

3 Advancing Innovation: A Call for Presidential Leadership

Admiral James D. Watkins, USN (Ret.)

I have witnessed processes related to the governance of science and technology initiatives at the national level from a variety of vantage points. As Chief of Naval Operations and a member of the Joint Chiefs of Staff in the 1980s, I watched science and technology (S&T) work well in national defense and eventually win the Cold War. Our strength was and remains the timely fielding of new threat-detering technologies and systems born out of innovative research. Of course, during the Cold War, the Soviets provided the needed catalyst that forced us to institute an aggressive and sustained national security research and development (R&D) program. The Soviets could not win the frantic back-and-forth of this science and technology competition; they knew it, and finally gave up the race at Reykjavik, Iceland. We must not forget this lesson of the powerful S&T threat to the Soviets that came out of our accelerated R&D commitment to move away from the distasteful strategy of mutually assured destruction toward the more acceptable one of strategic defense.

Then, as chairman of President Reagan's Commission on the Human Immunodeficiency Virus Epidemic, I watched as my number one recommendation was ignored. I recommended that we work with states and researchers to develop suitable curricular material for K-12 human biology that was properly tailored to the level of student maturation and included in all required pre-college science curricula. Few, if any, received or cared about this message. My goal was to equip our youth with knowledge about their own physiology so they could become part of the solution to the many emerging and complex health-related problems.

Admiral James D. Watkins, USN (Ret.) is president emeritus of the Consortium for Oceanographic Research and Education (CORE). This article is based on remarks delivered at the 26th Annual AAAS Colloquium on Science and Technology Policy, held May 3–4, 2001, in Washington, DC.

Youth would be exposed to the scientific basis on which they could “say no” themselves to self-destructive behavior instead of being pontificated to by adults. One of the eight national goals set by the 1989 National Education Goals Panel held in Charlottesville, Virginia, was that our students would be number one in math and science by the year 2000. As far as I know, only our fourth graders have come close to achieving that goal. The need for effective curriculum materials is obvious.

Subsequently, as Secretary of Energy at the decade’s turn into the 1990s, I saw defense S&T begin to degrade in priority toward the end of the Cold War. The old habit of using the fear of the Soviets to drive so much of our national R&D effort became quickly outmoded. In its place were the terms “peace dividend” and “dual-use technologies.” The drive toward “relevance” set the priority for future scientific investments. We saw the Department of Defense rapidly decrease its research portfolio. There was general apathy and little political support for maintaining a strong national scientific research base. In fact, for most of the decade of the 1990s, it was a monumental annual struggle to defend basic research needs for the Department of Defense, despite the exploding number of national security uncertainties facing us in the post-Cold War world. This world should demand more, not less, basic research and technology development to keep open all our options for addressing future unknowns. Of course, such a struggle has classically been the case in the nondefense agencies where support for R&D has always been an annual and difficult fight (except for the National Institutes of Health).

In the nondefense side of my Department of Energy work, I watched the sad story of the Superconducting Super Collider as it fell in 1992, to the new buzz word “relevance,” to indifference to basic research and possible resultant new discoveries (e.g., high temperature superconducting materials), and to a totally unresponsive policy-making process in the area of S&T and foreign affairs. This was a loss of an exciting crusade to understand the fundamental makeup of matter.

I also watched the advocacy-only policy approach in dealing with the new and emerging challenge of global warming. Prior to the U.S. participation in the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, I witnessed our inadequate intergovernmental preparation. We had prepared no integrated and coordinated set of S&T objectives to parallel political advocacy. As a result, we can rightfully be criticized for being “down on” the emerging international protocols rather than being “up on” the good S&T-based

alternatives that offer reasonable balance with the real world of modest and sustained economic growth for our nation.

Finally, I have watched the emergence of a general public and congressional apathy toward using scientific justification to underpin good public policy legislation in such fields as national energy policy; nuclear, toxic, and hazardous waste management; and the reliability and safety of the nuclear weapons complex. In fact, many single-purpose “advocates” see using good science underpinning to effect rational public policy “as a thinly veiled threat to throw obstacles in the path of their advocacies.”

From all of these vantage points, I have concluded that our nation’s science and technology policy-making process is antiquated, ineffective, and inefficient. It needs radical restructuring to be competitive in the new dot-com and mono-polar world of the 21st century. I was questioned recently at a public seminar on the 43rd President and the 107th Congress, which was sponsored by the Center for the Study of the Presidency. Dr. David Abshire, the Center’s president, asked me as a member of the S&T panel what I would advise the President on S&T. I would tell him the following:

Mr. President, one of the sad commentaries on our political process is the benign neglect too often assigned to one of the most powerful long-range drivers of a continuing strong national economy, healthy quality of life, and assured national security. This driver is an effective science and technology strategy and an efficient process for its implementation. Alas, few politicians are elected on the basis of their interest in such a thrust. Yet, repeated studies and reports have assessed our current S&T process at the national level as broken and in need of repair.

Below are a few of the studies and reports on S&T conducted over the past decade since the end of the Cold War.

Science and Technology in U.S. International Affairs. (January 1992. Carnegie Commission on Science, Technology, and Government.) Nothing was done until the year 2000.

The State-Federal Technology Partnership Task Force: Final Report. (Sept. 5, 1995. State-Federal Technology Partnership Task Force.) Report developed by 20-member Task Force created at the request of Dr. Jack Gibbons, and co-chaired by former Governors Celeste and Thornburgh. No lasting infrastructure improvements are evident as yet.

Allocating Federal Funds for Science and Technology. (1995. National Academy Press.) Frank Press, chair of the Committee on Criteria for Federal Support of Research and Development made 13 recommendations in this report. No real impact has been noted as yet.

Unlocking the Future: Toward a New National Science Policy. (September 24, 1998. U.S. House of Representatives Committee on Science.) Rep. Vernon Ehlers (R-MI) chaired the hearings for the House Science Committee and made a wide range of recommendations, which were published in this report. Little action has resulted to date.

The Pervasive Role of Science, Technology, and Health in Foreign Policy: Imperatives for the Department of States. (1999. National Academy Press.) Robert Frosch, chair of National Research Council Committee on Science, Technology, and Health Aspects of the Foreign Policy Agenda of the United States, provided this report in response to former Secretary of State Madeleine Albright's request for a blueprint to improve S&T in the State Department. Maybe it will reform, but not without strong external intervention by the new Administration and not without strong interest by the congressional science and foreign affairs committees.

Advancing Innovation: Improving the S&T Advisory Structure and Policy Process. (Winter 2000. Center for the Study of the Presidency.) This report headed up by David Abshire wrapped up ten years of expressed concerns and made many of the recommendations all over again.

What these leading national experts have all been saying, since the end of the Cold War, is that the current science and technology process is flawed. It needs considerable reworking to ensure maintaining, over the long term, a competitive U.S. world leadership position in nearly all matters that define our way of life. In ocean science and technology alone, the National Academy of Sciences (NAS) has published over 30 studies. No more studies are necessary.

So, Mr. President, here are just a few specific recommendations born out of all these reviews and studies that you and your new team should consider:

- Appoint a presidential science advisor with stature to whom you will actually listen. Then act on broad national S&T matters of import to the nation and the world on the basis of the advice you get. In addition, you should assign this individual as principal S&T advisor to the Director of the Office of Management and Budget (OMB). This will help ensure coordinated S&T budget guidance to those agencies involved in research, particularly those adopting structured R&D approaches where horizontal R&D budget integration is deemed important (e.g., ocean science and technology where 12 federal agencies are now integrated by law).

- Have your team work with the congressional Authorization and Appropriations Committees to encourage them to accept a five-year nondefense basic research budget from each of the major agencies with an S&T portfolio. This will add long-sought-after stability to the scientific research base. Congress has always allowed this for the Department of Defense and is now beginning to move in this direction selectively for other agencies [e.g., the National Science Foundation (NSF) for 2002 in selected areas]. This needs a further push from your Administration.
- Give guidance to your team to integrate R&D among federal agencies in those broad areas of science where they can receive mutual benefit from more structured interaction with one another by leveraging scarce research dollars. Ocean S&T successes are only the tip of the iceberg.
- Direct OMB to track S&T separately from R&D as defined by the NAS report. This will enable us to present a clearer picture of our long-term investment in the national science portfolio and better facilitate adjusting priorities and focus when appropriate. For example, we ought to double the NSF budget over the next five years so that investments in basic scientific research across all their core science areas will be more in balance with the basic research investment in health at the National Institutes of Health. To do this properly, we first need to know what our science portfolio is today.
- Revamp the existing Science Advisory Board structure so that the President's Committee of Advisors on Science and Technology, the Office of Science and Technology Policy, and the Office of Management and Budget are more interconnected with the Secretary of Energy Advisory Board, the Defense Science Board, the National Science Board, the National Oceanic & Atmospheric Administration Science Advisory Board, etc.
- Have your team work with the congressional leadership to encourage them to accept, in addition to the classic, vertically oriented budgets, a horizontally integrated budget for those S&T areas brought together in formally established multiagency partnerships. This has been done in the area of ocean science and technology

under the National Oceanographic Partnership Act of 1996. In this connection, also encourage congressional leadership to hold periodic Joint Authorizing and Appropriation Committee hearings on selected, broad, cross-agency S&T matters to address interactive programs among participating multiple federal agencies. This will need a push from both you and the congressional leadership to overcome traditional committee jurisdictional problems.

- Help bring the Department of State and its Authorizing and Appropriations Committees on Foreign Relations into the S&T arena. Encourage them to do what the Frosch and Ehlers reports said to do. Congress must be an early and continuing partner when planning any large future investment that could be born out of promising research, particularly when international collaboration will be required. An example of the latter case would be the development and fielding of an integrated ocean-observing system for enhanced climate prediction modeling. This system has the potential to address the ramifications of global warming and population growth on health, agriculture, coastal hazards, etc. This is all now achievable because of rapidly emerging technologies. This process is already underway for the oceans but will need your support if it is to become self-sustaining.
- Establish a task force to integrate these and the remaining recommendations of the Center for the Study of the Presidency in their report *Advancing Innovation*, along with portions of the other reviews I highlighted that are still relevant to this matter. This task force should develop a broad S&T strategy for your consideration and implementation in close consultation with congressional leadership.

Mr. President, the timing seems to be right to do all of this. Fortunately our information also says that Congress would be receptive to such a broad S&T restructuring process, one which cries out for top-level attention.

If you do this, you will have given new life to one of our greatest national strengths, i.e., developing new technologies, born out of the finest research intellects and institutions in the world. Restructuring science and technology policy will help this nation maintain its economic competitiveness, quality of life, and national security in the 21st century.