

**AEROSPACE INDUSTRIES ASSOCIATION**



**INDUSTRY INPUT TO THE OSTP ON  
U.S. EARTH OBSERVATION POLICY**

**SEPTEMBER 2007**

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September 10, 2007

Gene Whitney, Ph.D.  
Office of Science and Technology Policy  
Executive Office of the President  
New Executive Office Building  
Washington, DC 20502

Dear Dr. Whitney,

Enclosed is the Aerospace Industries Association's input for the U.S. Earth observation policy currently being drafted at the Office of Science and Technology Policy.

As a follow-up to our conversation of June 19, 2007 the AIA Space Council formed a working group populated by our member companies well versed on the subject of Earth observation. Our input was then vetted through the entire Council for approval.

As you are aware, our industry is a key player in providing Earth observation tools and supporting infrastructure, so we hope you will find our response valuable.

Please do not hesitate to contact me if you have any questions or need clarification about our recommendations.

Sincerely,

A handwritten signature in black ink, appearing to read 'J.P. Stevens', is positioned above the typed name and title.

J.P. Stevens  
Vice President, Space Systems

Cc: Nancy Colleton, Institute for Global Environmental Strategies  
Teresa Fryberger, NASA Applied Sciences Program in the Earth Science  
Martha Maiden, NASA Earth Science Data Systems  
Helen Wood, NOAA Satellite and Information Services

## **ABOUT THE AEROSPACE INDUSTRIES ASSOCIATION**

The Aerospace Industries Association represents more than 100 regular and 180 associate member companies, and operates as the largest professional organization in the United States across three lines of business: space systems, national defense, and civil aviation. With a total workforce of 640,000 that manufactures high technology, transportation, and reconnaissance products for customers around the world, AIA also has extensive experience in promoting civil, commercial, and national security space programs to members of Congress and the general public. The AIA Space Council serves as a primary voice of the Aerospace Industry and represents AIA members as an authoritative source on space policy.

## **SUMMARY PAGE**

The AIA recognizes it is in the national and economic security interest of the United States to maintain an independent global Earth observation capacity (to provide measurements and monitoring determined to be critical to U.S. interests in global information and attendant infrastructure). AIA therefore recommends, in part:

- That the OSTP establish a National Advisory Board on Earth observations that will develop, iterate, evolve and optimize the architecture for U.S. Earth observation system of systems towards realizing the target vision. Members of this Board should include academia, industry, non-profits, and other members of the private sector.
- That the U.S. government utilizes, leverages, and benefits from private sector capabilities and capacities, to the maximum extent possible, to enable commercial delivery of observations, decisions support tools, and product generation.
- That the Integrated Earth Observation System (IEOS) architecture should be developed on the principles of the Federal Enterprise Architecture.
- That this policy should establish the authority (and requirement) for agencies to develop and comply with an annual crosscut budget through an Exhibit 300 mechanism to enable a view of all funding across all agencies associated with Earth observations to be identified.
- That there be an overall target architecture (that extends into the future 40 years) to direct both research and operations with the next generational operational science; and that these systems be based on advancements demonstrated by previous generation research and experience in current generation operational systems.

## **I. POLICY PURPOSE AND PRINCIPLES**

It is in the national and economic security interest of the United States to maintain an independent global Earth observation capacity (to provide measurements and monitoring determined to be critical to U.S. interests in global information and attendant infrastructure).

Given the documented experience and well established utility of Earth observations from sensors deployed on, over, and under the Earth's surface, the purpose of this policy is to optimize the U.S. benefits, and provision of, observations to support established and evolving research and operational science applications for society by minimizing systems effects on the data being collected. Additionally this policy is important so U.S. leadership can establish a global information infrastructure and be recognized as a major contributor to this infrastructure into the future.

AIA suggests this policy should recognize that there are increasingly major environmental, economic, and societal challenges that the U.S. and global economy will face during the rest of this century. Such issues include sustainability of soils, water, food, energy, air quality, health, and security. Furthermore the economic value and human impact of these issues relative to the value of science-based information from Earth observations should remain in the context of this policy.

The policy should include several broad dimensions in its framework:

1. Establish, evolve and optimize a target set of observations, based on how data is, and will be, used to support the user community and society, including those used systematically through Earth system models and decision support tools.
2. Establish, evolve and optimize operational views of an overall system (including an annual crosscut budget through an Exhibit 300 mechanism to enable a view of all funding across all agencies associated with Earth observations) and organize configuration with the capacity to deliver the target set of observations (with a time-phased view looking forward 40 years to include guidance for research for future generations of operational systems).
3. Establish, evolve, and optimize blueprints for implementing the components needed for an integrated approach to accomplish the discreet capabilities outlined in the operational views of the overall capability.

The results of these broad dimensions of the policy should highlight the existing and planned infrastructure, and identify the major gaps in knowledge, programs, governance structure, and capabilities that are required in formation of generation observational capabilities, and include direction and guidance regarding the role of private sector, U.S. government, and international participants in securing and maintaining these capabilities.

This policy should pertain to all agencies, civil and defense, and has linkages to other key U.S. policies (listed in Section II).

This policy should recognize that the U.S. has established the U.S. Group on Earth Observations (USGEO) within the Committee on Environment and Natural Resources (CENR) of the Office of Science and Technology Policy (OSTP). The U.S. should recognize and participate in the international Group on Earth Observations (GEO). This policy should recognize the principals, vision, goals, and objectives of the Strategic Plan for the U.S. Integrated Earth Observation System (IEOS) and the Global Earth Observation System of Systems (GEOSS) 10-Year Implementation Plan Reference Document.

A key tenant of this policy should be to utilize, leverage, and benefit from private sector capabilities and capacities (to the maximum extent possible) integrated with government capabilities and capacities.

### **Key Operating Principles**

Key operating principles of this policy should be to ensure the United States achieves and sustains timely satisfaction of critical Earth information needs through a set of operating principles:

1. **Mission Focused:** Continuously evolve existing and planned Earth observation systems to be optimally useful.
2. **User Oriented:** Responsive to meeting civilian and economic needs, using optimize heritage capacity and through continuous innovation, the United States should develop and field operational Earth observation systems.
3. **Science and Technology Enabled:** Applying research, technology, and credentialed science as the basis of ensuring rapid optimal capacity to place the right capabilities in the right place at the right time.
4. **Innovation Driven:** Maintain commitment to the innovation and discovery process to continue to provide the advantages of Earth observation systems and their applications for our national interests.

### **Benefits**

The policy should reflect the established set of societal benefits of an integrated global Earth observing system with associated models and decision support system as a way forward:

1. Improve Weather Forecasting
2. Reduce Loss of Life and Property from Disasters
3. Protect and Monitor Our Ocean Resource
4. Understand, Assess, Predict, Mitigate, and Adapt to Climate Variability and Change
5. Support Sustainable Agriculture and Forestry, and Combat Land Degradation
6. Understand the Effect of Environmental Factors on Human Health and Well-Being
7. Develop the Capacity to Make Ecological Forecasts
8. Protect and Monitor Water Resources
9. Monitor and Manage Energy Resources

## II. EXISTING POLICY AND LEGISLATION FOUNDATIONS FOR EARTH OBSERVATIONS

AIA believes that a number of existing policies or legislation should be considered in establishing a U.S. Earth observation policy. In considering policy objectives, we recommend that these be considered both in terms of support and/or impact.

A list of policies and legislation that should be considered (but are not limited to) is given in Appendix A.

## III. DEFINITIONS

AIA believes that important concepts will require concise definitions to provide clear U.S. Earth observation policy guidelines. Among these definitions should be:

**Analysis of Alternatives:** a systematic process of evaluating different methods or systems to achieve a desired result, outcome, or performance.

**Benchmark:** a systematic process of evaluating the relative performance of a system, algorithm, or other process by running a number of standard tests and trials against peer systems, algorithms, or other processes and includes rigorous documentation of the test processes and resulting findings.

**Concept of Operations (CONOPS):** a description of a particular method of deploying resources for a particular mission. (The terminology originated in the U.S. Air Force).

**Data Protocols & Standards:** a set of guidelines or rules for use in various circumstances related to technologies and industries establishing commonality among entities in a market or components in a system.

**Earth Observation:** measurements or monitoring of, around, or for Planet Earth. Methods include sensors, systems, and people.

**Federal Enterprise Architecture (FEA):** a structured systematic approach led by OMB to simplify business processes and systems that unify work across the agencies and within the lines of business of the federal government. The purpose is a more citizen-centered, customer-focused government that maximizes technology investments to better achieve mission outcomes.

**Global Earth Observation System of Systems (GEOSS):** a comprehensive, coordinated and sustained set of systems to provide measurements and monitoring to serve models and decision support tools around the world.

**Global Information Infrastructure:** common systems for acquiring, processing, archiving, delivering, exploiting, transferring, and communicating information around the world.

**Interoperable:** a systematic ability to connect separate components, data, and systems with minimal tailoring of the interfaces.

**Maturity of Measurements:** a scale indicating the level of acceptance of approaches to providing input to science.

**Research to Operations:** systematic and planned transition from results, findings, and benchmarks accomplished through research activities, into operational processes, procedures, and systems.

**System of Systems:** addressing large-scale inter-disciplinary problems involving multiple heterogeneous, distributed systems that are embedded in networks of systems operating at multiple levels and in multiple domains. (Definition as applied primarily to government projects).

**Technology Readiness Levels (TRL):** measure used to assess the maturity of evolving technologies (materials, components, devices, etc.) prior to incorporating that technology into a system or subsystem for deployment.

**U.S. Commercial Remote Sensing:** refers to privately owned and operated space systems licensed under the Land Remote Sensing Policy Act of 1992, their technology, components, products, data, services, and related information, as well as foreign systems whose products and services are sold commercially.

#### **IV. COORDINATION AND GOVERNANCE OF FEDERAL EARTH OBSERVATION ACTIVITIES**

The U.S. office of Earth Observations in the Office of Science and Technology Policy (OSTP) coordinates with the Office of Management and Budget (OMB) on plans, progress, and investments throughout the federal government related to Earth observations.

To establish a target vision for federal Earth observation activities, this policy should recognize the benefit of OSTP establishing a National Advisory Board on Earth observations with budget, staff, and authority to call upon national experts, including members of the private sector, to develop architecture for U.S. Earth observation system of systems. This architecture can be based on an assessment of essential measurement and monitoring capabilities needed to provide information to nationally recognized Earth system models including, but not limited to weather, climate, hazards, ecosystems, and decision support tools for applications of national priority (including, but not limited to policies related to, and management of, agriculture, air quality, aviation, coastal and ocean ecosystems, disasters, drought, energy, homeland security, public health, and water).

AIA sees benefit and advises that as part of the U.S. global information infrastructure, the Integrated Earth Observation System (IEOS) architecture, should be developed using the principles of the Federal Enterprise Architecture (FEA). (The Office of Information and Regulatory Affairs (OIRA) may be of use as a model for this architecture).

The national architecture for Earth observation system of systems should reflect and support input and benefits associated with USGEO, and its sister CENR committees, the Joint Planning Development Office (JPDO) for aviation systems, Civil Applications Committee (CAC), Office of the Federal Coordinator for Meteorology (OFCM), the Climate Change Science Program Office (CCSPO), the Climate Change Technology Program Office (CCTPO), and the Federal Geographic Data Committee (FGDC). Additionally, the DoD National Space Architects Office would benefit from the development and maintenance of the Earth observations architecture.

This policy should establish the authority and requirement for agencies to develop and comply with an annual crosscut budget through an Exhibit 300 mechanism.

The policy should recognize existing OMB circulars relating to Earth observations and geospatial information, with particular note of Circular A-16 that provides direction for federal agencies that produce, maintain or use spatial data either directly or indirectly in the fulfillment of their mission. This circular would establish a coordinated approach to electronically develop the National Spatial Data Infrastructure and establishes the Federal Geographic Data Committee (FGDC).

## **V. ROLES AND RESPONSIBILITIES**

### **White House Offices and Federal Agencies**

In the Office of Science and Technology Policy (OSTP), the U.S. office of Earth Observations coordinates plans and investments across the federal government related to Earth observations, and facilitate establishing, evolving, and optimizing the commonly recognized target vision for federal Earth observation activities.

AIA recommends the development of a National Advisory Board on Earth observations (herein “the Board”) that would develop, iterate, evolve and optimize the architecture for U.S. Earth observation system of systems towards realizing the target vision. Members of the Board should include:

- Academia
- Industry
- Non-profits
- Private Sector

The Board would draw upon expertise in the federal agencies and the private sector to conduct periodic assessments of essential measurement and monitoring capabilities needed to provide information to nationally recognized Earth system models (including, but not limited to weather, climate, hazards, ecosystems) and decision support tools for applications of national priority (including, but not limited to policies related to, and management of, agriculture, air quality, aviation, coastal and ocean ecosystems, disasters, drought, energy, homeland security, public health, and water.)

The Board would construct a high-level system of systems concept of operations (CONOPS) and conduct associated high-level Analysis of Alternatives (AoA) so as to optimize the balance

amongst the competing needs, such as fulfilling the information input needs of Earth system models, decision support tools for national applications, agency budgets and priorities, technology readiness, and maturity of measurements.

Because the Board would be managed through OSTP and because Earth observations are not solely the responsibility of any one agency, it is recommended that the Board includes a Federal Advisory Committee Act (FACA) management overview (or establishes an equivalent overview process).

Guiding principles for the Board would mean that it be:

1. Inclusive: Embrace cross-community, national perspectives on a target vision and on capabilities and capacities to achieve that target vision.
2. Responsive: Produce value-added targets (measurements, architectures, solutions) to enable timely decisions on investments.
3. Objective: To act as an “honest broker” with broad, analytically based perspectives.
4. Accountable: To serve the needs of the nation by taking into account the needs of the agencies, state, regional, local, tribal, and private sectors using OMB’s Program Assessment Rating Tool (PART).
5. Effective: Capitalize on agency/private sector activities and expertise; including use of existing investments in Earth observations that can be leveraged to meet additional target observations.

AIA also suggests interagency coordination include:

- Climate Change Science Program Office
- Climate Change Technology Program Office
- Federal Geographic Data Committee (FGDC)
- National Security Space Office (NSSO)
- U.S. Group on Earth Observations (U.S. GEO)

A list of federal agency roles related to U.S. Earth observations policy that should be considered (but are not limited to) is given in Appendix B.

### **State, Local, Regional, and Tribal Governments and Institutions**

AIA suggests policy recognize that non-federal agencies and programs both conduct research on, and apply, systems that acquire, transmit, process, archive, model, integrate, and distribute, data, information through decision support tools. Policy should be designed to benefit these entities and that they in turn are encouraged to make their data assessable for national access.

### **Private Sector**

AIA recommends that this policy should invite the private sector to participate in the optimization of U.S. GEO plans and architecture. The United States government will delineate the needs and responsibilities between private sector and federal government and shall seek private sector participation in identifying these needs and responsibilities.

The United States government should vigorously pursue commercial and private sector participation in Earth observation by encouraging and facilitating a viable U.S. commercial Earth observation industry that supports U.S. GEO goals, benefits the U.S. economy, and is

internationally competitive. Toward that end, United States government departments and agencies should:

1. Purchase commercially available U.S. products and services to the maximum extent possible, consistent with mission requirements and applicable law.
2. Provide a timely and responsive regulatory environment for licensing commercial systems.
3. Maintain, and periodically review, the competitiveness of U.S. industry.
4. Involve the U.S. private sector in the design and development of U.S. GEO capabilities to meet United States government needs.
5. Refrain from conducting activities with commercial applications that preclude, deter, or compete with U.S. industry, unless required by national security.
6. Encourage private sector and state and local government investment and participation in the development and improvement of industry U.S. GEO products or systems.

To enable U.S. GEO efforts to the fullest extent, government should capitalize on the U.S. private sector and offer new opportunities to open new commercial markets. To attract sustained private investment, government should create conditions that encourage private enterprise. In this regard, government should consider innovative solutions to meet market requirements where appropriate, implement meaningful incentives for private sector investment where market conditions warrant, and act to reduce market and regulatory risk where possible.

AIA believes it will be critical that the U.S. government provide risk sharing of third party liability for U.S. Earth observation providers. Indemnification will ensure private industry endeavors will not “bet the company.” Such a regime will also lower barriers encouraging new entrants into the field.

### **Defense and Intelligence Communities in Earth Observations**

Because both civil and defense agencies within the U.S. government shall have both overlapping and unique systems of data acquisition, AIA suggests this policy encourage the sharing and exchange of Earth observation data and to encourage all agencies to make their data assessable for national access to the maximum extent practicable.

## **VI. GUIDELINES FOR RESEARCH-TO-OPERATIONS TRANSITION**

AIA recognizes that the transition of research to operations in Earth observation systems has been and remains a paramount challenge. With the continued advancements enabled by research, there must be a systematic approach to transitioning the research results toward operational implementation.

AIA believes the formation of the Board will be a critical step in providing guidelines for this transition and that the Board should take a leadership role in defining and assisting research to operations transition.

This policy should use the overall target architecture (that extends into the future 40 years) as the basis of direction for both research and operations. Next generational operational science and

systems (and subsystems) should be based on advancements demonstrated by previous generation research and experience in current generation operational systems.

In order to have an effective progression from generation to generation, and from research to operations, the overall blueprint for Earth observation systems developed and championed by OSTP should cover the period out forty-five to fifty years (similar to the DoD approach). With a generation being nominally 15 years, this would include current generation operational capabilities (which may extend as far as 15 years into the future), next generation operational capability (which may be 15-30 years into the future), where current research capabilities are correlated with next generation plus one for operations (N+1) with prospects to be operational 30-45 years into the future, and initiation of plans for N+2 generation research capabilities.

In order to minimize the constraints placed on research agencies and their research communities, operational agencies would need the authorization and funding to support the transition of results, findings, and benchmarks into operational mode for the nation.

In order to facilitate the effective transition of research results, federal research agencies and funding recipients should rigorously benchmark their progress and publish competent benchmark reports at the conclusion of their projects. These benchmark reports would form the basis of development of operational systems, processes, and/or procedures with minimal re-development.

Operational agencies would publish criteria used in assessing research results, findings, and benchmarks.

## **VII. INTERNATIONAL COOPERATION IN EARTH OBSERVATIONS**

The AIA recognizes that there is a set of Earth observations that are essential to our national security. For these essential variables, the U.S. policy should ensure that there are high confidence U.S. and (when U.S. sources are not available) international sources of the critical data.

Given that many of the essential Earth observations (including the set of variables to be measured and monitored) that are important to the United States are also important to the international community, and that Earth observations around the world are important to the United States, international cooperation enables the optimization of observations to support established and evolving research and operational science applications for society.

The GEOSS 10-Year Implementation Plan Reference Document outlines a series of principles and approaches that should be adopted by this policy, including a focus on full and open sharing of civil Earth observation data.

The coordination of surface-based, airborne and spaceborne assets towards a comprehensive and sustained Earth observation system would be enabled by coordinating through existing international organizations, such as the Group on Earth Observations (GEO) and the Committee on Earth Observation Satellites (CEOS). This policy should endorse U.S. government participation in GEO, CEOS and other similar international coordination bodies; that systematically assess, evolve, and optimize architectures and configurations of Earth observation

capabilities that maximize provision and benefits of all measurements and monitoring of essential variables and minimize unnecessary overlap or duplication of capabilities.

Regarding data sharing and interoperability, this policy should support U.S. and international efforts to promote the coordinated development, use, sharing, and dissemination of geospatial data on an international basis. These activities would include developing international standards, protocols, and benchmarks for integrated system solutions; collaborations amongst the organizations (government and private sector) that focus on the effective transfer of information from Earth observation sources through data handling facilities into Earth system models; and, decision support tools for applications of national priority to maximize societal benefits.

This policy should also encourage commercial activities that support U.S. government participation in international programs and that optimize U.S. benefits through the provision (in accordance with U.S. policy and regulations) of observations systems, data, and support services for both research and operational science applications.

## **VIII. EARTH OBSERVATION TECHNICAL ARCHITECTURE**

The OSTP-led National Advisory Board on Earth observations will develop and evolve a commonly recognized target vision for federal Earth observation activities. The architecture for the U.S. Earth observation system of systems will be based on an assessment of essential measurement and monitoring capabilities needed to provide information to nationally recognized Earth system models (including, but not limited to weather, climate, hazards, and ecosystems) and decision support tools for applications of national priority (including, but not limited to policies related to, and management of, agriculture, air quality, aviation, coastal ecosystems, disasters, energy, homeland security, public health, and water). The architecture will include the data handling, processing, computing, and visualization facilities, and data interoperability standards and protocols to optimize the U.S. benefits and provision of observations to support established and evolving research and operational science applications for society.

The technical architecture should use the construct of the Federal Enterprise Architecture to capture relevant input from interested and affected parties. The architecture will use “best practices” for ensuring comprehensive, coordinated, and sustainable solutions. The private sector should be provided with opportunities to develop approaches, blueprints for solutions with cost, schedule, and performance estimates to accomplish the target architecture. The architecture will be developed to optimize the balance between legacy systems and programs, optimal service to the nation, allocated budgets, agency and program capacity, and the technology readiness and maturity of measurements and monitoring techniques.

AIA suggests the policy address the challenge that data from heritage sensors are in different formats and levels of metadata and data integrity. While future data should be evolved towards more interoperable data, provisions should be in place to bridge heritage data to future data whenever practicable.

## **IX. CAPACITY BUILDING FOR EARTH OBSERVATIONS**

AIA recommends the OSTP-led National Advisory Board on Earth observations should develop a detailed gap analysis of the overall capacity of the nation's Earth observation system and prioritize key programs and funding to increase capacity of this system. This assessment, along with recommendations, should be reported to OMB and OSTP annually.

## APPENDIX A

A list of current policies or legislation that should be considered in establishing a U.S. Earth observation policy should include but not be limited to:

### **National**

**Clean Air Act (1970):** sets goals and standards for the quality and purity of air in the United States. By law, it is periodically reviewed. A significant set of amendments in 1990 toughened air quality standards and placed new emphasis on market forces to control air pollution.

**Clean Water Act (1972):** establishes and maintains goals and standards for U.S. water quality and purity. It has been amended several times, most prominently in 1987 to increase controls on toxic pollutants, and in 1990, to more effectively address the hazard of oil spills.

**Coastal Zone Management Act (1972):** provides a partnership structure allowing states and the federal government to work together for the protection of U.S. coastal zones from environmentally harmful overdevelopment. The program provides federal funding to participating coastal states and territories for the implementation of measures that conserve coastal areas.

**Commercial Remote Sensing Policy (2003):** establishes guidance and implementation actions for commercial remote sensing space capabilities. This policy supersedes Presidential Decision Directive 23, U.S. Policy on Foreign Access to Remote Sensing Space Capabilities, dated 9 March 1994.

**Endangered Species Act (1973):** is designed to protect and recover endangered and threatened species of fish, wildlife and plants in the United States and beyond. The law works in part by protecting species habitats.

**Federal Land Policy and Management Act (1976):** provides for protection of the scenic, scientific, historic and ecologic values of federal lands and for public involvement in their management.

**Future Land Imaging Interagency Working Group (FLI-IWG) (2006):** is responsible for formulating a U.S. strategy for a National Land Imaging Program that would establish stable, long-term management and funding of Landsat-type data collection.

**Fisheries Conservation and Management Act (1976):** governs the management and control of U.S. marine fish populations, and is intended to maintain and restore healthy levels of fish stocks and prevent over harvesting.

**Marine Mammal Protection Act (1972):** seeks to protect whales, dolphins, sea lions, seals, manatees and other species of marine mammals, many of which remain threatened or endangered. The law requires wildlife agencies to review any activity -- for example, the use of underwater explosives or high-intensity active sonar -- that has the potential to "harass" or kill these animals in the wild. The law is our nation's leading instrument for the conservation of these species, and is an international model for such laws.

**National Aeronautics Policy (2006):** to advance U.S. technological leadership in aeronautics by fostering a vibrant and dynamic aeronautics community that includes government, industry, and academia.

**National Environmental Policy Act (1970):** creates environmental policies and goals for the country, and established the President's Council on Environmental Quality. It's most important feature is its requirement that federal agencies conduct thorough assessments of the environmental impacts of all major activities undertaken or funded by the federal government. Many states have enacted similar laws governing state activities.

**National Space Policy (2006):** establishes overarching national policy that governs the conduct of U.S. space activities.

**National Space Transportation Policy (2005):** establishes national policy, guidelines, and implementation actions for United States space transportation programs and activities to ensure the Nation's ability to maintain access to and use space for U.S. national and homeland security, and civil, scientific, and commercial purposes.

**Oil Pollution Act (1990):** enacted a year after the *Exxon Valdez* oil spill in Alaska's Prince William Sound, this law streamlines federal response to oil spills by requiring oil storage facilities and vessels to prepare spill-response plans and provide for their rapid implementation. The law also increases polluters' liability for cleanup costs and damage to natural resources and imposes measures -- including a phase out of single-hulled tankers -- designed to improve tanker safety and prevent spills.

**Presidential Decision Directive 2 (PDD2) (1994):** directs the DoD (Air Force) and DOC (through NOAA) to establish a converged national weather satellite program that would meet U.S. civil and national security requirements and fulfill international obligations.

**Resource Conservation and Recovery Act (1976):** seeks to prevent the creation of toxic waste dumps by setting standards for the management of hazardous waste. Like the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), this law also includes some provisions for cleanup of existing contaminated sites.

**U.S. Global Climate Change Policy (2002):** sets a near-term goal, a ten-year goal, of reducing the U.S. greenhouse gas intensity -- that is, the greenhouse gas emissions per dollar of GDP -- by 18 percent over the decade, over the ten-year period, 2002 to 2012.

## **International**

**Agenda 21 (1992):** international action plan on achieving global sustainability adopted at the UN Conference on Environment and Development.

**Convention on Biological Diversity (1993):** international agreement covering all ecosystems, species, and genetic resources. It links traditional conservation efforts to the economic goal of using biological resources sustainably.

**Convention to Combat Desertification (1994):** international agreement to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa.

**Intergovernmental Panel on Climate Change (1988):** established by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to assess scientific, technical, and socio-economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation.

**Montreal Protocol on Substances that Deplete the Ozone Layer (1989):** international agreement signed by more than 150 countries to limit the production of substances harmful to the stratospheric ozone layer, such as CFCs.

**United Nations Framework Convention on Climate Change (1994):** international agreement for dealing with climate change, adopted at the United Nations Conference on Environment and Development (the "Earth Summit") in Rio in 1992. (Note: The US has not ratified this convention.)

## APPENDIX B

A list of federal Agency roles related to U.S. Earth observations policy that should be considered (but are not limited to):

**Center for Disease Control (CDC):** conducts research and development of health-related science and systems that acquire, transmit, process, archive, model, integrate, and distribute, data, information, and understanding that both advances and uses Earth science; applies Earth science information through decision support tools.

**Climate Change Science Program (CCSP) Office:** created by the U.S. government in February, 2002 to address unresolved questions regarding global change and climate change by integrating federal research across thirteen federal agencies.

**Climate Change Technology Program (CCTP) Office:** created by the U.S. government in 2002 to address coordinate and integrate federal research on energy related activities associated with global change and climate change across federal agencies.

**Department of Defense (DoD):** uses all source data, information, and understanding of Earth science information to support military operations planning and execution and analyzing future risks to facilities and forces to optimize support to the warfighter and national security.

**Department of Energy (DOE):** conducts research and development of energy related systems that acquire, transmit, process, archive, model, integrate, and distribute, data, information, and understanding that both advances and uses Earth science; applies Earth science information through decision support tools.

**Department of State (DOS):** uses data, information, and understanding Earth science information through decision support tools.

**Department of Transportation (DOT):** conducts research and development of transportation-related science and systems that acquire, transmit, process, archive, model, integrate, and distribute, data, information, and understanding that both advances Earth science; applies Earth science information through decision support tools.

**Environmental Protection Agency (EPA):** conducts research and development of environment-related science and systems that acquire, transmit, process, archive, model, integrate, and distribute, data, information, and understanding that both advances and uses Earth science; applies Earth science information through decision support tools.

**Federal Aviation Administration (FAA):** regulates and oversees all aspects of civil aviation in the U.S. and includes regulating U.S. commercial space transportation, encouraging and developing new aviation technology, and developing and operating a system of air traffic control.

**Federal Geographic Data Committee (FGDC):** interagency committee that promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis. The FGDC administers a publishing effort known as the National Spatial Data Infrastructure (NSDI).

**National Air and Space Administration (NASA):** conducts research and development of aerospace systems that acquire, transmit, process, archive, model, integrate, and distribute, data, information and understanding that advances Earth science.

**National Oceanic and Atmospheric Administration (NOAA):** conducts operations of aerospace, surface, and subsurface systems that acquire, transmit, process, archive, model, integrate, and distribute data, information and understanding associated with oceans and atmosphere that both serves and uses Earth science; applies Earth science information through decision support tools.

**NASA/NOAA/OSTP:** an interagency office and function that effects the systematic transition of research results from NASA to operational implementation by NOAA.

**National Science Foundation (NSF):** conducts research and development of science and systems that acquire, transmit, process, archive, model, integrate, and distribute, data, information, and understanding that both advances and uses Earth science.

**National Security Space Office (NSSO):** formed by combining the National Security Space Architect (NSSA) and the National Security Space Integration (NSSI) office to provide enterprise-wide engineering and functional area integration.

**United States Agency for International Development (USAID):** conducts research and development of international aid-related science and systems that acquire, transmit, process, archive, model, integrate, and distribute, data, information, and understanding that both advances and uses Earth science; applies Earth science information through decision support tools.

**United States Department of Agriculture (USDA):** conducts research and development of agriculture-related science and systems that acquire, transmit, process, archive, model, integrate, and distribute, data, information, and understanding that both advances and uses Earth science; applies Earth science information through decision support tools.

**U.S. Group on Earth Observations:** established by the U.S. government in March 2005 to coordinate the capacity and benefits of integrating Earth observation systems across the federal agencies.

**United States Geological Survey (USGS):** conducts operations of aerospace, surface, and subsurface systems that acquire, transmit, process, archive, model, integrate, and distribute, data, information and understanding associated with land and terrestrial surfaces that both serves and uses Earth science; applies Earth science information through decision support tools.

## **APPENDIX C**

OSTP recommended subjects for AIA input:

- 1). Existing policy foundation for Earth observations.
- 2). Definitions.
- 3). Coordination and governance of Federal Earth Observation Activities.
- 4). Roles and responsibilities of federal agencies and White House offices.
- 5). Roles and responsibilities of state and local, regional, and tribal governments and institutions.
- 6). Roles and responsibilities of the Commercial/Industrial/Private sector /NGO's /Academia.
- 7). Guidelines for Research-to-Operations transition.
- 8). International cooperation in Earth observations.
- 9). Earth observations technical architecture.
- 10). The role of the defense and intelligence communities in Earth observations.
- 11). Capacity building for Earth observations.

## APPENDIX D

June 2007 letter to OMB requesting it extend guidelines for geospatial information:

June 4, 2007

Mr. David Anderson  
Principal Associate Director  
Natural Resources Program  
Office of Management and Budget  
725 17th Street, NW  
Washington, DC 20503

Mr. Michael Bopp  
Principal Associate Director  
General Government Programs  
Office of Management and Budget  
725 17th Street, NW  
Washington, DC 20503

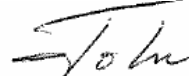
Dear Mr. Anderson and Mr. Bopp,

On behalf of the Aerospace Industries Association of America (AIA), which represents more than 275 companies that employ nearly 640,000 high-skilled engineering and manufacturing workers, we are writing to urge the Office of Management and Budget to require federal agencies, federal funded researchers, and contractors to electronically publish all relevant Earth observations and science data products in compliance with Federal Geographic Data Committee (FGDC), National Spatial Data Infrastructure (NSDI), Open Geospatial Consortium (OGC), and World Meteorological Organization (WMO) supported standards and procedures.

As the U.S. moves forward with its Integrated Earth Observation System (IEOS) in support of the Global Earth Observation System of Systems (GEOSS), the principle of full and open access to key environmental information requires compliance with policies and standards that optimize sharing of information collected from all U.S. observations systems; including those that are space borne, airborne, in the water, and on land. We recognize that the digital science data products derived from those observations are intended for use in very important applications that support decisions critical to national security. Effective integration of these observations into Earth System models and decision support tools require quality metadata.

AIA recognizes that the U.S. government agencies are working on the standards being developed and supported through FGDC, OGC, and WMO. We ask that OMB extend its guidelines for geospatial information to include Earth science observations and forecasts from Earth System models to optimize solutions for benefits to our society.

With warm personal regards,



John W. Douglass  
President & CEO  
Aerospace Industries Association

**Cc: Melissa Brandt, Examiner, NOAA**  
**Mike Hickey, Examiner, USGS**  
**Janet Irwin, Chief, Interior Branch**  
**Amy Kaminski, Examiner, NASA**  
**Randolf Lyon, Chief, Commerce Branch**  
**Paul Shawcross, Chief, Science and Space Programs**

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