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Good morning. I want to thank Dr. Clark and Under Secretary Cohen for inviting me to speak this morning at the opening of this Summit. The engagement of the university community in homeland security issues has been an important objective for this Administration, and for me personally, since the days after September 11, 2001. This Summit is a symbol of the commitment of our intellectual community to the protection of our homeland as well as a showcase for the successful recruitment of scientific and engineering talent for advances in homeland security. Your presence here this morning creates a very welcome opportunity to learn and share ideas about the deep problems and possible solutions for the vexing issues of security on the domestic front.

In preparation for today's remarks I looked back on speeches I gave in the aftermath of the disastrous events of 9/11, and I will draw on them this morning to give you a sense of the history of this enterprise. I was still in my office at Brookhaven National Laboratory on that fateful day, and watched the Twin Towers burn and collapse, and smoke billow from the Pentagon, on television. President Bush had nominated me to be his science advisor, but I was not yet confirmed by the Senate. After making sure the Laboratory was responding appropriately to the heightened security level formally declared by the Department of Energy (this was in the days before the threat color codes), I loaded up a borrowed van with household goods and books and drove to Washington. Within days, and somewhat prematurely with regard to my official status, I was meeting with representatives of the science and academic communities in forums rapidly called to consider how science and higher education might be of service in the aftermath of these traumatic events. In that same time frame, anthrax-laden mail began to arrive in Washington and elsewhere, and I realized my first months in office would be almost entirely consumed by homeland security issues.

During those months I received a swelling flood of e-mails and phone calls from colleagues around the country offering help and advice, urging action, and expressing concern about the consequences of these events for science. And in December I tried to give a partial answer in a talk to a conference convened by the American Association for the Advancement of Science called "The War on Terrorism: What Does it Mean for Science?" Here are some excerpts:

"First, this administration is determined not to let terrorism deflect America from its trajectory of world leadership in science. Our nation's prowess in technology, especially information technology and instrumentation, have opened extraordinary new vistas in science. It has made it possible to visualize and manipulate matter on the atomic scale, leading to unprecedented understanding and control of the processes of life as well as of inanimate matter.

Having produced the means for great strides in science, and in accompanying technologies for improved health care, economic competitiveness, and quality of life, it would be foolish to turn aside now from the course of discovery while we engage the monster of terrorism – an evil force that denies the benefits of progress and the search for truth. Thus I expect that science in America and the world will forge ahead relatively unaffected by the war against terrorism. I expect the President's prior commitment to increase funding for health related research to be realized. I expect the tremendous momentum in the information sciences to roll forward. I expect the technologies of measurement and analysis -- atomic scale microscopy and manipulation, light sources, probes, detectors and analyzers -- to continue to win new ground on the frontiers of complexity as well as of scale. Science has its own intrinsic imperative and this nation will continue to pursue it."

"Second, this administration is determined to win the war against terrorism, and President Bush is mobilizing all the talents and resources of our immensely strong society to that end. He is doing this through the conventional mechanisms of American government, and he is drawing upon much previous work that prepared us for this struggle. It is too easy to criticize – after the fact – a prosperous peace-time nation for unpreparedness in the face of danger. A better criterion for defensive health would be the speed with which a nation under attack can respond effectively. There is no question that the steps New York City took after the first world Trade Center attack in 1993 saved numerous lives in the second attack eight years later, and expedited a response that limited the scope of its evil consequences. Nor is there doubt that lessons learned from attacks on US embassies and federal buildings limited the damage to the Pentagon, portions of which had been remodeled with designs based upon these lessons. Our consciousness of the biowarfare work of troubled regimes elsewhere in the world had led to studies of biodefenses and to exercises designed to teach us where our greatest vulnerabilities lay before September 11. I do not mean to imply that we were as prepared as we could have been, or perhaps should have been. But many of the means required for a war against terrorism were already available to us, and only needed to be enlisted in a systematic way to support the effort. This readiness is most visible in the technologies now in play in the war beyond our borders – in Afghanistan for now. But significant readiness of homeland technology is also apparent, though not yet fully mobilized. We are not starting "from scratch" in the technology of homeland defense. We have much relevant technology, and the challenge is to deploy it effectively."

"I am making these points to cool somewhat a fever that I fear is rising in the scientific community -- a notion that science may be diverted in a massive way as it was in World War II, the course of discovery interrupted, the quality of intellectual life distorted and impaired. Or on the other hand that a great windfall for science is at hand, at least for some of us, because of the need for new research bent to the exigencies of new forms of warfare."

"Science does indeed have much to offer in this war, and for three months in my new capacity as Presidential Science Advisor, I have been urging America's science and engineering organizations to respond to the President's call. And I have been immensely impressed and gratified by the response. Today's conference is taking place as the momentum is gathering, and as the first signs of its direction are becoming evident. We are on our way. Our awareness of the need has been aroused. Now let us reflect dispassionately on what happens from here on."

Four months later at the Annual AAAS Colloquium on Science and Technology Policy in April 2002 I reported on the rapidly developing organization of the science role in homeland security. After a brief description of how I had organized my office to accommodate the homeland security functions in those days before there was a Department of Homeland Security, I talked about

"Initial responses to the war against terrorism My message to the science and higher education communities last fall was first and foremost to appreciate how deeply committed the President is to winning the war against terrorism. That commitment includes the mobilization of every sector, including science, engineering, and higher education. Shortly after the September 11 attacks, many federal agencies launched initiatives to respond to terrorism issues, and funded them with existing appropriations. The Department of Defense and the State Department created a "Combating Terrorism Technical Support Working Group" that solicited, evaluated, and funded specific projects that could improve technology needed for this special kind of war. Some needs were obvious, such as increasing the capability of first responders to detect bio- or chemical hazards, better ways to sift intelligence data from multiple sources, and better vaccines and therapies for bio-pathogens. Other needs are more strategic: defining and assessing the nature of terrorist threats, or analyzing and strengthening the nation's logistical infrastructures in transportation, communication, energy distribution, food supply, and health care. Many of us realized that these longer term issues would require considerable thought and consultation with the nation's intellectual community. To this end, the National Academies sponsored an important meeting late in September to consider how they might organize science input to the war effort. I learned much from that event, and agreed to establish an interagency task force that would take up recommendations produced by a NAS committee proposed at the meeting. The committee, co-chaired by Lewis Branscomb and Richard Klausner, is likely to produce useful guidance by mid-summer." [That did indeed produce a very useful document called "Making the Nation Safer: The Role of Science and Technology in Countering Terrorism" NRC 2002. This book should be required reading for anyone interested in this topic. I will come back to the interagency task force I promised in a moment.]

To continue with my April 2002 AAAS remarks:

"The institutions that produce science and technology are not only sources of solutions and advice, they are also potential targets and means of exploitation for terrorism. Universities can inadvertently provide materials, skills, and concealment for terrorist operations. They cannot ignore their responsibility to society for limiting the opportunities for such perversions of their educational and research missions. Universities need to think through these responsibilities and advise governments where to draw the line between avoiding terrorist risk, and obstructing the processes of education and discovery. During the weeks following September 11, I met with higher education leadership organizations to urge them to begin dialogues on their campuses to define their positions on terrorism and to clarify where the balance must be struck in response to society's desire to protect itself. OSTP is fostering and closely monitoring the broader dialogue on these issues within the administration."

"Innovation versus implementation in the war against terrorism As I learned more about the challenges of terrorism, I realized that the means for reducing the risk and consequences of

terrorist incidents were for the most part already inherent in the scientific knowledge and technical capabilities available today. Only in a few areas would additional basic research be necessary, particularly in connection with bio-terrorism. By far the greater challenge would be to define the specific tasks we wanted technology to perform, and to deploy technology effectively throughout the diffuse and pervasive systems it is designed to protect. The deep and serious problem of homeland security is not one of science, it is one of implementation."

"This has two consequences. First, terrorism is not going to be a significant driver for science funding in general. Second, those seeking federal agency customers for specific technology products are likely to be frustrated while implementation strategy is being developed. Unlike conventional warfare, where trained personnel employ purpose-built technology in a localized and well defined threat environment, the war against terrorism is waged across all society against the vulnerabilities of poorly defined and fragmented systems, only a few of which are owned or controlled by the federal government. Central authorities have limited means available to reduce risky practices in the private sector, and often the simplest means are unacceptably intrusive to American society."

In July of 2002 the first National Strategy for Homeland Security appeared, and its section on science and technology included the following paragraph:

"The federal government is launching a systematic national effort to harness science and technology in support of homeland security. We will build a national research and development enterprise for homeland security sufficient to mitigate the risk posed by modern terrorism. The federal government will consolidate most federally funded homeland security research and development under the Department of Homeland Security to ensure strategic direction and avoid duplicative efforts. We will create and implement a long-term research and development plan that includes investment in revolutionary capabilities with high payoff potential. The federal government will also seek to harness the energy and ingenuity of the private sector to develop and produce the devices and systems needed for homeland security." This is the first reference to science in the new Department of Homeland Security, which was not actually established by Congress until late November.

I mentioned the commitment I made even before I was "official" to create an interagency task force on science and technology for homeland security. That task force was eventually integrated into the National Science and Technology Council's Committee on Homeland and National Security. My office, OSTP, set up the transition team for the science component of DHS which then became the focus for homeland security activities while OSTP worked on broader interagency issues. In April 2005 we produced a report "Science and Technology: A Foundation for Homeland Security" that summarized S&T applications to homeland security during the three years following 9/11. The various NSTC committees subsequently produced a number of important reports dealing with homeland security S&T which can be found on OSTP's website.

Last October the Homeland Security Council released a second edition of the National Strategy for Homeland Security that listed examples of accomplishments and a commitment for the future:

"Over the past six years, focused partnerships with our Nation's vast and varied research enterprise, which includes businesses, research institutes, universities, government laboratories as well as Federal departments and agencies, have yielded significant capabilities that are helping us to better protect the lives and livelihoods of the American people. For instance, the focused application of the Nation's nuclear expertise has produced improved tools for countering the threat of nuclear terrorism against the Homeland. We also have applied biometric technologies and systems to enhance the security of travel documents and inhibit the movement of terrorists internationally and across our borders. The development and application of a variety of chemical, biological, radiological, and nuclear countermeasures are helping to prevent WMD terrorism and address the public health consequences that can stem from a range of natural and man-made disasters. We also have upgraded the technical capabilities of our first responders through the provision of decontamination equipment and protective gear; these advances serve not only to better protect our Nation's first responders but also to increase their ability to save the lives of others. Other improvements in the critical area of S&T include additional funding of independent analysis for homeland security S&T research and setting of standards for homeland security technology."

"We will continue to build upon this foundation of scientific and technological advancement and support funding for research and development to further strengthen the security of the Homeland. We will streamline processes and reduce red tape in order to enhance our partnerships with the country's national research enterprise, including within and among Federal departments and agencies. Specifically, we will continue to engage in disciplined dialogue about the threats we face, our strategies to counter them, and how S&T can bridge gaps in approaches or facilitate the more effective and efficient achievement of our objectives. Our collaborative S&T efforts should continue to explore existing or emerging technologies used for multiple or non-security specific purposes and develop rapid prototyping methods to adapt them to fill critical homeland security needs. Research in systems and operations science that will allow the integration of technology into functional capability is of equal importance. For example, a sound scientific knowledge base regarding health and medical response systems could improve our ability to manage the health consequences of disasters. By promoting the evolution of current technologies and fielding new, revolutionary capabilities, S&T will remain an essential and enduring enabler of our *Strategy*."

This is our National Strategy. It cannot be carried out without your help. Your presence here today is a reassuring sign that you and your colleagues are helping, and that the spirit of national cooperation that was ignited on September 11, 2001 is alive and well today. On behalf of the Administration, I extend my thanks for your support, and my congratulations on your successes.