

Statement of Dr. John Marburger, III
Director, Office of Science and Technology Policy
to the
United States House of Representatives
Committee on Science
Fiscal Year 2007 Federal R&D Budget
February 15, 2006

Chairman Boehlert, Ranking Minority Member Gordon, and Members of the Committee, I am pleased to appear before you once again to discuss the President's research and development (R&D) budget. This is my fifth year coming before you soon after the budget release to discuss the President's commitment to research and development. Once again, let me say that I greatly appreciate the effective working relationship between our office and your Committee, which I believe has resulted in good outcomes for the Nation's science and technology enterprise.

One of these outcomes has been recognition by this Administration of the critical nature of research as the foundation to our Nation's economic competitiveness. This is a message that the President has elevated through his American Competitiveness Initiative (ACI), which received prominent attention during his State of the Union Address, and in many of his speeches and remarks since then.

I will discuss the ACI in a moment, but first I want to provide some overall context for this year's budget.

President Bush has made it very clear that his top budget priority is to cut the deficit in half by 2009 by continuing the President's strong pro-growth economic policies and limiting the growth in Federal spending. The President's FY 2007 Budget does what is required to achieve this goal by reducing non-Department of Defense, non-Homeland Security discretionary spending by one-half of one percent. Of course, a budget is all about priorities. And while winning the war on terror and securing the homeland are the top two, investing in America's future competitiveness through research and development is also of critical importance to this Administration. The proof of this is a two percent increase in non-defense R&D within a declining overall non-defense budget. Under the FY 2007 Budget, R&D is 14.3 percent of non-defense discretionary budget authority, compared to 13.7 percent in 2001 when the President took office. At a record \$59 billion, non-defense R&D is up \$1.1 billion in this year's request.

MAXIMIZING THE EFFECTIVENESS OF RESEARCH FUNDING

Before I get into specifics about this year's budget, I want to draw your attention to the very serious impact of earmarking on the science budget. I do this with some trepidation here, but I believe the problem has escalated in recent years and threatens to harm the effectiveness of our nation's science if it is not addressed.

R&D earmarks have been increasing at a rate much faster than the growth in the overall R&D budget. The American Association for the Advancement of Science (AAAS), which uses a narrow definition of earmark, recently estimated that R&D earmarks total \$2.4 billion in 2006,

an increase of 13 percent over the Association's 2005 estimate. The total has increased by about 63% since 2003. Other organizations have estimated even higher levels of R&D earmarking. This serious problem is noted in the President's Budget: "Notwithstanding the recent progress in restraining discretionary spending, there is a widespread public perception that the number of earmarked spending items is excessive, and that too many of them are difficult to justify on the merits. The large number of earmarks, the lack of transparency, and the lack of a rigorous justification process make it difficult to assure taxpayers that their dollars are being spent wisely."

This administration supports awarding research funds based on merit review through a competitive process refereed by scientists, engineers, or other relevant experts. Such a system has the best prospects for ensuring that the most important research is supported. Research earmarks signal to potential investigators that there is an acceptable alternative to creating quality research proposals for merit-based consideration. Fortunately, Congress has not traditionally earmarked the budgets of the National Science Foundation or the National Institutes of Health. But major portions of other important science budgets are directed outside the agency advisory, planning, and evaluation processes. The problem is particularly serious within the Department of Defense, where the basic and applied research budgets have been subject to earmarks in excess of a billion dollars this year. The consequences of excessive earmarking go beyond underfunding the best possible science—it also impacts agency jobs and stability. For example, just last week the Department of Energy's Renewable Energy Laboratory (NREL) was forced to reduce its staff by 32 people to meet budget shortfalls caused by earmarked funding.

The existence of earmarks also affects the interpretation of the numbers that appear in the FY 2007 Budget. To maximize the impact of competitive, merit-based programs, the Administration often does not request funds for projects that had been earmarked the previous year. The existence of earmarks in the FY 2006 estimates and their absence in the FY 2007 request means that it can appear that the 2007 Budget requests less funding for programs, even in instances where relevant program content actually is increasing. The fact that a significant fraction of an agency's appropriated funds may be unavailable for the agency's mission needs deserves much wider attention. In the NIST budget, for example, the FY 2006 appropriated budget includes \$137 million in earmarks, many of which do not contribute to NIST's mission. This is a huge amount compared to NIST's total budget of about \$400M. The President is requesting a 24% increase for the NIST core budget, which amounts to \$104M, but since this is less than the earmarks the total appearing in the budget documents for NIST appears to be a *reduction* of 5.8% from the current year.

President Bush has called upon Congress to ensure that funds provided under the American Competitiveness Initiative are free of earmarks. As we discuss the importance of pursuing the best science to contribute to U.S. competitiveness, I hope the Congress will join with us to encourage competition for research funding by rejecting research earmarks in the FY 2007 appropriations process.

THE PRESIDENT'S FY 2007 R&D BUDGET

Given the overall environment of fiscal discipline, it is notable that President Bush once again proposes a record R&D budget -- over \$137 billion, \$3.4 billion more than this year's funding level. This represents an increase of more than 50 percent during this Administration. Funding proposed for basic research is \$28.2 billion in 2007, up from \$21.3 billion in 2001 - a 32 percent increase. While this year much focus is justifiably being placed on the President's words in his State of the Union address and the American Competitiveness Initiative, it is important to emphasize that the President's budgets have consistently supported research and development at levels commensurate with other major priorities throughout this Administration. Real five-year growth in the conduct of the R&D budget has exceeded 40 percent for each of the last two years, the first time five-year inflation adjusted R&D outlays have topped 40 percent since 1967 and the Apollo era.

AMERICAN COMPETITIVENESS INITIATIVE (ACI):

American economic strength and national security depend on our Nation's rich tradition of innovation. To strengthen our technological leadership in the world and build on the Administration's record of results, President Bush announced the American Competitiveness Initiative (ACI) in his State of the Union address. The ACI commits \$5.9 billion in FY 2007, and more than \$136 billion over 10 years, to increase investments in R&D, strengthen education, and encourage entrepreneurship and innovation.

The centerpiece of the American Competitiveness Initiative is the President's proposal to double, over ten years, priority basic programs emphasizing the physical sciences and engineering. Physical sciences research develops and advances knowledge and technologies that are used by scientists in nearly every other field. President Bush seeks to strengthen Federal investments in this area by providing three key, innovation-enabling research agencies with landmark initial investments in 2007: the National Science Foundation (NSF) - \$6 billion; the Department of Energy's Office of Science (DoE SC) - \$4.1 billion; and the Department of Commerce's National Institute of Standards and Technology (NIST) core programs - \$535 million. In addition to the collective doubling effort at these agencies, the President's Budget also prioritizes the similarly high-leverage basic and applied research at the Department of Defense in 2007 by requesting \$5.9 billion, \$442 million (eight percent) more than last year's request.

In 2007, the ACI proposes overall funding increases for NSF, DoE SC and NIST core of \$910 million, or 9.3 percent. To achieve ten-year doubling, overall annual increases for these agencies will average roughly seven percent. This amounts to a total of \$50 billion in new investments in high-leverage, innovation-enabling research that will underpin and complement shorter-term R&D performed by the private sector. To encourage private investment in innovation to be equally bold, President Bush continues to propose making the R&D tax credit permanent and supports modernizing it to make it even more effective.

While the President has prioritized and focused physical science funding in past budgets through such coordinated programs such as the Networking Information Technology Research and Development (NITRD) program, the National Nanotechnology Initiative (NNI) and others, the

ACI represents an elevation of the role of the physical sciences contributing to national competitiveness and a significant ramping up of funding over a sustained budget period. This is good news for the science community and is a recognition and endorsement of the importance of the physical sciences and math and science education. Members of Congress - including many on this committee - have helped to bring attention to these issues in our national discourse. Many other groups also deserve credit for highlighting the importance of investment in this area, including the President's Council of Advisors on Science and Technology (PCAST), the Council on Competitiveness and the National Academy of Sciences. It is a rare day when so many different organizations speak with one voice. I am optimistic that with your help and the support of the scientific community, we can provide funding for ACI with a minimum of research earmarks.

Networking Information Technology R&D (NITRD)

A key interagency priority related to ACI is the Networking and Information Technology R&D (NITRD). President Bush's 2007 Budget contains \$2.8 billion for NITRD and represents an increase of 9 percent over 2006 and a 57 percent increase since 2001. This brings total investment in this area over six years to more than \$13.7 billion. Tools and capabilities that result from research in networking and information technologies propel advances in nearly every area of science and technology, and enhance the Nation's competitiveness. Agencies participating in the NITRD program actively coordinate their research programs, making these programs far more productive than if they were independent.

High-end computing (HEC) continues to be a major focus of NITRD. DoE's Office of Science (DoE SC), NSF and NASA are all engaged in developing and/or operating leadership class computing systems as recommended in the 2004 *Federal Plan for High-End Computing*, with the goal of deploying petascale computing systems by the year 2010. The DoE SC 2007 investment of \$103 million in leadership class computing, coupled with NSF's investment of \$50 million in their Office of Cyber Infrastructure, will ensure that U.S. scientists and researchers have access to the most powerful computational resources in the world. Similarly, NASA continues to emphasize high-end computing within its NITRD portfolio through the operation of the *Project Columbia* supercomputer. All three agencies have pledged to make a portion of their leadership class computing systems available to other Federal users and the larger research community. A 9 percent increase in support for advanced networking research in 2007, primarily by NSF, DARPA and DoE SC, will ensure that large-scale networking technologies will keep pace with the rapid development of petascale computing systems, so that the results of petascale computations are immediately accessible for analysis.

The 2007 Budget also includes significant increases in long-term fundamental research in cyber security and information assurance, as recommended by the President's Information Technology Advisory Committee.

National Nanotechnology Initiative

The President's 2007 Budget also provides over \$1.2 billion for another key ACI interagency priority, the National Nanotechnology Initiative (NNI). The FY 2007 NNI request brings the

total investment since the NNI was established in 2001 to over \$6.5 billion and nearly triples the annual investment since the first year of the Initiative. This sustained investment is advancing our understanding of the unique phenomena and processes that occur at the nanometer scale and expedite the responsible use of this knowledge to achieve advances in medicine, manufacturing, high-performance materials, information technology, and energy and environmental technologies.

Critical, broad-ranging investments continue to be made by NSF, reflecting the agency's mission in supporting fundamental research across all disciplines of science and engineering, whereas the DoD investment emphasizes development of materials, devices, and systems that address the department's mission. DOE is in the process of completing five Nanoscale Science Research Centers that will make advanced research facilities and instrumentation, as well as technical expertise of DOE laboratory staff, available to researchers from across the scientific research community.

In addition to supporting the development of nanotechnology for beneficial uses, the NNI funds research on the human and environmental health implications of nanotechnology and methods for managing potential risks. The funding within the EPA will nearly double in 2007 and additional efforts in this area are funded by NSF, HHS, NIST, DoD, and USDA.

In response to recommendations by the President's Council of Advisors on Science and Technology (PCAST) in its May 2005 report assessing the NNI, the Departments of Labor and Education have become participants in the interagency group that manages the NNI, thereby facilitating progress toward the education and workforce goals of the Initiative.

Advanced Energy Initiative (AEI):

In his State of the Union address, President Bush outlined the Advanced Energy Initiative (AEI) in pursuit of a national goal of replacing more than 75 percent of U.S. oil imports from the Middle East by 2025. Since 2001, nearly \$10 billion has been invested by the Federal government to develop cleaner, cheaper and more reliable alternative energy sources. The AEI provides a 22 percent increase for certain clean-energy R&D programs at the Department of Energy (DOE). The Initiative will accelerate breakthroughs in two vital areas.

The Administration will work to diversify energy sources for American homes and businesses through: the President's Coal Research Initiative, with \$281 million in FY 2007 for development of clean coal technologies—nearly completing the President's \$2 billion commitment four years ahead of schedule; the FutureGen project, a key part of the Coal Research Initiative, with \$54 million in 2007 to support the partnership between government and the private sector to build a near-zero atmospheric emissions demonstration coal plant that captures the carbon dioxide it produces and stores it in deep geologic formations; the President's new \$148 million Solar America Initiative—an increase of \$65 million over FY 2006—to accelerate the development of semiconductor materials that convert sunlight directly to electricity; \$44 million for wind energy research—a \$5 million increase over the 2006 level; and clean and safe nuclear energy under the new \$250 million global nuclear energy partnership.

The President also proposes acceleration of the development of domestic, renewable alternatives to gasoline and diesel fuels through: \$150 million for the Biofuels Initiative—a \$59 million

increase over FY 2006—to help develop bio-based transportation fuels such as “cellulosic ethanol” from agricultural waste products, such as wood chips, stalks, or switch grass; \$31 million to speed the development of advanced battery technology to extend the range of hybrid vehicles and make possible “plug-in” hybrids and electric cars—a 27 percent increase over FY 2006; and \$289 million for the President’s Hydrogen Fuel Initiative.

Climate Change Science and Technology

The Administration is also carrying out two important climate change programs that represent a continuation of our commitment to understanding the climate system and developing technologies that will lead to cleaner, cheaper and more reliable alternative energy sources.

The U.S. Global Change Research Program, authorized by the Global Change Research Act of 1990, and the President’s Climate Change Research Initiative of 2001 are integrated in the comprehensive U.S. Climate Change Science Program (CCSP). The CCSP published the Strategic Plan for the U.S. Climate Science Program in 2003, describing a strategy for developing knowledge of climate variability and change and for application of this knowledge. The 2007 CCSP budget sustains the level enacted in 2006. The CCSP comprises over 13 agencies, but nearly 90 percent of the CCSP funding is distributed among NASA, NSF, NOAA and DOE. The Climate Change Research Initiative, a focused component of CCSP, is sustained at \$200 million in 2007.

The U.S. Climate Change Technology Program (CCTP) supports research, development, deployment, and voluntary programs to reduce greenhouse gas emissions via renewable energy, fossil energy and nuclear energy, and also to improve efficiency and carbon sequestration. Led by DOE, CCTP recently published a Vision and Framework for Strategy which outlines six strategic goals that will guide the CCTP strategy planning and interagency coordination. These goals are:

- Reduce Emissions for Energy End-Use and Infrastructure
- Reduce Emissions from Energy Supply
- Capture and Sequester Carbon Dioxide
- Reduce Emissions of Non-CO₂ Greenhouse Gases
- Improve Capabilities to Measure and Monitor GHG Emissions
- Bolster Basic Science Contributions to Technology Development

CCTP will work toward these goals by employing several core approaches that will stimulate participation by others and ensure progress in this important area. These approaches include strengthening climate change technology research and development by helping to coordinate and prioritize ongoing activities, creating new opportunities for partnerships and international collaboration, and providing technology policy recommendations.

AGENCY BUDGET HIGHLIGHTS

National Science Foundation (NSF):

Funds are requested to increase the budget for NSF by 7.9 percent to \$6.02 billion in FY 2007, 36 percent above 2001's \$4.4 billion level. Similar investments in the past have yielded important scientific discoveries, which boost economic growth and enhance Americans' quality of life.

The centerpiece of the American Competitiveness Initiative is President Bush's plan to double investment over a 10 year period in key Federal agencies that support basic research programs emphasizing in physical sciences and engineering. NSF is one of the three key agencies, as it is the primary source of support for university and academic research in the physical sciences, funding potentially transformative basic research in areas such as nanotechnology, advanced networking and information technology, physics, chemistry, material sciences, mathematics and engineering. The NSF funding derived from the ACI initiative is expected to support as many as 500 more research grants in 2007 and provide opportunities for upwards of 6,400 additional scientists, students, post-doctoral fellows and technicians to contribute to the innovation enterprise.

NSF leads two previously mentioned Administration priority research areas that promise to strengthen the Nation's economy: the National Nanotechnology Initiative (NNI) and the Networking and Information Technology R&D program (NITRD). NSF-funded nanotechnology research, proposed at \$373 million in FY 2007, an 8.4 percent increase over 2006 and 149 percent since 2001, has advanced our understanding of materials at the molecular level and has provided insights into how innovative mechanisms and tools can be built atom by atom. This emerging field holds promise for a broad range of developing technologies, including higher-performance materials, more efficient manufacturing processes, higher-capacity computer storage, and microscopic biomedical instruments and mechanisms. NSF's investments in NITRD, funded at \$904 million in 2007, up \$93 million over 2006 and 42 percent since 2001, support all major areas of basic information technology (IT) research. NSF also incorporates IT advances into its scientific and engineering applications, supports using computing and networking infrastructure for research, and contributes to IT-related education for scientists, engineers, and the IT workforce.

Continuing concerns about the vulnerability of computers, networks and information systems have prompted increased NSF investments in cyber security research, education and training. The NITRD investment includes \$35 million, an increase of \$10 million, for Cyber Trust, a cutting-edge research program to ensure that computers and networks underlying national infrastructures, as well as in homes and offices, can be relied upon to work even if faced with cyber attacks. Cyber Trust is part of a larger NSF Cybersecurity and Information Assurance research effort totaling \$97 million, an increase of 26 percent for FY 2007.

NSF will invest \$20 million in fundamental research on new technologies for sensors and sensor systems to improve detection of explosives, including Improvised Explosive Devices (IEDs).

The Foundation, in close cooperation with other agencies, will also address policy-relevant Science Metrics with a new research effort funded at \$6.8 million. The goal is to develop the data, tools and knowledge needed to establish an evidence-based 'science of science policy' as a means for informing policy makers about opportunities and to encourage innovation.

The FY 2007 Budget will continue NSF's efforts to prepare U.S. students for the science and engineering workforce. The new Discovery Research K-12 program will invest \$104 million to strengthen K-12 science, technology, engineering and mathematics education by supporting the development of effective science and math assessments, improving learning in K-12 education and introducing cutting edge discoveries into K-12 classrooms.

Department of Energy (DOE):

DOE is the lead agency for the President's Advanced Energy Initiative, highlighted above. The 2007 Budget proposes:

- \$148 million for the Solar America Initiative (an increase of \$65 million over FY06) to accelerate development of cost-effective photovoltaic materials;
- \$150 million for the Biofuels Initiative (a \$59 million increase over FY06), to help enable cellulosic ethanol to be practical and competitive within 6 years;
- \$31 million for development of high-energy, high-power batteries (a \$6.7 million increase over FY06) for hybrid-electric and "plug-in" hybrid vehicles (includes \$1.4 million for the Department of Transportation);
- \$289 million for the Hydrogen Fuel Initiative (an increase of \$53 million over FY06) to accelerate development of hydrogen fuel cells and affordable hydrogen-powered cars;
- \$44 million for wind energy research (a \$5 million increase over FY06) to help improve the efficiency and lower the costs of wind technologies for use in low-speed wind environments; and
- \$54 million for the FutureGen Initiative (an increase of \$36 million over FY06) to develop technologies for a coal gasification plant with near-zero atmospheric emissions.

The 2007 budget also proposes \$250 million for the Global Nuclear Energy Partnership (an increase of \$171 million over FY06), with the goals to demonstrate advanced fuel cycle technologies, to expand the domestic use of nuclear power, and to provide for safe, environmentally responsible global nuclear energy systems that support non-proliferation objectives.

The Office of Science in DOE (DOE-SC) is one of the three priority agencies in the President's American Competitiveness Initiative, supporting scientific studies and infrastructure for a wide range of R&D related to economically significant innovations. Within DOE-SC, the new funding from ACI is expected to support approximately 2,600 new researchers. Highlights of the FY07 budget proposal within DOE-SC include

- completion of the Center for Integrated Nanotechnology and the Center for Functional Nanomaterials;
- maximum capacity operations of the full suite of major x-ray light source and neutron research facilities;
- support for project engineering and design and R&D for the National Synchrotron Light Source II;
- upgrade of the leadership class computing facilities at Oak Ridge and Argonne;
- upgrade of the NERSC supercomputer facility at LBNL;

- full operations for the high-energy physics facilities at SLAC and Fermilab;
- increase in support for R&D towards a potential linear collider;
- robust operations for the nuclear physics facilities at TJNAF and RHIC;
- project engineering and design towards an accelerator upgrade for the facility at TJNAF;
- full funding for ITER;
- increase in operations over FY06 for the domestic fusion facilities.
- optimum operations of the BER facilities;
- increase in support for the GTL research;

National Institute of Standards and Technology (NIST):

National Institute of Standards and Technology (NIST) “core” programs receive \$535 million, an increase of 24 percent after earmarks are excluded from the enacted FY 2006 level, but a decrease of 5.8 percent relative to 2006 appropriated funds. In 2007, the American Competitiveness Initiative proposes overall funding increases for NIST to focus on meeting the Nation’s most urgent measurement science and standards to speed innovation and improve U.S. competitiveness. The FY 2007 request is a 55 percent increase over 2001. The Administration continues to insist on the highest priority for NIST lab research which is producing the scientific foundation for new technologies and providing essential technical support through its standards activities for industrial development and commercialization of new and emerging technologies, in such areas as advanced manufacturing, nanomanufacturing and nanometrology, homeland security, biosystems and health, and quantum computing.

To improve efficiency, the Budget also streamlines administrative layers within the Technology Administration (TA). The Budget reflects TA’s intent to evaluate its current operating practices and incorporate methods to improve the effectiveness of its operations.

Department of Defense (DoD):

DoD’s FY 2007 R&D budget is over \$74 billion. This level of funding will support the Department’s transforming commitment to reorient its capabilities and forces for greater agility, while enabling effective responses to asymmetric and uncertain challenges of future conflicts. These funds will also help address emergent threats through countermeasures to biological agents and novel technologies to detect and neutralize improvised explosive devices, mines, rockets and mortars.

The Science and Technology (S&T) component of the overall DoD R&D budget includes basic research (6.1), applied research (6.2), and advanced technology development (6.3). At \$11.1 billion in the FY 2007 Budget, DoD S&T exceeds last year’s request by \$442 million. From 2000 to 2006, Congressional adds to DoD S&T quadrupled. For 2006, there were over 1,300 of these adds (totaling \$3.1 billion) that must be identified and tracked down, advertised in a way specific to the Congressional mark, evaluated, negotiated and awarded, all separate from other potential awards. This means that those awards consume several times the staff and management resources of the average research award, and may not even target a military-specific need. A total of \$5.9 billion is provided for DoD basic and applied research. This is \$738 million less than the FY 2006 enacted level in this category, but \$561 million greater than the FY 2006

budget request. The struggle continues over Congressional earmarks and true DoD priorities. The Administration wishes to work with Congress to align Legislative and Executive priorities for funding the best scientific research possible to support our military forces.

Events of the last few years, including the Global War on Terror and Federal assistance to disasters in the US and around the world, have emphasized the importance of continuing our investment in next generation command, control and communication technologies and our ability to integrate with sensor platforms. Specific high potential S&T programs relating to these challenges have been increased in this budget by \$42.3 million (30 percent over 2006 enacted levels).

The DoD also understands the importance of continued investment in power and energy technologies. These efforts span a range of topics – from novel battery technologies to reduce the weight burden that soldiers must carry to power their critical equipment – to research on advanced propulsion technologies to enable revolutionary aerospace capabilities. These aerospace propulsion investments include an additional \$33 million (13 percent above 2006 enacted) in certain applied research and advanced technology development programs.

The S&T needs of the DoD are diverse and highly challenging, drawing upon the best minds in the Service labs, industry and academia. The development of the future workforce to support defense S&T remains an important challenge. We continue to confront issues relating to training the next generation, attracting the best candidates and rewarding top performers. Important programs such as the National Defense Science and Engineering Graduate (NDSEG) Fellowship program and the Science, Mathematics and Research for Transformation (SMART) Defense Scholarship program allow us to provide support and incentive to graduate and undergraduates to enter into DoD-relevant research careers. In fact, this budget virtually doubles the SMART program funding to \$19.5 million.

Department of Homeland Security (DHS):

The President's FY2007 request includes \$1 billion for the DHS Directorate of Science and Technology (including funding for research at TSA, Coast Guard and Secret Service) and \$536 million for the Domestic Nuclear Detection Office.

R&D at DHS S&T is focused on countering the threat of terrorism through improved threat awareness and infrastructure protection, as well as the development of countermeasures against chemical and biological agents, explosives, and other catastrophic threats. The President's FY 2007 budget request will provide \$86.5 million for R&D projects to address the threat from conventional explosives used in the form of improvised or vehicle born explosive devices, which remain one of the most accessible weapons available to terrorists to attack and cripple critical infrastructure, or to inflict severe casualties.

To continue to develop the tools necessary to prevent the terrorist use of a nuclear weapon against the United States, the President's FY 2007 Budget supports aggressive R&D and operational programs for nuclear defense with a 70 percent increase over FY 2006 funding to expand and support the capabilities of the Domestic Nuclear Detection Office (DNDO) DNDO

is working to develop and deploy a comprehensive system to detect and mitigate any attempt to import, assemble or transport a nuclear explosive device, fissile material or radiological material intended for illicit use within the United States.

The Administration is also eager to protect civilian and commercial aviation from the threat of man-portable air defense systems (MANPADS). The government has developed a multilayered defense against this threat consisting of risk reduction at major airports, counter proliferation efforts, and development of new countermeasures. In the 2007 Budget the President has requested \$6 million to complete DHS's counter-MANPADS program. The final phase of this program calls for actual live testing of the two systems under development.

National Aeronautics and Space Administration (NASA):

Two years ago, the President outlined a bold vision for sustained and affordable human and robotic exploration of space, with the Moon as a first step toward human missions to Mars and beyond. NASA instituted various organizational and programmatic steps to pursue this vision in the initial months after its release. Over the last year, NASA has continued working to redirect its existing human spaceflight programs—the Space Shuttle and International Space Station (ISS)—toward the goal of supporting the vision. Further, it has determined the launch and spacecraft architecture requirements necessary to implement the vision in earnest. An exciting array of space science missions is also being planned that will enhance our understanding of the solar system, the complex interaction between the Earth and space and its impact on our environment, and the origin, structure, evolution, and destiny of the universe.

In support of these goals, the President has requested \$16.8 billion in his 2007 budget for NASA, a 3.2 percent increase over the enacted 2006 level (excluding one-time supplementals), reflecting a strong commitment by the Administration to continued pursuit of the exploration vision. Of this amount, the budget provides \$5.33 billion for earth and space science activities 1.5 percent increase in FY 2007 over FY 2006 in order to continue advancing our knowledge of the Sun, Earth, planets and broader universe. Further, the budget requests \$3.98 billion for the new vehicles and technologies necessary to move forward on the exploration activities contained in the vision. Such activities include beginning development of the Crew Exploration Vehicle (which will eventually carry astronauts to the Moon), pursuing the lunar robotic exploration program, and researching other critical new technologies to support exploration. The budget also proposes \$6.23 billion for operating the Space Shuttle and continuing assembly and operations of the ISS. With regard to this activity, NASA has selected a configuration for the ISS that is consistent with the President's vision and meets the needs of our international partners, while employing the minimum number of Shuttle flights required to complete assembly of the ISS before Shuttle retirement in 2010. I should note here that, of necessity, the budget for NASA also makes some difficult decisions, canceling some projects with high technical risk and/or whose cost would have led to the certain delay or cancellation of other important programs.

In addition to supporting a broad range of space activities, the President has requested \$724 million for NASA's aeronautics program. NASA is restructuring its aeronautics activities in order to dedicate itself to the mastery and intellectual stewardship of the core competencies of aeronautics in all flight regimes, as well as ensuring that research is focused on appropriate areas

that are unique to NASA's capabilities. NASA will implement a completely replanned Airspace Systems Program in FY 2007 that aligns with key research requirements of the Next Generation Air Transportation System, and is working with the DoD to take a strategic, national asset view of aeronautics facilities such as wind tunnels.

NASA is also working with the DoD to take a strategic, national asset view of aeronautics facilities such as wind tunnels.

National Oceanic and Atmospheric Administration (NOAA):

For the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce, the FY 2007 Budget provides \$338 million for Oceanic and Atmospheric Research (OAR), an 8.6 percent reduction from 2006 enacted, due mostly to earmarks. This investment provides for ongoing research on climate, weather, air quality, and ocean processes. For NOAA programs that support the climate change science program, \$181 million is provided, and the National Sea Grant College Program is sustained at the 2006 level of \$55 million.

Environmental Protection Agency (EPA):

The FY 2007 request for science and technology funding at EPA is \$788 million, approximately 8 percent above the FY 2006 level, even before accounting for earmarks. This investment supports core Agency programs and strengthens high priority program areas, including maintaining and improving our nation's water collection and distribution systems, understanding the potential environmental impacts of nanotechnology, and expanding EPA's computational toxicology program. In addition, the FY 2007 request continues to support the Integrated Risk Information System (IRIS) and the Science to Achieve Results (STAR) program. (OMB version)

Department of Transportation (DOT):

The FY 2007 Budget request for highway-related research is \$562 million, which is \$38 million more than 2006. Highway research includes the Federal Highway Administration's transportation research and technology contract programs and National Highway Traffic Safety Administration research and analysis. These research programs include the investigation of ways to improve safety, reduce congestion, improve mobility, reduce lifecycle construction and maintenance costs, improve the durability and longevity of highway pavements and structures, enhance the cost-effectiveness of highway infrastructure investments, and minimize negative impacts on the natural and human environment.

The 2007 Budget request for Federal Aviation Administration (FAA) Research, Engineering, and Development is \$130 million, including \$88 million for continued research on aviation safety issues. The remaining research funding is for mobility and environmental issues, including \$18 million for the Joint Planning and Development Office for the advancement of the Next Generation Air Transportation System.

In addition, the 2007 Budget requests \$8.2 million for the Research and Innovative Technology Administration to coordinate and advance the pursuit of transportation research that cuts across all modes of transportation, such as hydrogen fuels and remote sensing. DOT research programs also support the National Nanotechnology Initiative, the U.S. Climate Change Technology Program, and the President's Hydrogen Fuel Initiative.

CONCLUSION

Making choices is difficult even when budgets are generous, but tight budgets have the virtue of focusing on priorities and strengthening program management. This year's R&D budget proposal maintains levels of funding that allow America to maintain its leadership position in science and move ahead in selected priority areas. The American Competitiveness Initiative and Advanced Energy Initiative properly focus R&D investments in areas that will increase our economic competitiveness decrease our dependence on foreign oil, and accelerate development of clean energy technologies.

America currently spends one and a half times as much on Federally funded research and development as Europe, and three times as much as Japan, the next largest investor. Our scientists collectively have the best laboratories in the world, the most extensive infrastructure supporting research, the greatest opportunities to pursue novel lines of investigation, and the most freedom to turn their discoveries into profitable ventures if they are inclined to do so.

We lead not only in science, but also in translating science to economically significant products that enhance the quality of life for all people.

This budget will sustain this leadership and maintain science and technology capabilities that are the envy of the world. I would be pleased to respond to questions.