

**Testimony of Vinton G. Cerf, Ph.D.  
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**Chairman, Visiting Committee on Advanced  
Technology (VCAT), NIST**

**Before the U.S. Congress, House of Representatives,  
Committee on Science and Technology, Subcommittee on  
Technology and Innovation**

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Thank you Chairman Wu, Ranking Member Adrian Smith and members of the subcommittee for the opportunity to testify before you, in writing, on the planned NIST Organizational Realignment and its effect, and the potential role NIST can play in the inter-agency coordination of national and international documentary standards development and adoption. I regret that my calendar commitments conflicted with your kind invitation to testify in person and I hope that you will accept my sincere offer to meet with staff and members at a time of mutual convenience if this will contribute to achieving your legislative and policy objectives.

My name is Vinton G. Cerf and I have served since October 2005 as Vice President and Chief Internet Evangelist of Google. With Robert Kahn, I am the co-inventor of the Internet's architecture and fundamental TCP/IP protocols. My career has centered on computers and communications including work at UCLA, IBM, Stanford University, MCI, the Corporation for National Research Initiatives, and the Defense Advanced Research Projects Agency. I was a founder of the Internet Society and its first president and served as chairman of the Internet Corporation for Assigned Names and Numbers (ICANN) for seven years. I served on the President's Information Technology Advisory Committee during the Clinton administration. I have been active in technology standards in the Internet Architecture Board (IAB), Internet Engineering Task Force (IETF) and the Internet Research Task Force (IRTF). For our Internet work, Robert Kahn and I have received many awards and citations including the US National

Medal of Technology and the US Presidential Medal of Freedom. I began service on the Visiting Committee on Advanced Technology in 2007, served as its Vice Chair in 2008-2009 and was elected Chairman in 2010.

I have had the benefit of reading a draft of the testimony of Dr. James Serum who has also been asked to testify before this subcommittee. In consequence of this, I will attempt in this written submission to avoid duplication and seek to amplify his remarks where this seems warranted and draw attention to additional points that seem of interest to the subcommittee. While these remarks should be understood to be personal, I intend to draw also upon the recently submitted 2009 Annual Report of the VCAT to the Secretary of Commerce.

### **Purpose and Effect of the NIST Realignment**

Upon assuming the role of Deputy Director and Acting Director of NIST, Dr. Patrick Gallagher undertook to organize the top management of NIST so as to reduce the number of direct reports to the Director and to improve top management's attention to the needs of the operating units and programs undertaken by NIST. He was able to delegate responsibility, within the limits of his existing authority, for coordination of the laboratory programs, extramural programs and administrative and management programs to three top-level managers. In its most recent incarnation, the new structure would elevate each of the three to associate directorships, replacing the earlier single deputy director position. The VCAT strongly endorsed this aspect of reorganization. I was strongly persuaded of the value of this proposal on the grounds that this would increase management attention in each of the three areas, improving planning, execution and, importantly, integrated oversight of priorities across the organization.

Upon his nomination and confirmation as Director of NIST, an action very strongly endorsed by the full VCAT, Dr. Gallagher undertook to begin a deeper re-examination of the structure of the laboratory and center programs. This was no simple task as the demands on NIST are extraordinarily diverse. There are efforts mandated by the Congress, such as the role NIST plays in Cyber-Security and Smart Grid standards; there are requests from industry for development of standards to enhance commerce and interoperability; there are requests or proposals from the research world to collaborate on basic and applied efforts to enhance the NIST metrology capabilities; and there are programs initiated at NIST in anticipation of need. The consideration of biological effects of nano materials is a good example of this kind of foresighted initiative.

The VCAT has reviewed the process by which NIST management, including the laboratory and center leadership will evaluate alternative organizational structures. As is pointed out by my colleague and former VCAT chairman, Dr. James Serum, there are a variety of alternative organizational structures, each with strengths and weaknesses. It is to his credit that Dr. Gallagher did not simply dictate a choice, but, rather, put into place a wide-ranging discussion that reaches into and outside of the NIST organization for inputs and insights. I agree with Dr. Serum that combining the standards and technology development within each general laboratory entity has strong benefits. The primary role of NIST is measurement and this often requires research and experimentation into new technology and even fundamental physics. Standards coordination and development may also hinge on laboratory-oriented work so making an organizational unit accountable for the science and technology needed for standards work creates incentive for mutual reinforcement.

It has become apparent that the needs expressed by NIST's constituencies, including the Congress, private sector and other US Government agencies, manifest as requirements that cross laboratory boundaries. One proposed restructuring of the laboratory program into Physical Measurement, Material Measurement, Engineering and Information Technology has the benefit of a thematic alignment within each laboratory and opportunity for better inter-disciplinary collaboration. The NIST Associate Director for Laboratory Programs and the Laboratory heads would be responsible for assuring that tasks requiring inter-laboratory cooperation and resources are properly addressed. Accountability and clarity of mission in this structure will be the key to its success and it seems evident that this is well understood by the NIST top management team.

### **Future Role in International Standards and Federal Agency Coordination**

It has become increasingly evident that the United States faces rising competition in manufacturing, outsourcing of information technology services, high technology consumer goods and standards-making initiatives. Countries that had been followers of American or European-led standards are not only capable of but are actively pursuing the creation of standards. In some countries, the domestic market is large enough to justify the establishment of domestic standards that can, by virtue of their role in the export markets, become de facto international standards. Apart from this potential, the high population countries (e.g. China and India) are

literally in a position to participate in international standards forums in overwhelming numbers. To the extent that American products and services must compete in an international marketplace, standards are critical for interoperability and compatibility with business and consumer needs. Coordination of documentary standards development and application for domestic and international use is therefore of strategic importance.

NIST has been assigned responsibility in varying degrees and ways for cyber-security, health information technology and smart grid documentary standards in addition to other standards work in non-IT areas. On the international front, the US State Department has formal responsibility for coordinating US positions in treaty-based standards organizations such as the International Telecommunications Union (ITU). In the private sector, the American National Standards Institute (ANSI) coordinates private sector and government inputs into a broad spectrum of national and international standards. ANSI represents US interest in the International Organization for Standardization (ISO). There are other organizations that produce standards relevant to US interests, notably the Internet Engineering Task Force (IETF) that is international in scope and participation.

Standards have become vital to the production of interoperable, competitive products and services. In an international setting, the US Government has an interest in and responsibility for adopting technical standards policies that are favorable to international trade and US private sector access to international markets. It is self-evident that coherent inter-agency standards positions will serve US interests better than an uncoordinated approach. Moreover, to the extent that private sector competitors outside the US seek to meet domestic business and consumer needs, it is vital that standards be developed and adopted that protect both the private sector and US Government users of such products and services. As is well expressed in Dr. Serum's testimony, NIST is well equipped to serve as the primary coordinator for the development of US Government positions on documentary standards. The VCAT strongly endorsed this recommendation.

## **Other Observations**

I note that Dr. Serum mentions the potential elevation of the NIST Director to Undersecretary. Given the extraordinary mandates historically and especially, recently, assigned to NIST, this elevation would be particularly beneficial to the success of an enhanced role for NIST in facilitating domestic and international standards development and coordinating inter-agency standards policies. Given the increasingly important role for technology in America's domestic and international enterprise, it seems timely to re-establish an Undersecretary position that would have responsibility for technology and standards-related issues within the Department of Commerce. Like my colleague, Dr. Serum, my only reservation is whether the combined role of Undersecretary and Director of NIST would have a material effect on the ability of one individual to service both roles. With the right organizational infrastructure in place, it would seem feasible.

I also join Dr. Serum in reiterating the VCAT's very strong support for Dr. Gallagher in his role as Director of NIST. He has demonstrated a remarkable range of scope and depth in his short tenure in this position. In addition to his technical qualifications, he has shown a considerable degree of creativity in his approach to management, priority-setting and organizational structure. I am confident in Dr. Gallagher's leadership and very much looking forward to the work that lies ahead for the VCAT in supporting the work of NIST.