions, ratings, terminology and symbols, test methods, performance and safety requirements.

As the accreditor of U.S. standards developing organizations that desire to prepare American National Standards, ANSI ensures the integrity of the standards development process and determines whether standards meet the necessary criteria to be approved as American National Standards. Before a standard is approved, the standards developer must submit evidence that it has adhered to principles of openness, balance, public review, and due process (including the right to appeal), and that representatives of all materially affected interest categories have reached a consensus. In addition, ANSI regularly conducts audits of its accredited developers to ensure that they are adhering to their procedures and current ANSI requirements.

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While all American National Standards must be developed in accordance with these basic hallmarks of the ANSI process, accredited developers may satisfy these requirements in innovative ways and rely extensively on electronic communications. If there is already consensus by the interested parties on a proposed standard, the standard can meet the procedural requirements for, and be approved as, an American National Standard in as little as four months. Today there are 201 ANSI-accredited standards developers responsible for approximately 12,000 current American National Standards.

ANSI's voluntary consensus standards development process has proven its usefulness to a diverse set of industries and to federal, state and local government agencies. ANSI-accredited standard developers address horizontal issues like safety, health, the environment and quality. In addition, ANSI accredits developers and approves standards work in automotive, building technologies, mechanical devices, electrical, electronic, telecommunications, information technology, petroleum, banking, medical devices, dental products, household appliances, and many other sectors of the U.S. economy.

Voluntary consensus standards for products, processes and services are at the foundation of the U.S. economy and society. ANSI was created to bring together public and private sector interests to make this happen. The ANSI system is itself operated through the voluntary activities of those affected by or interested in these standards.

For nearly a century, the U.S. voluntary consensus standardization system has been effective in developing standards that meet industry's needs and adequately address public interest concerns. One of the greatest strengths of the system lies in its ability to represent and accommodate the views of a wide spectrum of participants and to adjust to the concerns of a changing environment. Coupled with its resiliency and adaptability, the U.S. system is empowered because it is constituency-driven from the bottom up. The result of all this activity is that there are approximately 90,000 voluntary standards used in the U.S. to enable commerce.

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Another important role for ANSI is to provide leadership and pathways to facilitate the acceptance of U.S. products, processes and services in international markets. ANSI is the United States member of the two major, non-treaty international voluntary consensus standards organizations, the International Organization for Standardization (ISO) and, through the United States National Committee, the International Electrotechnical Commission (IEC), and of the major non-treaty regional standards organizations throughout the world. But, ANSI's role internationally extends beyond working to ensure that ISO and IEC standards are globally relevant and useful in the U.S. We also advocate the U.S. approach to standardization, the fundamental premise of which is that the user should determine what is needed in a standard—both its technical content and the process by which it is developed. In contrast, some WTO members assert that only standards promulgated by ISO, IEC, and ITU are acceptable. We believe that the robust state of our national economy is partly attributable to the fact that the U.S. standardization system, to which ANSI contributes, is the most effective and efficient in the world.

QUESTIONS FROM THE COMMITTEE

1. While voluntary consensus standards for products, processes, and services are the underpinnings of the United States economy, the current standards-setting system is now facing new challenges. Increasing pressures on trade and competition from our international competitors, in addition to rising global concern for health, safety, and environmental protection, are dramatically changing the current standards framework that has supported the needs of our citizens and the competitiveness of American businesses for so long. In light of the dynamics that are altering the standards landscape, what measures can be undertaken to improve the American standards-setting system?

ANSI agrees with your basic premise. We are rising to meet the challenges of the changing international landscape and the evolving needs of our national community by implementing an aggressive National Standards Strategy.

As some on this Committee may recall, the ANSI federation recently completed a two-year effort to develop a "National Standards Strategy for the United States."[\(see footnote 3\)](#) We did this with the support of this Committee and with active involvement by many federal agencies. We believe that the United States needs a clear set of priorities and plan of action to ensure that U.S. interests—not just ANSI interests—are well represented worldwide and that our voluntary standards environment domestically is healthy and productive. This Strategy document was the result of a broad-based participation from affected interests including representatives from mature industries, emerging technologies, standards developing organizations, government, and consumers.

The National Standards Strategy was approved by our Board and presented to this Subcommittee on September 13, 2000. It begins by noting that "The standardization world has changed."[\(see footnote 4\)](#) It continues, "We can't assume that U.S. technology and practices will automatically be adopted everywhere, nor can we assume that within the U.S. everyone will be satisfied with 'business as usual.' "[\(see footnote 5\)](#) The Strategy then sets forth an ambitious plan for addressing the challenges of today's global economy. ANSI and ANSI members are in the process of aggressively implementing that plan, and we hope that you and others will actively support it as well.

A significant national need with regard to standards-setting and U.S. competitiveness is a much higher level of executive awareness and understanding both within industry and within government of the strategic significance of standardization. The National Standards Strategy addresses this in initiative 11 which states "Make the value of standards development both apparent and real by educating public and private sector decision-makers about the value of standards and how to take advantage of the process". Those of us who participate in international meetings are continually made aware of the difference in the strategic role of standards to companies in other nations, again most notably Europe, compared to the non-strategic role of standards to many U.S. companies.

In light of some of your subsequent questions, I think it is important to note that a central theme of the National Standards Strategy is this statement: "*The strength of standardization in the United States is a sectoral focus supported by a dynamic infrastructure.* This sectoral approach allows interested parties to address their own issues and develop working methods that fit the problems at hand, since no single standardization approach can satisfy all needs. This allows efficient standards development and fosters innovation and competition." Throughout the Strategy, and throughout the standardization community, there is widespread recognition that there are many methods of standards development, and that each sector must decide for itself what method or methods best suit its needs. This is fundamentally different from the approach taken by those in other nations that adopt a top-down, status-based approach.

The Strategy sets forth the following twelve strategic objectives that are further supplemented with delineated tactical initiatives:

1. Build on the trend in government to use voluntary consensus standards through existing public/private partnerships.

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2. Address the ongoing need for standards in support of health, safety and the environment.

3. Improve the responsiveness of the standards system to the views and needs of consumer interests.

4. Broaden the U.S. standards "umbrella" to include all those organizations that are contributing to the standards system.

5. Work to improve processes internationally to more closely reflect our principles and vision.

6. Work to harmonize the use of standards worldwide as a tool for meeting regulatory requirements.

7. Provide an outreach program to show those outside the U.S. the value of U.S. technology, standards and processes.

8. Improve the standards process within the U.S. to address customer needs for efficiency.

9. Improve the standards process within the U.S. to address customer needs for coherence.

10. Improve communications between various public and private elements of the U.S. standards system.

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11. Make the value of standards development both apparent and real by educating public and private sector decision-makers about the value of standards and how to take advantage of the process.

12. Establish a stable funding mechanism for the standardization infrastructure.

ANSI recognizes that there are many ways to develop standards. We believe that voluntary consensus standardization—which has as its hallmarks openness, balance, due process, and consensus—has proven its value time and time again for almost a hundred years. ANSI and its members have been very successful at shepherding activities that meet the needs of those industries, government agencies and other interests that value the consensus process for developing standards. We are well aware that other means of developing standards exist, and that in many instances those other methods and the resulting standards are entirely appropriate for the targeted user community.

2. How do standards impact our ability to compete internationally? How can we enhance United States leadership Internationally in standards setting? Would it be helpful to have standards officials based at

American embassies abroad?

Standards critically affect market access. As tariffs have been reduced, more economic competition is being waged in technical areas as nations use technical requirements to limit market access. ANSI has been very active in working with the Office of the U.S. Trade Representative to address Technical Barriers to Trade (TBT) issues. The WTO Technical Barriers to Trade Agreement seeks to reduce the national use of technical barriers that inhibit international commerce. However, there exists a continuing struggle. The U.S. view is that voluntary consensus standards (whatever their origin) that meet user needs are preferable. In contrast, some WTO members assert that only standards promulgated by a small set of international organizations deserve recognition under the WTO agreement. In the last review of the Technical Barriers Agreement, the signatories agreed to a set of principles (transparency, openness, impartiality and consensus, effectiveness and relevance, coherence, and concern for developing countries."(see footnote 6)) that demonstrate the kind of standards development process appropriate to meeting the WTO requirements. U.S. voluntary consensus standards developers accredited by ANSI meet these requirements.

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2. The same principles should also be observed when technical work or a part of the international standard development is delegated under agreements or contracts by international standardizing bodies to other relevant organizations, including regional bodies.

Source: "ANNEX 4, Decision of the Committee on Principles for the Development of International Standards, Guides and Recommendations. . .," WTO TBT Triennial Review, WTO Committee on TBT, G/TBT/9; 11 November 2000, p. 24.

I would like to turn now to the question of whether it has been helpful to have standards officials based at American embassies abroad.

To assist U.S. companies in overcoming standards-related barriers in foreign markets, NIST cooperates with the U.S. and Foreign Commercial Service, another Department of Commerce function, to place standards experts in U.S. embassies in key markets—the European Community in Brussels, Brazil, India, Mexico, and Saudi Arabia. All the standards experts work with U.S. private sector representatives, U.S. government agencies, and foreign counterpart organizations to identify and remove technical barriers to trade. Standards-related information and on-the-ground assistance in key markets is critical to U.S. exports and competitiveness.

We have worked closely with standards attachés, particularly in Brussels, and have seen first-hand that standards attachés can be extremely effective for U.S. competitiveness. These standards attachés provide invaluable technical support on a regional basis on standards-related issues that might affect U.S. Government agencies and U.S. companies. Often the assistance can be as simple as explaining a procedure that the aspiring exporter did not know existed. A second, highly leveraged, role for the standards attachés is to be a vigilant observer of the standards related decisions under consideration in the country and region to which they are assigned. For example, Mexico had made a decision at a high level in government to commit to full implementation of ISO and IEC standards. The Mexican plumbing and water distribution infrastructure is consistent with U.S. standards rather than those of the ISO. If this decision had gone

forward, Mexico would have spent a great deal of money complying their plumbing infrastructure with ISO standards while achieving no added value. The NIST standards attaché was able to identify this problem and, by bringing the issue to the attention of Mexican decision makers, benefit the Mexican economy by avoiding a change not required technologically and not required by WTO obligations.

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The issues with which these special attachés contend are complex and difficult, and they have far-reaching effects on U.S. competitiveness. Some issues are sector-specific; many are far broader and have implications for the U.S. economy as a whole. All call for in-depth knowledge of U.S., foreign and ISO, IEC, IT standardization principles and practices and how these differ from those of other nations. Regular U. S. Foreign Service and U.S. and Foreign Commercial Service personnel cannot be expected to have the level of special knowledge necessary for negotiating these murky waters.

ANSI endorses the placement of standards attachés—provided that they are truly knowledgeable about standards issues and the U.S. standards system—in key U.S. embassies. We believe they provide a unique and significant advantage to making the world's standards environment more understandable to U.S. organizations.

Finally, I would note that having standards officials is not the only way we can enhance U.S. leadership in international standards-setting efforts. As I mentioned earlier, it is imperative that U.S. industry executives recognize the strategic importance of having their representatives participate actively in international standards developing activities, both technical and management, so that U.S. interests are reflected in the resulting standards and U.S. companies can compete more effectively in the global marketplace.

3. Last year, RAND prepared a report that concluded the convergence of new information technologies in various areas—cellular, broadcasting, Internet and intelligent transportation systems (ITS) and others—is proving to be a real challenge to industry and international standards groups. The report recognized that many emerging information technology standards issues have moved away from the formal standards development organizations in favor of informal consortia and forums like the World Wide Web Consortium and the Wireless Access Protocol Forum. Also, the report noted that the growing popularity of open-source software is driving a movement toward vendor-neutral standardization.

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There are many challenges. Different sectors approach those challenges in light of their needs.

The sectors cited by the Committee exemplify a wide range of sector-specific responses. Cellular is evolving from a stand-alone, local operation, to the possibility of being part of the global high bandwidth data, voice and video network. Broadcasting has the standards for a whole new generation of communications capabilities, either providing High Definition Television or subdividing the spectrum to provide other innovative services. In addition, it must look over its shoulder at what is happening in the cable services sector. The Internet, being based on a set of basic standards, is evolving rapidly to support a

wide variety of other services, many based on Web technologies. Intelligent transportation systems integrate telecommunications, Internet, automotive and human factors in a complex environment where, unlike many of the other sectors just cited, safety and pervasive regulation are important considerations. How are standards groups responding? Very actively. Many thousands of engineers, executives, consumer representatives, and government officials are involved in each area worldwide. Whether the standards documents are developed in formal bodies (an alternative term for ANSI, ISO, IEC and ITU work) or in consortia should depend upon the needs of the sector.

Are there special standards challenges faced by the information technology (IT) industry that impairs their ability to compete domestically or internationally?

The IT industry has been and continues to be in the forefront of advocating and adopting necessary changes to accommodate its objectives both nationally and internationally. The industry has been very successful in using a variety of standardization tools.

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IT involvement in voluntary consensus standards setting and management is broad and deep. At the same time the IT sector likely leads all others in the use of consortia or even less formal "special interest groups." The special challenge in IT appears to be for management to identify the appropriate level group in which to work on standardizing a technology.

Would it be helpful to the IT industry to move towards consortia-developed standards?

A concise answer would be, "They already do," but this question raises some additional issues. Let me begin by pointing out, at the outset, that the word "consortia" does not connote a particular standards development process. There is no single method of standards development within consortia, nor is there a set of criteria which they must meet in order to develop standards. It is this flexibility that makes them useful. Many consortia have operating procedures similar to ANSI's; others operate with no established procedures. So, I would caution against using "consortia" as if it were a commonly accepted term with a clear definition.

ANSI members understand the reasons consortia exist and their value in the U.S. standardization system. ANSI has never had—nor has it ever sought—exclusivity in promulgating standards development processes. ANSI does believe and advocate that the processes we administer produce standards with certain characteristics that many consumers, companies and government agencies have found critical.

The National Standards Strategy is very clear in recognizing that many types of standards development exist in the United States, and that each sector must determine what best meets its needs in a given situation. ANSI believes that it is up to the users to decide where they want particular standards developed. In many instances, that will be within the formal standards-setting process. In many other instances, it will be elsewhere.

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Many companies that are active in ANSI also participate in consortia. The choice of whether to develop a particular standard within the ANSI system or within consortia is driven by market forces, including government agency needs, and industry requirements. ANSI recognizes and respects that fact.

The U.S. information technology (IT) industry leads the world, and they do so by working actively within both ANSI and consortia. This is an industry in which generations of hardware and software change quickly; all of these changes are highly dependent upon the timely development of standards. The IT industry is agile and opportunistic in the best sense—it uses ISO, IEC, ITU, ANSI and consortia, and blends of them all, to meet its ever-changing needs. Examples of their use of the formal standards process to meet IT needs include the following:

Standards that are essential to safety and compatibility (i.e., electromagnetic compatibility and radio frequency interference) of all IT equipment are both developed through voluntary consensus organizations, principally the IEC, to produce a single, stable global environment.

The Institute of Electrical and Electronic Engineers (IEEE) develops the most ubiquitous standards for local area networking, both wired and wireless. These IEEE standards have been processed as American National Standards or ISO standards, or both.

Standards for such basic attributes as character sets are ISO and IEC standards.

The multimedia coding standards for audio and video, such as MPEG are ISO/IEC standards, with a significant part of the development work done in the ANSI accredited National Committee for Information Technology Standards (NICTS). (As far as we know, MPEG—on which DVD products are based—is the only standard ever to win an Emmy award.)

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On the other hand, Internet standards are developed by the Internet Engineering Task Force (IETF) and World Wide Web standards are developed principally by the World Wide Web Consortium (W3C). Neither is accredited by ANSI. The documents of both are used worldwide. The overall DVD standards were developed in a consortium of consumer electronics companies, with some of these standards then processed as formal standards.

The formal standards process plays an important role in developing IT standards, as do consortia. It is up to the user community—not government, or ANSI, or proponents favoring consortia—to determine the forum in which particular standards should be developed.

Are there difficulties with the recognition of consortia-developed standards?

As we have stated above, industry and government procurement agencies use whatever standards meet their needs, including consortia standards. If what is meant by this question is whether there are any perceived obstacles inhibiting the U.S. Government's "use" of consortia-developed standards, then it is important to review the different ways the government currently uses such standards.

The U.S. Government is very important as a user of standards, including IT standards. For purposes of this discussion, We have categorized the government's use of standards in three broad areas—procurement, regulation, and trade and competitiveness. Each use is to accomplish different public policy objectives, and the requirements for each are different.

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Procurement

Agencies such as the Defense Department and General Services Administration are most concerned about quality, price, and appropriateness of products. The major impact of the NTTAA has been to shift agencies to referring to private sector developed standards, rather than to write their own. They can and do choose freely among private sector standards, caring very little whether the standards they use have been developed by ANSI-accredited developers or by consortia. They are not required by any federal law or policy to give preference to voluntary consensus standards over other private sector standards. In fact, ANSI federal government members report experiencing no difficulty in procuring the most advanced technologies available in the market place today. There is no expectation that the federal government will experience any difficulty procuring the most advanced technologies in the future. The federal government uses consortia based standards to purchase information and telecommunications technologies when those standards meet their needs. This is true across all the technologies procured by the federal government. It seems reasonable to expect that the federal government will continue to use consortia developed standards whenever they are useful.

We are not aware of any current instances where changes in either law or policy are necessary to facilitate the use of consortia-produced standards within the U.S. Government for procurement.

Regulation

As a matter of law([see footnote 7](#)) and policy([see footnote 8](#)), and with the strong support of this Committee, regulators rely heavily upon voluntary consensus standards when promulgating regulations for health, safety, and protection of the environment. Regulators are among the strongest supporters of standards developed by ANSI-accredited developers. This has been especially true since the implementation of the NTTAA shifted regulatory agency focus from internally written standards.

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The principles of ANSI's process—openness, balance, due process, and consensus—assure that all stakeholders have had an opportunity to participate in the development of the standard, and that no one interest group has dominated the process. This goes far to meet the requirements imposed by the Administrative Procedures Act and agency statutes on which their rulemakings are based.

Whether there is a clear distinction between standards for procurement and standards for health, safety, and the environment is an issue that was carefully considered by ANSI a number of years ago. Our

conclusion was and remains that there is no bright line segregating standards for procurement and standards for health, safety, and the environment.

For example, standards covering such areas as electrical safety, electromagnetic interference, and accessibility for the disabled fall within the "Information Technology" definition in USC Title 40 that is a procurement statute; we do not believe that the U.S. Government considers these to be outside the concern of regulators. In addition, many of the so-called "traditional" industries that are highly regulated now incorporate huge amounts of IT technology in their products. Automobiles and earthmoving equipment, for example, contain thousands of IT components that ensure safety and performance as well as market differentiation. While the idea of separating "market" from "regulatory" standards has a certain appeal, we support the NTTAA's approach of relying on private sector standards, but with the agencies determining whether the technology and the process meet their needs.

Trade and U.S. Competitiveness

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A third and extremely important area of government involvement in standards is that of trade and U.S. competitiveness. This is directly related to your question, "Are there difficulties with the recognition of consortia-developed standards?"

As noted above, consortia standards are very useful. However, possible "recognition" of consortia-developed standards might create considerable difficulty internationally.

ANSI, along with many organizational and company members of the ANSI federation, has been working vigorously to enhance international recognition of U.S. based standards developers and thus meet U.S. social and competitiveness needs. This is not easy, because much of the rest of the world insists that only formal international organizations such as ISO and IEC should be recognized as international standards under the WTO Technical Barriers Agreement. We have urged that other nations continue to recognize standards—such as those developed by ASTM, ASME, IEEE, and NFPA—that have been developed using the ANSI processes, regardless of whether those standards have gone through the ISO/IEC process.

The U.S. has consistently argued in the World Trade Organization, as well as in ISO, IEC, and other international fora, that the principles of transparency and openness that we practice within the ANSI federation are essential requirements in international standardization. The U.S. has strenuously objected to the "closed door" approach of some organizations based outside the United States.

As noted above, signatories to the WTO Technical Barriers to Trade Agreement agreed to a set of principles (transparency, openness, impartiality and consensus, effectiveness and relevance, coherence, and to address the concerns of developing countries) for the kind of standards development appropriate in meeting WTO requirements. U.S. voluntary consensus standards developers accredited by ANSI meet these requirements.

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A New and Critical Issue

Since the Chairman has invited comments on how we might improve the American standards-setting system, I would like to bring an emerging issue to the Committee's attention. This is an issue critical to the effective implementation of the National Technology Transfer and Advancement Act of 1995 (NTTAA)([see footnote 9](#)) provisions authored by this Committee.

The NTTAA specifically encourages the participation of the U.S. government in the development of private sector standards. Recently, lawyers in the Department of Defense have discovered a law written in 1912([see footnote 10](#)) that they believe forbids the U.S. Government from paying membership dues for its employees to participate in standards organizations that base their activities on individual memberships. This opinion is under review by the Office of the General Counsel of the Department of Defense, but if the opinion is upheld it would significantly impair the ability of federal agencies to benefit from standardization through active participation of their employees.

Expecting federal employees to pay for memberships and participation, including travel, from their personal funds is clearly bad policy. Enforcing such a requirement would disconnect the individual government employee's participation from the agency's needs, and more likely put an end to the participation in standards activities by many who rightfully consider such participation to be part of their job.

This law is diametrically opposed to the clear intent of the NTTAA—that federal employees play an active role as agency representatives in the development of standards that will be used in regulation, procurement, and trade.

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It is also contrary to a basic principle of the U.S. standardization—that standards-setting is a partnership process between government and the private sector. In fact, the first tactic in the National Standards Strategy is, "Build on the trend to use voluntary consensus standards through existing public/private partnerships."([see footnote 11](#)) The U.S. is an example to the rest of the world on how the public and private sectors can work cooperatively. The 1912 law is a dire threat to this partnership.

Using voluntary standards allows the government to achieve economies of scale and have access to the most modern technologies. If federal participation in standards development is curtailed, over time these benefits would be lost to the federal government—costs would go up and antiquated technologies would remain in use. While the private sector would suffer the loss of the expertise of often uniquely knowledgeable government experts, the government would lose the benefit of critical, timely access to private sector expertise.

ANSI recommends that, if this opinion precluding the government from paying for membership dues and participation costs of its employees who represent them in the individual membership based standards activities is upheld, the Committee quickly amend the NTTAA to allow membership and participation in standards development by U.S. Government employees in furtherance of the objectives of the National Technology Transfer and Advancement Act.

Conclusion

ANSI shares this Committee's desire to further improve the U.S. standards system and its role internationally. This is a top priority for all of us, and we look forward to working closely with you and your staff.

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The U.S. has the most dynamic, responsive, and effective standards development system in the world. It meets the needs of industry and government through both the formal standards development process and consortia. The system is not perfect, but we are working continuously to improve it. ANSI and all its members look forward to working closely with you as we do so.

Thank you for this opportunity to testify. I would be happy to answer any questions that you might have.

BIOGRAPHY FOR OLIVER R. SMOOT

Oliver Smoot was elected chairman of the American National Standards Institute (ANSI) Board of Directors on December 7, 2000. He also serves as vice-president for external voluntary standards relations of the Information Technology Industry Council (ITI), a post to which he was appointed in 2000 to support ITI's activities in voluntary standards domestically and internationally.

Before being elected as chairman of the ANSI Board, Mr. Smoot served in numerous ANSI leadership posts, including service as chair of ANSI's Finance Committee, Organizational Member Council and Patent Group.

Before being elected ITI's vice-president for external voluntary standards relations, Mr. Smoot held the post of ITI's executive vice-president for 23 years. During this tenure he was responsible for ITI's internal activities including the association's technical regulatory activities and its voluntary standards activities: the National Committee for Information Technology Standards (NCITS) and the U.S. Technical Advisory Group (TAG) to ISO/IEC JTC 1, the Joint Technical Committee 1 on Information Technology Standards of the International Organization for Standardization and the International Electrotechnical Commission.

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An active member of the American Bar Association for many years, Mr. Smoot currently serves as chairman of its Technical Standardization Law Committee and has previously served as chairman of the Section on Science and Technology Law. He has also served in numerous positions with the Computer Law Association, culminating as President, and currently serves on the Executive Committee of the U.S. Policy Committee of the Association for Computing Machinery (ACM).

Mr. Smoot has served on numerous international delegations and U.S. Governmental advisory committees. He received a Juris Doctor from Georgetown University and a Bachelor of Science from the

Massachusetts Institute of Technology.

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ANSWERS TO POST-HEARING QUESTIONS

Question 1. What procedures do ANSI and its accredited organizations follow to ensure that standards they produce do not create unnecessary obstacles to international trade or that they are not more restrictive than necessary to fulfill a legitimate objective?

If the standard is an American National Standard developed by an ANSI-accredited standards developer, the standard will have met the requirements set forth in the *ANSI Procedures for the Development and Coordination of American National Standards* (the "ANSI Procedures").

If a standard is developed according to ANSI requirements, there should be sufficient evidence that the standard has a substantive reasonable basis for its existence and that it meets the needs of producers, users and other interest groups. If a vote on a standard was or is somehow perceived as having been subtly manipulated, any person or entity who is materially affected by or otherwise interested in the standard—whether a voting member of the consensus body or a public commentator—can appeal the decision. The grounds for an appeal to ANSI include issues such as lack of balance on the consensus body, dominance by any person or entity, inadequate response to a negative comment (again whether from a voting member of the committee or a public commentator), and improper restraint of trade concerns. The appeals process, and the requirement that all consensus bodies seek to have representatives from a balanced group of interested parties, assures that no one interest can manipulate the process unfairly. The ANSI system is designed so that contrary evidence proffered by opponents of the standard must be properly addressed and responded to or else the standard will fail to achieve ultimate approval.

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In addition, proper procedures are of little value if they are not followed in practice. As a result, in addition to the review ANSI undertakes when a standard is submitted to it for approval as an American National Standard, the Institute also has implemented a mandatory standards developer audit program. The program is designed both to verify an accredited developer's compliance with ANSI requirements and to provide guidance on more efficient or effective ways to address various aspects of the standards development process.

ANSI requirements (described in greater detail in response to the second question below) are based on due process principles and include several required public announcements regarding the status of the standard as it undergoes development. One such announcement is a public call for comments, pursuant to which all comments received must be reviewed and responded to. These public announcements are reflected in ANSI's *Standards Action* publication that is forwarded to and included in the ISONET reporting system in conformance with the requirements set forth in the WTO Code of Good Practice. This ensures that the transparency associated with the development of American National Standards is global in scope.

Question 2. If an ANSI accredited organization produces a standard that is challenged as not being

consensus based, what mechanisms exist to ensure that the organization followed the procedures for which it was accredited by ANSI?

The American National Standards process is characterized by openness and due process. The ANSI Executive Standards Council (ExSC) accredits the procedures used by developers of American National Standards, thus ensuring that the procedures used to develop evidence of consensus in connection with a candidate American National Standard satisfy ANSI's requirements relative to openness, balance of interests, lack of dominance by any party or interest category, due process and consensus as set-forth in the *ANSI Procedures for the Development and Coordination of American National Standards* (the "ANSI Procedures"). All processes that relate to the accreditation of a standards developer by ANSI and the subsequent approval of a standard as an American National Standard (ANS) provide for public input and due process.

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Accreditation as an American National Standards developer is a precondition for submitting a candidate standard for approval as an American National Standard. The ANSI Procedures require that a project to develop a new standard be announced at an early stage; this early announcement is referred to as a PINS announcement. All draft American National Standards (including revisions and reaffirmations of existing ANSs) undergo a mandatory public review in ANSI's Standards Action and other appropriate media. Any subsequent substantive changes to the draft standard must undergo an additional public review.

Interested parties (whether members of consensus body or of the public at large) may comment and object in writing at the PINS stage and it is expected that the developer will respond to such comments. Later, when a draft standard is made available for public review, all interested parties have the opportunity to submit written comments to the ANSI-accredited standards developer. Such comments must be reviewed and objections must be responded to in accordance with a developer's ANSI-accredited procedures and the requirements set forth in the ANSI Procedures.

Then, prior to submittal of a candidate standard for approval as an ANS, unresolved objectors must be notified by the standards developer of their right to appeal to the developer. It is important to note that in order to preserve one's right to appeal a later possible approval decision of the ANSI Board of Standards Review (BSR), an objector must file an appeal first at the developer level in accordance with the developer's accredited procedures. Appeals to the ANSI BSR are typically procedural appeals. The ANSI BSR does not evaluate appeals related to the technical content of a standard; however, the BSR does consider whether technical issues were afforded due process consideration.

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When an ANSI-accredited standards developer has followed its ANSI-accredited procedures and concluded any related appeals, it may submit to the ANSI BSR a standard for approval as an American National Standard. The submittal includes evidence of consensus and procedural compliance. If there are any negative votes from consensus body members and/or sustained, negative public review comments, the

submittal is reviewed by the ANSI BSR. If the BSR approves the candidate standard as an American National Standard, those on record as having concluded an appeal at the standards developer level are notified of their right to file a procedural appeal with the BSR.

When an ANSI-Audited Designator has followed its ANSI-accredited procedures, and concluded any appeals filed, they may designate the standard as an American National Standard (ANS) without review by the BSR. The bestowal of the status of ANSI Audited Designator by the ExSC indicates that the ExSC has a high level of confidence in the developer to conduct its standards-related activities in a fair, objective and exemplary manner. While Audited Designators do not have to submit their candidate ANSs to the BSR for approval, they do have to undergo a more rigorous audit schedule than other ANSI-accredited standards developers. Appeals of ANSI-Audited Designator actions are ultimately subject to review by the ANSI ExSC.

Appeals decisions issued by the ANSI ExSC (i.e., accreditation appeals) and by the ANSI BSR (i.e., standards approval or denial decisions) may be further appealed to the ANSI Appeals Board.

Finally, ANSI has a process whereby someone can seek the withdrawal of a standard's American National Standard status for cause. This process may be invoked at any time in connection with an approved ANS. Any interested party may request the withdrawal for cause of an ANS in accordance with clause 1.3.1.3 of the ANSI Procedures (see attached document).

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The overall system of checks-and-balances that characterize the ANS process that includes:

A. Mandatory public review of accreditation applications and the corresponding standards development procedures.

B. The right for any materially affected and interested party to appeal:

— to the ANSI ExSC the decision to accredit a standards developer and to approve an ANSI-accredited standards developer as an ANSI-Audited Designator;

— to the ANSI ExSC the implementation by the developer of its ANSI-accredited procedures during the consensus process;

— to the ANSI-accredited standards developer, the handling of one's comments during the consensus process or any alleged violation of the developer's procedures or ANSI's requirements;

— to the ANSI BSR the decision to approve a standard as an ANS.

C. Mandatory public review that is open to all materially affected and interested parties of all candidate American National Standards.

D. Mandatory re-circulation of comments to the members of the consensus body, including procedural concerns that result from public review and/or the vote of the consensus body, and the opportunity for

consensus body members to change their vote.

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E. Mandatory audit of all accredited developers to verify procedural compliance with the requirements set forth in the ANSI Procedures and the requirements set forth in the developer's ANSI-accredited standards development procedures:

— ANSI-accredited standards developers are audited on a 5-year cycle unless a more frequent audit review is deemed necessary.

— ANSI-accredited standards developers that also are ANSI-Audited Designators are audited on a more rigorous schedule than ANSI-accredited standards developers.

F. Submission of Annual Procedural Compliance Form by each ANSI-accredited standards developer confirms compliance with new and revised procedures related to the ANS process.

G. Routine Certification of Procedural Compliance by an ANSI-accredited standards developer accompanies each submittal of a candidate American National Standard to the ANSI Board of Standards Review (BSR). Each candidate standard, where outstanding objections exist, and where the standard is submitted by an ANSI-accredited standard developers that is not an ANSI-Audited Designator (i.e., all but four ANSI-accredited standards developers) is reviewed for procedural compliance by the ANSI BSR.

Mr. Chairman, we at ANSI wish to thank you again for the opportunity to address the Committee on June 28th, and also through these follow-up responses to the questions you sent to us. We appreciate very much your continuing interest in the standards community.

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Oliver R. Smoot Chairman

PREPARED STATEMENT OF GERALD H. RITTERBUSCH

Standards serve a substantial role in business and government. Standards help businesses be more effective, efficient and communicate information. Standards deal with a multitude of technical issues for products and services as well as providing for the health, safety and environmental issues. Governments also realize these benefits from the use of standards.

The most prominent standards are those that facilitate trade and commerce. As the economic world has shrunk, the primary emphasis for many companies has been the development of global standards. For a market to offer global opportunities, there is a specific need for global standards.

Standards are indeed an enabler. They enable the transfer of information by providing effective communications paths. They provide for a "level-playing field". A global standard enables a manufacturer to produce product in conformity with the standard to be marketable on a global basis.

As an employee of a company that has had a global focus for at least the last five decades, my culture is global. As a result of this culture, I have worked to achieve the role of Chairman of the International Organization for Standardization (ISO) Technical Committee for Earthmoving Machinery. Thus, my focus is to ensure the establishment of ISO standards to enable the greatest opportunity for global trade and commerce in earthmoving machinery, while protecting health, safety and the environment.

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The standards development process has certain complexities that are necessary in order to ensure that there is fairness and equity for the manufacturers, customers, and society. These complexities have been summarized in the following key statements.

The development process is *open* so those who have an interest may participate.

Information on the development is *available* to the interested parties.

Interest views are *balanced* so that all views are considered.

Consensus is the basis of agreement on the standard.

Due process enables views to be expressed and appeals to be heard.

Standards developed under these conditions generally are referred to as being developed under the "formal standards development process".

This is not the only way standards are developed. Standards may be developed without all of these conditions being met. But, the value for a user to apply a standard developed in the formal standards development process with these conditions is that there is considerably less risk in the use of the standard, than when the standard is developed without conformity with these conditions.

The formal standards development process has been well organized at the global level. ISO and the International Electrotechnical Commission (IEC) were formed on a voluntary basis to enhance trade and commerce through the harmonization of national standards. ISO has 137 members and IEC has 60 members. While not encompassing all of the world countries, it is a good representation.

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For the USA, the ISO member body is the American National Standards Institute (ANSI). ANSI is a membership organization that includes members from the USA standards development community, trade associations, companies, individuals, and government agencies. A *member body* of ISO is the national body "most representative of standardization in its country". As the coordinator of the formal standards development process in the USA, ANSI alone in the USA has this recognition.

Within the USA the standards development is conducted by a large number of Standards Development Organizations (SDO). The SDOs organize the interested individuals into practical groupings to develop standards that are desired by a host of drivers within the business community, society and government. The SDOs provide the guidance and structure to ensure that the five conditions of the formal standards development process are met. When the standards are complete, the SDOs retain the right to publish the standard even though the individuals that served in the development process provided the intellectual property (IP). The value to the individuals and the organizations that have supported them in the process is sufficient to grant the transfer of the IP to the SDO.

Some of the SDOs believe that the best standards can be developed when they open their process to participants from other countries as well. Broadening the input to the standards development process provides for more benefit from the concept of "multiple minds and hands", as well as opening up the usage of the standard by more customers. Obviously, whatever works best to achieve user satisfaction with a standard is appropriate.

As noted above not all standards are developed in the formal standards process. Many times the interest for a standard is that there is no need to include any or all of the five conditions listed above. When several parties have an interest in a standard, they form a "consortium". A consortium exists to fill a specific need where the desire to meet the conditions of openness, information availability, balance, consensus, and due process are not material to the eventual standard. The consortium brings like minded interests together to effectively produce what the consortium believes is the needed standard. If they do a good job and the standard really serves the broader interests of business, society and government, nobody cares about how the standard was developed. When it works, it is good. When a standard doesn't work, then there is a problem.

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Consortia developed standards can be effective for a number of areas of standards development. But, there are risks that by not having met the five conditions and using to the greatest extent practical the "multiple minds and hands" concept, there will be some issues that are not addressed in the development of the standard and thus broader and broader usage of the standard may uncover these to the extent that objections to the standard may arise.

Thus, the concern with consortia standards is that users of these standards need to understand the environment in which they were developed. The user must then perform the necessary due diligence to ensure that use of the standard will not create some jeopardy that becomes an unacceptable risk for the product or service.

Individuals or companies may also develop standards. In some instances a company just starts doing something that becomes a de facto standard. Again, there is no problem as long as the standard performs the need and is judged to be acceptable by the users. But, the concern is that when there is broader usage of those standards, the user needs to perform the due diligence of the standard to ensure that its usage will not create a jeopardy that becomes an unacceptable risk.

This evaluation shows that not all standards are equal. Standards that are developed in the formal standards development process have the benefit of the conditions described above, plus much greater benefit

from "multiple minds and hands". Standards developed by either consortia or on a de facto basis have not benefited from the value of the conditions and thus could be found to be wanting in certain usages.

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Most standards users prefer to use standards produced by the formal standards development process as the need for due diligence in selecting a standard is much reduced and risks are substantially shared by a much broader group of users. Thus, most of the emphasis is on the formal standards development system.

In the recently produced "A National Standards Strategy for the United States" that was published by ANSI, the strategic initiative four (Broaden the U.S. standards "umbrella" to include all those organizations that are contributing to the standards systems.) directly deals with the concerns noted above. While it is recognized that consortia serve a useful purpose in the total picture of standards development, as their work matures, there should be a migration to the formal standards process. That will ensure that as consortia developed standards have broader and broader usage, new users will have the benefit of the formal standards development process to offset these new users needs for due diligence evaluation of the standard.

A key work that has focused the standards development in recent years has been the National Research Council Report on "Standards, Conformity Assessment, and Trade into the 21st Century" published in 1995. This report became the basis for parts of Public Law 104-113, which solidified the need for revision of OMB Circular No. A-119. The revised OMB Circular No. A-119, published February 10, 1998 "directs agencies to use voluntary consensus standards in lieu of government-unique standards, except where inconsistent with law or otherwise impractical". This is an important direction as it serves to increase the use of the product of the formal standards development process and is financially beneficial to the government and its citizens.

Because the OMB Circular No. A-119 is silent on consortia standards; some have interpreted the meaning of the circular to not allow consortia standards to be used by government. The emphasis for the circular was to make inroads in the usage of formal standards development process standards by government because the process already has performed extensively the due diligence that would be required for government promulgation of a standard. The purpose of the circular was to provide a tracking mechanism to identify where government continued on the usage of government-unique standards versus using standards from the formal standards development process.

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The circular lumps all other standards as "other" and delineates the private sector standards as "non-consensus", "industry", "company", or "de facto" standards. As consortia standards are "non-consensus", they would clearly be in this group. The circular goes on to state in clause 6g. that use of any standards in this grouping need not be included in the reporting that is required by the circular. Again, the purpose of the circular was to create greater interest with government agencies to look to the formal standards development process standards, but not limit them to the use of only these standards. Thus, the use of consortia standards by government is not prohibited in any way. Further, when government uses such standards, they are not included in the reporting process.

The USA standards development process as well as the International standards development process has for many years recognized the value of continuous improvement of the processes. There are several projects in ANSI, the USA SDOs and ISO to better address the user (market needs) for standards.

Paramount to all continuous improvement projects is the need to ensure that "the most technically valid consensus standard" is produced. Trade and commerce will only be enhanced when the standards that enable them are "the most technically valid consensus standard" that can be prepared.

Timeliness is important, but not at the sacrifice of "openness", "information availability", "balance", "consensus" and "due process". It is recognized that some interest areas may find that achieving these five conditions is either not necessary to attain a usable standard, or that achieving them impairs meeting the need for a standard. When the associated risks are properly considered and the correct result is achieved, there is no detriment associated with the use of a standard that has not been developed under the five conditions. The only requirement is that the user of the standard recognizes the development process for them and acts accordingly.

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Both the International and the USA standards system have provided substantial value over their years of existence. As the economic world continues to shrink, the need for standards will continue to increase. As the pace of technology increases, revised, updated and new standards will continue to be required. Timeliness will always be a question. Only through the use of good development systems and cooperation of the individuals in the process will the objective of better standards to facilitate trade and commerce be accomplished.

My hope is that these comments will be helpful to the Sub-committee. This is particularly relevant as it ponders the responsiveness of the standards development process in addressing the issues that continue to arise as new people become engaged in standards and as the breadth of standards impact on all of society continues.

RESPONSES TO QUESTIONS POSED IN THE INVITATION TO TESTIFY

Responses submitted by Gerald H. Ritterbusch, Director of Standards and Regulations, Caterpillar Inc.; Chairman of ISO Technical Committee for Earthmoving Machinery

In light of the dynamics that are altering the standards landscape, what measures can be undertaken to improve the American standards-setting system?

The answer to this question is why the National Standards Strategy (NSS) was prepared last year. There are a number of actions and the NSS identifies 12 specific strategies. Some of these are structural changes; some are processes to follow, many are just action steps to complete. All of these require the commitment of resources and hard work by Americans to take charge of their destiny. Really it is up to American business to take up this charge and put in the resources. The opportunity is there to control our destiny, but it takes work and commitment. If American business doesn't want to succeed, not following the NSS is likely to

ensure such failure. Some sectors of USA industry are likely to fall into developing nation status.

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How does standards impact our ability to compete internationally?

When we have domestic standards that are not harmonized with international standards then we drive added costs for differences in products between domestic and foreign markets. These added costs hurt American consumers and the higher costs cause unfavorable opportunities in foreign markets. What is needed is that the domestic standards experts aggressively participate in international standards development to get domestic standards accepted. Where they are unable to do so, then we must learn to adopt the international standard and achieve harmonization. The standards development process is very competitive and the first to have the idea is the one who will most likely succeed. Thus, it is necessary that we have a vibrant domestic standards system that really is in touch with the market needs and gets to the international arena ahead of standards experts from other countries. We need to ensure that we have our share of international committee leadership and convener positions to be successful.

How can we enhance United States leadership internationally in standards-setting?

We need domestic standards experts that are really in touch with the market need for standards. Then they need to develop the standards to support the business and meet the needs for health, safety and the environment. We need domestic experts who are willing to work and take on convenerships, and chairmanships of working groups and committees. It just takes knowledge and action to achieve leadership. Then they must work the processes to achieve the end goal.

Would it be helpful to have standards officials based at American embassies abroad?

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Standards officials based in American embassies can be very helpful to American businesses as they try to understand the maze of standards in foreign countries. This is particularly helpful to companies that don't have global networks to enable their success in foreign countries. The standards officials in the Brussels office have been quite useful over my years of work with them. Likewise the standards official in Riyadh also has been helpful because in that sector of the world, American business needs USA government support to help enable access. USA Government and USA industry partnering together can be a very effective force.

Are there special standards challenges faced by the information technology (IT) industry that impairs their ability to compete domestically or internationally?

A challenge to the IT industry is that the technology is moving rapidly and thus it is a significant hurdle to keep the standards current and more significantly the use of standards in conformity assessment processes in foreign countries that require third-party certification. The IT industry must get the standards in place quickly to enable the new technology to be put into the market. Standards development processes that are time consuming have cycles longer than the product cycles.

Would it be helpful to the IT industry to move towards consortia-developed standards?

The IT industry needs the right mix of standards that are developed in both the formal standards system and those that can be developed in consortia. The IT industry has maintained that they have very short product life cycles and thus they need more speed than is typical of the formal standards system. Thus, to deal with their need for rapid development on issues that are mostly internal to the industry, there is no problem with the use of consortia. But, for standards that have longer life cycles, there is no reason not to use the formal standards system. In many instances it would seem that the standard could initially be developed in consortia, but then move to the formal standards system as the standard develops maturity.

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Are there difficulties with the recognition of consortia-developed standards?

A consortia standard is not a consensus standard and thus interests that have not been in the development of the standard and then are expected to use the standard will most likely give some push back. This is a normal human reaction because if you aren't involved in something and it is essentially forced on you there is push back. The real measure must be if the standard works, it is used. Pedigree is not as important as performance. To avoid this, consortia standards development needs to be limited to those areas where it is simply the best approach and the users are those who are the ones developing the standard. If the intent is for broader usage than the developers, then the standard needs to be the product of the formal standards process.

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PREPARED STATEMENT OF SCOTT BRADNER

The Internet Engineering Task Force

Executive Summary:

The Internet Engineering Task Force (IETF) is the primary standards organization for the basic Internet technology. It is international, consensus-based, self-funded, open to all participants, transparent, allows appeals, vendor-neutral with merit-based technical evaluation. Participation is free and all working and final documents are freely available over the Internet. It has an advanced process to deal with intellectual property rights and has relationships with many other international standards development organizations.

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The Internet Engineering Task Force

The Internet Engineering Task Force (IETF) is the group that is generally considered to be the primary developer and keeper of the basic standards for the Internet. It is an open international standards

development body. The IETF operates under the auspices of the Internet Society, a Reston, VA based non-profit international membership organization dedicated to the support and expansion of the Internet. Starting with fewer than 25 participants in 1986, IETF meetings now attract more than 2,000 people each with thousands more participating via electronic mailing lists.

The IETF is the keeper and maintainer of all of the original Internet standards. These include TCP/IP itself, SMTP (electronic mail), FTP (file transfer), DNS (domain names), telnet (remote login), and many more. Since 1986, the IETF has developed hundreds of new standards. These include MIME (enhanced email), IPsec (secure Internet communications), http (the transport protocol for the world-wide web), DHCP (dynamic address assignment), BGP (used to direct Internet traffic to the proper destination), PPP (used for most dial-up Internet access), and, more recently, a number of standards dealing with the convergence of the telephone and Internet worlds.

IETF Standards:

IETF standards are voluntary standards produced by a rigorous, well-defined open public process. The IETF does not, however, make any attempt to police or mandate the use of those standards; companies and individuals decide whether or not the standards are useful to them (i.e., the free market decides whether a standard is adopted by the community or not, rather than government-imposed regulatory action) The IETF does not submit its standards to other standards organizations for their approval, though numerous standards organizations do reference and depend upon IETF standards in their own work.

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A short history of the IETF:

In 1968 U.S. Defense Department's Advanced Research Projects Agency (ARPA) started a research project to develop what was then a new computing concept: A packet (or datagram) based computer network. That work first created the ARPANET which evolved into today's Internet. The Internet Configuration Control Board (ICCB) was established in 1979 by Vint Cerf, then at ARPA and the co-developer of the Internet Protocol TCP/IP, as an informal committee to help guide the further development of TCP/IP and related protocols. By 1983 the ARPANET and TCP/IP related activities had expanded enough to warrant the creation of a number of task forces to deal with specific aspects of this development. At this time the ICCB was renamed the Internet Activities Board (IAB) and became self-organizing. These IAB task forces included the Internet Engineering Task Force (IETF), the End-to-End Task Force, a Security Task Force and a few others.

The IETF first met on its own January 16 and 17th 1986 in San Diego, California. Twenty-one people attended that meeting. The IETF structure at this meeting included a number of Working Groups which had been established to explore specific technical issues and a steering group to manage the operation of the Working Groups. By 1989 the IETF had 20 Working Groups and a multi-step Internet Standards Process had been defined. A variant of this standards process is still in use today. An IETF Secretariat was later created to manage the meetings and standard-setting process.

Participation in the IETF

The work of the IETF is conducted primarily through the use of Internet mailing lists. Anyone, anywhere in the world, who is interested in the work of the IETF can subscribe to, and participate in, any of the IETF mailing lists. There is no concept of membership and no participation fee is required.

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The IETF also holds face-to-face meetings three times a year. The next face-to-face meeting is in London England in August 2001. Most IETF working groups meet for a few hours to resolve open issues during each face-to-face meeting. But all decisions taken at the face-to-face meetings are tentative and must be ratified on the working group mailing lists so that people who were not at the face-to-face meeting can have their input. The face-to-face meetings are open to anyone who wants to attend and is willing to pay a meeting fee. Individuals participating in the IETF do so as individuals and not as representatives of the companies that employ them. Specifically, ideas and opinions are judged on their technical merit not by which company is espousing them.

IETF Funding:

From its start the overwhelming majority of the costs of the IETF have been born primarily by the individuals that volunteer to do IETF work. This includes members of the IETF management committees and the IETF chair. They, or their employers, cover the travel and other expenses incurred when working on IETF projects or attending IETF meetings. Early IETF meetings were partly funded by U.S. government agencies. In 1991, as the meetings grew and became more costly, IETF instituted a small meeting fee to help offset the cost of holding the meetings. In 1997 the IETF stopped receiving any U.S. government financial support. Meeting fees are now adjusted each year to match the projected Secretariat and meeting costs. In addition, the Internet Society funds the IETF publication process and provides a legal umbrella, including insurance coverage, for the IETF activities. The Internet Society in turn is supported by thousands of individual members and 120 mostly for-profit organizational members from around the world.

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IETF documents:

The principal IETF documents are known as RFCs. The RFC publication series started in 1969 as "Requests for Comment." The "RFC" name is now used on a wide range of IETF materials other than actual requests for comment. All IETF standards and standards-track documents are RFCs but not all RFCs are standards. There are several classes of RFCs. IETF standards are published as standards-track or Best Current Practice RFCs. In addition there are informational, experimental and historic RFCs. RFCs are published by the RFC Editor, a group that continues the work of Jon Postel, who was the initial RFC Editor and managed the RFC publication process from 1969 until his death in October 1998. The RFC Editor is funded by the Internet Society. All IETF working documents (known as Internet Drafts), the RFCs, and the mailing list archives are available for free over the Internet. RFCs may be freely reproduced or translated into other languages.

IETF Organization:

The IETF has continued to grow in size and scope. There are now 129 working groups organized into 9 technical "Areas," including the Applications Area, the General Area, the Internet Area, the Operations and Management Area, the Routing Area, the Security Area, the Sub-IP Area, the Transport Area, and the User Services Area. Each Area is managed by one or two volunteer Area Directors. These Area Directors, along with the IETF Chair, make up the Internet Engineering Steering Group (IESG). The IESG is the standards approval body of the IETF. See the IETF web site (www.ietf.org) for a full list of working groups and their charters.

A separate Internet Architecture Board (IAB), which is a descendent of the old Internet Activities Board, provides architectural advice to the IETF and ISOC and is responsible for dealing with the relations between the IETF and other organizations. The members of the IESG and IAB, as well as the IETF chair, are selected by a nominations committee whose members are randomly selected from volunteers who have attended two out of the last three IETF meetings.

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IETF Working Groups:

The process of IETF working group formation and operation is described in RFC 2418. An IETF Working Group is created when the IESG (with the advice of the IAB) determines that there is a specific issue warranting attention and that there are individuals that are willing to work on the issue. Each Working Group has a charter that describes what issue the group is working on and defines the scope of the Working Group's activities. Working Group charters are negotiated among the individuals chosen to be the working group chairs, the Area Directors, the IESG and the IAB. Working group charters also contain lists of goals and milestones, along with target dates specifying when each is expected to be completed. New tasks are added to working group charters only after being approved by the IESG. Working groups may be terminated when they have completed their tasks.

The IETF Standards Process:

The IETF Standards Process as defined in RFC 2026 is a straight-forward, but highly-detailed process. The Standards Process seeks rough consensus (but not unanimous consent) and technical operability.

— The first requirement—rough consensus—ensures that poor ideas do not make it through the review process. The consensus requirement minimizes the pressure to add unnecessary features to a proposal in order to secure unanimous support. Because there is no concept of IETF membership, the IETF does no voting—the Working Group chairs and the IESG are charged with discerning the level of consensus in the meetings and mailing lists.

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— The second objective—technical operability, or "running code"—means that multiple actual and inter-

operable implementations of a proposal must exist and be demonstrated before the proposal can be advanced along the standards track. The multiple implementation requirement checks to see that more than one vendor or person felt the technology was worthwhile enough to implement. The requirement for inter-operability also ensures that the documentation is clear enough that multiple implementers read and interpret the standard in the same way.

The IETF has a three stage Standards Process. To reach the first stage, known as Proposed Standard, the Working Group, the mailing list community and the IESG must feel that the proposal is useful, technically sound and has no known problems. The second stage, known as Draft Standard, adds a multiple inter-operable implementations requirement. The final stage, known as "Internet Standard," or just "Standard," indicates a measurable success in the market place. At each stage the level of the consensus in the Working Group and in the IETF as a whole are tested, usually by issuing a "last call" for comments. If the consensus is to support a proposal it is forwarded to the IESG for their evaluation. The proposal is published as a RFC if the IESG approves. In many cases, no industry consensus exists that it is worth the added effort to move things forward; the Proposed Standard level suffices in practice.

Appeals process:

RFC 2026 also defines a multi-stage appeals process that can be used if one or more IETF participants feel that Standards Process was not properly followed.

Intellectual Property Rights:

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One of the most difficult areas in standards development these days is that of intellectual property rights (IPR). The IETF has seen many cases of submarine patents and other attempts to subvert the standards process. This is not just a problem for the IETF, many other standards development organizations have also had problems in this area. The IETF has revised its IPR rules over the years and now focuses more on ensuring disclosure than on requiring statements pledging fair and non-discriminatory licensing from all IPR holders. It is left to Working Group consensus to determine if a particular technology should be used in an IETF standard and the Working Group takes into account any IPR information that is available at the time of the working group's deliberations.

This change was made after a company had blocked the IETF's Standards Process by refusing to provide such a licensing pledge. This was a company who asserted IPR claims without ever participating in the IETF process and without even knowing that the IETF was working in an area until after a standard had reached the final approval process. Companies who offer their IPR to the IETF are expected to provide a pledge of fair and non-discriminatory licensing before the IPR will be considered.

The change in the IPR part of the IETF Standards Process also includes an empirical test of the fairness of licensing practices by requiring that the multiple inter-operable implementations of a standard that are needed before it can be advanced to Draft Standard status be implemented with separate exercises of any required licenses. If the license terms are not seen as fair by implementers then the required multiple implementations will not be forthcoming and the proposal will not be able to be advanced on the standards

track.

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Individuals engaged in the IETF process must disclose whether there are any IPRs that they or their company would benefit from or they may not participate in any of the IETF activity about the technology. Notice of this requirement is on the web pages that are used to register for IETF meetings or subscribe to mailing lists run by the IETF Secretariat and is included in RFC 2026. If IPR issues surface, the Secretariat contacts the IPR claimant to request a statement of fair and non-discriminatory licensing. The Secretariat maintains an on-line repository of all IPR disclosures and of any statements that IPR holders wish to make on their own or make in response to a request from the IETF Secretariat.

The IETF and other standards organizations:

For most of its early history the IETF had little impact on the traditional standard-setting community. However in the mid 1990s the Internet, and thus the IETF, started to become more visible and the IETF began to increase its interaction with other standards organizations. By 1995 it was starting to become clear to most observers, including government regulators, that TCP/IP and the IETF were going to remain important parts of the continued development of the world's communications future. The Internet Society and International Telecommunications Union-Telcom Standardization Division (ITU-T) exchanged memberships, and liaisons were designated between the IETF and the ITU-T, Internal Standards Organization (ISO), World Wide Web Consortium (W3C) and the ATM Forum.

Many other organizations have requested that the IETF designate liaisons. However, liaisons to the IETF are not essential for the IETF to interact with other organizations. Since IETF Working Groups and documents are open to anyone, a person or organization can bring an issue to the IETF's attention simply by participating in the Working Group deliberations. In the last few years the IETF has undertaken joint standards development work with the ITU-T and with the W3C. Some observers believe that it may be more effective to assign one organization as the "lead" and encourage people from the other organization to participate in the Working Group deliberations.

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The IETF is quite concerned about maintaining constructive communication among standards organizations working in overlapping technical areas. A few years ago, the IETF established a private e-mail list for representatives of standards development organizations to join. More than a dozen standards development groups have since subscribed to this list. The IETF sends all proposals for new IETF activity to this list as do a number of other organizations. This channel provides an early warning system for potentially competing efforts and facilitates the creation of communications paths between the efforts.

Conclusion:

IETF standards are now used by much of the data communications industry around the world. It is doubtful that any of the people who gathered at that first IETF in 1986 would have believed it if they were

told that within a dozen years TCP/IP would have become the predominate data communications protocol in the world and all of the alternatives, whether company proprietary technology or official public standard, would have fallen by the wayside.

In a practical sense, users of modern data networking can not ignore the work of the IETF, and the IETF will continue to serve an important facilitating role in the emergence of new Internet technologies.

BIOGRAPHY FOR SCOTT BRADNER

WORK EXPERIENCE

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Senior Technical Consultant, Harvard University Office of the Assistant Provost for Information Systems, 1996 to present. Assist Assistant Provost in ascertaining the implications of advanced technology on the University, serve as a liaison to various University groups dealing with technology issues, serve as University Information System's liaison to external network based organizations such as Internet II.

Founded and managed the Harvard Network Device Test Lab, 1988 to 1999.

Senior Technical Consultant, Harvard University Office for Information Technology (OIT), 1989 to 1996. Design data networks, install and operate production gateways, serve as OIT liaison to external organizations, oversee installation of fiber infrastructure, develop network based applications, develop recommendations on security and privacy, document existing Harvard network and network support organization.

Senior Technical Consultant, Harvard University Psychology Department, 1975 to 1990. Managed computer facility consisting of UNIX computers, PCs and Macintosh computers, developed phototypesetting facility, and designed and installed first Harvard campus data network and Longwood Medical Area Network.

Computer Programmer, Harvard University Psychology Department, 1967 to 1975. Co-developed real-time operating system and designed special hardware to support real-time research experiments.

CONSULTING

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Consultant on network design, management and security to educational institutions, Federal agencies, international telecommunications enterprises and commercial organizations ranging from Fortune 500 companies to small businesses, 1989 to present.

Series Advisor, John Wiley & Sons, Inc. 1997 to present—member Wiley Computer Publishing's Networking Council

PATENTS:

U.S. Patent 4,799,262—Speech Recognition (with Joel A. Feldman and William F. Ganong, III) 1989

AWARDS:

The Jonathan B. Postel Service Award from the Internet Society

ORGANIZATIONS:

Internet Engineering Task Force (IETF)

Member, IETF Internet Engineering Steering Group (1993 to present).

Co-Director, Transport Area (1997 to present).

Co-Director, IPng Area (1993 to 1996).

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Co-Director, Operational Requirements Area (1993 to 1997).

Liasion between IETF and ITU–T, (1995 to present).

Chair, Benchmarking Methodology Working Group (bmwg), (1991 to 1993).

Internet Society (ISOC)

Internet Society Vice President for Standards, (1995 to present).

Trustee, (1993 to 1999).

The American Registry for Internet Numbers (ARIN)

Trustee, (1997 to present).

Secretary of the Board, (1997 to present).

Corporation for Regional and Enterprise Networking, Inc. (CoREN)

Co-chair, Joint MCI–CoREN Technical Committee, (1994 to 1995).

New England Academic and Research Network (NEARnet)

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Co-founder

Member, Steering Committee, (1990 to 1995).

Chair, Technical Committee, (1990 to 1995).

Longwood Medical Area Network

Chair, Technical Committee, (1991 to 1995).

Corporate Boards

Acallto

Technical Advisory Boards

Allegro Networks

AVICI Systems

Elastic Networks

Force 10 Networks

Malibu Networks

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MMC Networks

Packet Design

Procket Networks

PingTel

SS8 Networks

Member, ACM, IEEE, ISOC

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Bradner, S., and A. Mankin (Eds.), IPng, *Internet Protocol Next Generation*, Addison Wesley, 1996, ISBN 0-201-63395-7.

Bradner, S., *A Practical Perspective on Routers*, a chapter in *The Internet System Handbook*, Edited by D. Lynch & M. Rose, Addison-Wesley, 1993, ISBN 0-201-56741-5.

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PREPARED STATEMENT OF CARL F. CARGILL

Consortia Standards: Towards a Re-definition of a Voluntary Consensus Standards Organization

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Good afternoon, Chairman Ehlers, and thank you for inviting me to testify. I am Carl Cargill, Director of Standards at Sun Microsystems, a multi-billion dollar multi-national information systems company. My statement is based upon my experience in the Information Technology standardization arena and reflects the views of a practicing manager in standardization in the Information Technology arena. My full written testimony is attached to this shorter overview.

The theme of today's hearing is "Standards Setting and United States Competitiveness". I do not believe that there is a more successful example of the use of standards for competitive purposes than the IT industry. The U.S. based multinationals who are the sources of innovation and growth for the IT sector all recognize the importance of standards and invest in them heavily. Most IT companies—large and small—participate in some standards setting arena or the other.

What makes the IT companies unusual, however, is their willingness to explore new methods of standardization—methods that are more responsive to the needs of their technology and industry. One of the methods that IT companies have chosen to use is the creation of consortia—groups of like minded organizations that have joined together to produce specifications that further the market. It is important to recognize is that these are organizations—usually commercial companies, academia, and occasionally government—who use the consortia structure do so to produce common specifications which benefit the entire market.

The growth of this form of standardization has been phenomenal, starting from only a few organizations in 1980 to well over several hundred now. There is no aspect of IT which they do not touch, from optical backplane interconnects to Web languages to UNIX®. They are the preferred vehicle for standardization in IT. Led by U.S. multinationals, consortia and their specifications have been essential in the growth of the IT industry.

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But these organizations are part of the ISO/ANSI federation of standardization. They operate under usually strict processes and procedures, and focus on the creation of specific technical solutions. They are "pay-to-play" and funded by their membership—much the same as ANSI is. They receive no Federal monies except as membership dues or for contract work. They live—or die—by their ability to attract members. And these consortia do attract members from all over the world. They usually hold their meetings in

English, publish their specifications in English, and see their specifications productized by U.S. companies. These specifications are not U.S. specifications—they are made for a world wide market. A country that rejects them rejects information commonality with the rest of the world. But, it is important to note that—in a disproportionate number of cases—the companies who exploit the technologies to gain a competitive edge (both in producing products and in implementing those products) are U.S. based.

Over the past ten years, however, there has been a gulf opening between consortia and the formal process. ISO has tried to open doors to consortia, but they have always assumed that consortia wanted to be part of the formal process and placed conditions upon their entry. Needless to say, consortia believe that they are legitimate in their own right and have not been wildly enthusiastic about becoming like the organizations from which they were created to be different. The gulf is nowhere more apparent than in the area of government procurement. For ten years, I have heard constant assertions from participants in the formal process that "Consortia specifications aren't real standards". The wording of documents like OMB A119 has been used by participants in the formal process to prove that consortia produce inferior standards. While I understand that A-119 was never intended to place a barrier between formal and consortia standards, it has done so. And in so doing, a gulf between methods of standardization—not between ideals or beliefs about the efficacy of standards—has been allowed to develop.

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I would like to see this gap healed. A request to the OMB to reaffirm that consortia specifications—from consortia who meet legitimate requirements contained in my written testimony—would go a long way to removing some of the stress in the system. This reaffirmation that legitimate standards come from consortia would also give these groups credibility outside of the U.S.—leading to an increase in their ability to position themselves as they have within the U.S. It could serve to reunite those of us who "standardize", reminding us that we all do believe in a common goal.

There are other things which could be done—a larger role for NIST in acting as a neutral, embedded and empowered observer who can help to make sense of the activities of multiple consortia and formal organizations, for example. But these things would be additive to the major goal of removing the mistrust between organizations who believe in standardization. In my testimony last September, I stated that "ANSI is necessary, but not sufficient" for the IT industry. The strength of the IT industry lies in its ability to seek new forms and outlets for its inventiveness, and it has done so in standards. It has not rejected the old—it has merely added a different form of organization to its arsenal. With the affirmation of the consortia as a legitimate form of a voluntary standardization organization, you will be again helping U.S. industries who create and use specifications retain their global competitiveness.

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BIOGRAPHY FOR CARL F. CARGILL

Carl Cargill is Sun's Director of Standards, where he manages Sun's standardization strategies, activities, and portfolio. He has been at this activity (standardization) for nearly twenty years, and has written two books ("Information Technology Standardization: Theory, Process, and Organizations" and "Open Systems Standardization: A Business Approach"), several chapters in other books on the subject, and the "Standards" entry in the Van Nostrand Reinhold "Encyclopedia of Computer Science". He was the Editor-in-Chief of "StandardView", ACM's journal of Standardization, and has written scores of articles on the subject of standardization and its practical applications.

He is a member of the W3C Advisory Board, a member of the Board of Directors of the Open GIS Consortium, an alternate Governing Body member and Chair of the Governing Body Marketing Committee of The Open Group, and participates on an irregular basis with NCITS and the U.S. JTC1 Technical Advisory Group. He has been a member of the Coordinating Committee and General Assembly of ECMA, as well as a member of the BoD at the Object Management Group. Prior to rejoining Sun, he was the Director of Standards at Netscape, and a standards strategist at both Sun and Digital Equipment Corporation. He has also been a product strategist, marketing manager, and program manager for various and sundry other companies in the IT arena.

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Education:

BA History (Medieval European), University of Colorado, 1969

MSA, Management Engineering, The George Washington University, 1975

Appendix 3:

Additional Material for the Record

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[\(Footnote 1 return\)](#)

"Voluntary consensus standard" is a term defined with different nuances. "Voluntary" means that the use of the standard is optional. "Consensus" means that there is general agreement among those affected by the standard on its terms. American National Standards fall under the definition of voluntary consensus

standards set forth in the NTTAA and OMB A-119, but so can documents from many other organizations,

[\(Footnote 2 return\)](#)

ANSI does not write standards; it serves as a catalyst for standards development by its diverse membership. The Institute is a unique partnership of hundreds of companies, professional, technical, trade, labor, academic and consumer organizations, and some 40 government agencies. ANSI is a 501(c)(3), tax-exempt public interest organization.

[\(Footnote 3 return\)](#)

"National Standards Strategy for the United States," American National Standards Institute, Washington, DC, August 31, 2000. We have provided copies of the Strategy for your consideration.

[\(Footnote 4 return\)](#)

Ibid., p. 3.

[\(Footnote 5 return\)](#)

Ibid.

[\(Footnote 6 return\)](#)

1. The following principles and procedures should be observed, when international standards, guides and recommendations (as mentioned under Articles 2, 5 and Annex 3 of the TBT Agreement for the preparation of mandatory technical regulations, conformity assessment procedures and voluntary standards) are elaborated, to ensure transparency, openness, impartiality and consensus, effectiveness and relevance, coherence, and to address the concerns of developing countries.

[\(Footnote 7 return\)](#)

National Technology Transfer and Advancement Act (P.L. 104-113).

[\(Footnote 8 return\)](#)

OMB Circular A-119.

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Op. cit.

[\(Footnote 10 return\)](#)

5 U.S.C. Sect. 5946.

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"National Standards Strategy," op. cit., p. 7.

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