**Letter of Agreement**
**Between the**
**National Aeronautics and Space Administration's Earth Science Enterprise**
**And the**
**Association of American State Geologists**

## I. PURPOSE

This Letter of Agreement (LOA) between the Association of American State Geologists (AASG) and the National Aeronautics and Space Administration (NASA) describes the support and cooperation that will be provided by both parties to advance mutual objectives through AASG's State Geological Surveys, and NASA's Office of Earth Science. The goal of this cooperative effort will be to align NASA's research and applications development activities in the geological and natural hazards sciences with the operational requirements of State Geologists, State Surveys and other attending agencies and to facilitate the adoption of resulting science and space technologies by AASG and other professional Geologists.

## II. MISSION AND ORGANIZATIONAL RESPONSIBILITIES

Both AASG and NASA agree to work together to the extent practicable, to support mutual interests and pursue common objectives. Each party retains its own identity in providing services and is responsible for establishing its own policies.

### A. Association of American State Geologists

The Association of American State Geologists (AASG) is an organization of the Chief Executives of the state geological surveys in 50 states and Puerto Rico.

Each state has a State Geological Survey, the first one being formed in 1823 in the state of North Carolina. The responsibilities of the various state surveys differ from state to state, depending upon the enabling legislation and the traditions under which the survey evolved. Almost all function as a basic earth resources information source for their state governments' executive, legislative, and judicial branches. Some have regulatory responsibilities for water, oil and gas, land reclamation, and related matters.

The objectives of AASG are:

- To advance the science and practical application of geology and related Earth sciences in the United States and its territories, commonwealths, and possessions;
- To improve the effectiveness of state geological surveys through interchange of ideas pertaining to their administrative organization, programs, and applications to economic change and other geologically related issues;
- To improve methods of assembling and disseminating data and information to mining, energy, agriculture, utility, construction, insurance, and banking industries; educational institutions; civic and professional organizations; legislators; governmental agencies; and the public; and
- To effectively coordinate activities with federal and state agencies working in related fields.

Since 1908, the Association has met regularly to discuss issues of common interest and to initiate united actions when warranted.

Major areas of programmatic interest to AASG include:

- GEOLOGIC MAPPING - AASG strongly supports geologic mapping as a vital part of essential government services for the good of the public. Geologic maps are the basis for a wide range of economic, environmental, and health and safety applications. AASG supports the National Cooperative Geologic Mapping Program (which contains the peer-reviewed, competitive STATEMAP component that has produced more than 1,900 geologic maps since 1992 and is matched dollar for dollar by States) and the peer-reviewed EDMAP component that helps train the mappers of the future and is matched by participating colleges and universities. AASG supports revision and maintenance of digital and analog 1:100,000- and 1-24,000-scale topographic quadrangle maps, which are needed as bases for geologic maps.

- ENERGY AND MINERAL RESOURCES - AASG strongly supports the investigation of domestic energy and mineral resources within the relevant federal agencies, including the Departments of Energy and Interior. Such programs are essential for sound energy, mineral, and environmental policy decisions as well as for national security. Whenever practical and cost effective, these investigations should be conducted cooperatively with, or contracted to, State Geological Surveys. Up-to-date, accurate geologic mapping is critical to government's responsibility regarding natural resources.

- HAZARD MITIGATION - AASG advocates the use of geologic information, including hazard maps, in the mitigation of natural disasters, such as landslides, earthquakes, volcanic eruptions, and floods. This mitigation should occur before a natural disaster, because prediction, planning, and avoidance can significantly reduce risk and cost. Geologic maps are the basis for most natural hazard maps, which are needed to effectively reduce risks to people and property.

- CONTINENTAL MARGINS - The Continental Margins Program of the Minerals Management Service (MMS) provides fundamental scientific information that supports the federal responsibility to manage oil, gas, and marine mineral resources located on the Outer Continental Shelf. AASG endorses continuation of the Continental Margins Program activities as a cost-effective enterprise that contributes to the systematic evaluation and environmentally acceptable utilization of our Nation's marine energy and mineral resources.

- WATER RESOURCES - AASG supports a cost-efficient federal stream-gauging program and the development of a baseline national network of steam gages that measure the "pulse" of the Nation's surface-water resources.

## B. National Aeronautics and Space Administration

NASA is a civilian Federal research agency mandated to advance science and technology, particularly through aeronautics, space, and related research. It is committed to extending and applying the unique knowledge and benefits that flow from this research.

NASA programs advance and communicate scientific knowledge and understanding of the Earth, the solar system, and the universe, and use the environment of space for research; explore, use, and enable the development of space for human enterprise; and research, develop, verify, and transfer advanced aeronautics, space, and related technologies.

OFFICE OF EARTH SCIENCE - NASA's Office of Earth Science (OES) is dedicated to understanding the total Earth system and the effects of natural and human-induced changes on the global environment. Using the unique perspectives available from space, from within the atmosphere, and from the ground, NASA is observing, documenting, assessing and modeling environmental processes. Its current emphases are on biology and biochemistry of ecosystems and the global carbon cycle, climate variability and prediction, global water and energy cycle, atmospheric chemistry, and solid earth science. In addition, NASA OES is extending the use of science and technology through the development and demonstration of applications in

the areas of disaster management, environmental quality, natural resources, and community development and infrastructure. OES satellite data, complemented by aircraft and ground data, are enabling us to better measure, understand and model environmental changes, to determine how human activities have contributed to these changes, and to understand the consequences of such changes.

SOLID EARTH AND NATURAL HAZARDS PROGRAMS – The NASA Office of Earth Science Solid Earth and Natural Hazards programs conduct scientific and technological research for the understanding of the dynamics of the solid earth, its interactions with other Earth systems, and the processes which lead to natural hazards in order to develop better assessments of the vulnerability to natural disasters and mitigation of their effects. The program is international in scope and encompasses basic research, applied research, technology transfer, and works closely with customers including the scientific community, disaster managers and practitioners, and state and local governments. The focus of the program is on the development and utilization of NASA-unique technology and techniques (spaceborne and airborne) that includes optical and radar remote sensing (visible, near IR, short wavelength IR, thermal IR, microwave, synthetic aperture radar and interferometric SAR), space geodetic techniques (GPS, GPS arrays, VLBI, SLR), geopotential (gravity, magnetics), and encompasses data/information system and visualizations efforts.

Three basic elements comprise the Solid Earth and Natural Hazards programs:

- GEOLOGY PROGRAM - which is focused scientifically on the basic understanding of interaction of processes that shape the upper crust and land surface, and technologically on developing and refining remote sensing technologies and techniques in the optical (visible through thermal wavelengths) and Microwave (multiparameter Synthetic Aperture Radar (SAR) and SAR interferometry) region of the electromagnetic spectrum;

- GEODYNAMICS PROGRAM - which is focused scientifically on a basic understanding of the dynamic processes within the Earth, addressable by geodetic techniques, and the interaction of these and other global processes in the atmosphere, oceans, etc., and technologically, on the development of space geodetic techniques including Global Positioning System (GPS), GPS arrays, Satellite Laser Ranging (SLR), and Very Long Baseline Interferometry (VLBI); and,

- NATURAL HAZARDS PROGRAM - which is focused in particular on applications research for disaster management, and technologically on bringing research results and technology to an applied end.

## III. SCOPE AND RESPONSIBILITIES:

AASG'S responsibility under this LOA will be to define operational needs and to develop an implementation strategy for the incorporation of NASA science and technology by the State geologic surveys. NASA's responsibility will be to conduct applied research and develop research results into operational capabilities, and transfer that knowledge and technology to the geologic community through the State geologic surveys. Specifically, the topics that AASG and NASA will pursue under this LOA are:

- Development and maintenance of a standard "menu" of NASA data and information products that would be useful to the various states. The AASG & NASA will collectively decide what those products might be.
  Standard NASA products could be provided routinely and/or specifically for the map areas proposed by each state in their annual StateMap proposals. The products would then become an additional data layer for the StateMap project area. NASA and the States will explore the existing NASA archives for both satellite and airborne data sets.

- Access to technical advice from NASA's DAACs or NASA-sponsored researchers by the States that may require expertise in processing or interpreting remote sensing products to facilitate useful interpretation of the NASA products.
  The need for help may vary from NASA performing turn-key image analysis and interpretation - to ad hoc guidance of state personnel in performing their own analysis and interpretation.

- Enabling AASG to become more intimately involved with NASA research and development projects by electing appropriate representative(s) to act as adjunct science team members that helps establish mission tasks for satellite and airborne systems, such as ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer), if appropriate.

- Utilization of appropriate State Geologic Surveys as outreach centers and outlets for NASA science and data products.
  Additionally, or alternatively, outreach activity could also include State Surveys being the locations of knowledgeable hosts for Internet access to NASA products. The concept is that NASA could develop a sophisticated web site for the preview and ordering of products on a cost-recovery basis. NASA would train a State Survey member in each state in the intelligent use of the web site to guide local customers in selecting the correct products and

in placing the order over the Internet. This conceptual system seems to offer real potential for increasing NASA's outreach and in bringing new customers to both NASA and State Surveys without creating a lot of new overhead expenses.

The parties will establish an ad hoc steering committee to advise the overall effort on short and long term tasks and objectives, track progress, and seek funding and resources and opportunities as appropriate. Specific tasks will be described in one- or two-page task descriptions and circulated for approval to the points of contact of this agreement. Once approved, the task statements will be appended to this agreement.

## IV. GENERAL PROVISIONS AND AUTHORITIES

Nothing herein is intended to conflict with current AASG or NASA authorities or directives. If any terms of this LOA are inconsistent with existing authorities or directives of either of the organizations entering into this LOA, those portions of this LOA that are determined to be inconsistent shall be invalid; the remaining terms and conditions shall remain in full force and effect. At the first opportunity for review of the LOA, all necessary changes will be accomplished by either amending this LOA or by entering into a new LOA, whichever is deemed most expedient to the interest of both parties.

The parties are entering this LOA under their respective authorities:

For AASG: AASG Constitution, Article V, Executive Committee, Covenants, and Section 1. (Amended 8 June 1999).

For NASA: 42 U.S.C. 2473(c), Section 203(c) of the National Aeronautics and Space Act of 1958, as amended.

Should any funds be transferred between organizations under this LOA or an amendment to this LOA, such funds will be transferred pursuant to a determination that: the necessary funds are available; the transaction is in the best interests of the Government; that services obtained under this agreement cannot be provided as conveniently or inexpensively by a commercial enterprise; and the other Agency has determined that it is able to administer and provide the services under this agreement.

All activities under or pursuant to this LOA are subject to the availability of appropriated funds and no provision herein shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. 1341. This LOA is not a funding document and does not represent the obligation or transfer of funds.

## V. PRINCIPAL POINTS OF CONTACT:

For AASG:
President
Association of American State Geologists

For NASA:
Program Manager
Natural Hazard Program
Applications Division
Office of Earth Science

## VI. AMMENDMENT AND TERMINATION:

This LOA shall be reviewed annually, and it may be amended at any time by the consent of both parties. Addition of projects described in whole as a signed Addendum may be added at any time, as appropriate and practical, by mutual consent. The LOA may be terminated by either of the parties by a 60-day written notice to the other party.

## VII. EFFECTIVE DATE:

This LOA shall become effective upon the last date of approval specified below:

Approved:

Ghassem R. Asrar
Associate Administrator
Office of Earth Science
NASA

4 January 2001
Date:

Approved:

Jonathan G. Price
President
Association of American
State Geologists

11 January 2001
Date: