

GAO

Report to the Chairman, Committee on  
Science, Space, and Technology, House of  
Representatives

June 1992

EOS DATA POLICY

Questions Remain  
About U.S. Commercial  
Access



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**Information Management and  
Technology Division**

B-248072

June 25, 1992

The Honorable George E. Brown, Jr.  
Chairman, Committee on Science,  
Space, and Technology  
House of Representatives

Dear Mr. Chairman:

In November 1990, you asked us to address several aspects of the National Aeronautics and Space Administration's (NASA) planned Earth Observing System (EOS). This report focuses on NASA policies and international principles governing U.S. commercial access to information collected by the multibillion dollar EOS satellites. Details of our objectives, scope, and methodology are provided in appendix I.

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**Results in Brief**

Although EOS is primarily a scientific program aimed at furthering global climate change research, data from several planned EOS instruments could have significant value to commercial users involved in activities such as oil and mineral exploration, forest management, and geological mapping. It is unclear, however, whether NASA's current two-tiered data access policy of providing data at the cost of reproduction to scientists and at a market-based cost to commercial users will make it difficult for U.S. companies to obtain access to that data. While NASA has made a general commitment to provide EOS data commercially, it has neither formally defined its plans for doing so nor considered commercial needs in early planning for the information system that will store EOS data. Other factors contribute to concerns about commercial access. For example, the viability of using a private sector vendor to distribute EOS data—as provided by law—is uncertain, and NASA lacks backup provisions should the distribution process fail.

International principles governing the exchange of data among international users have not been formally approved. Draft principles, if approved by the agencies participating in the International Coordination Working Group, would lay a foundation for fair and equitable access to data by all parties. If practiced, it is unlikely that Japanese and European participants would release data collected at U.S. expense sooner in those countries than in the United States.

EOS program officials recognize that some data will likely have commercial value but believe the highest priority for the program is science and global

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climate change research rather than commercial applications. NASA does not plan to begin addressing commercial interests until later this decade. While science should have a high priority, we believe the agency could increase its emphasis on commercial access by seeking industry input now to verify which instruments have potential commercial value and how best to make data available from these instruments.

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## Background

EOS is the centerpiece of NASA's Mission to Planet Earth program and its main contribution to the international effort to study the earth on a global scale. The goal of EOS is to create a unified scientific observing system that will permit studies of the earth's atmosphere, biosphere, oceans, land surfaces, and polar regions. Space platforms carrying numerous scientific instruments, sponsored primarily by the United States, Europe, and Japan, will collect earth observations for about 15 years beginning in 1998 in order to better understand various earth processes and how they may affect the environment.<sup>1</sup>

Massive volumes of data will be generated by the EOS instruments, and a large number of users will access the data. Data volume expected from the first EOS satellite will match the text volume of the Library of Congress about every 12 days. NASA estimates that there are some 10,000 potential scientific (research) users of EOS data worldwide. The EOS Data and Information System (EOSDIS) will store, process, and distribute data from EOS at an estimated cost of \$3 billion through fiscal year 2000. These costs will be funded by the U.S. government. According to NASA, EOSDIS will also include previously archived data, new measurements from other non-EOS spacecraft, ground-based measurements, and contributions from the scientific user community.

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## Landsat Act Governs Commercial Access

The Land Remote Sensing (Landsat) Act<sup>2</sup> allows researchers and commercial users the use of federally collected remote-sensing data, such as that produced by EOS. Consistent with the act, NASA plans a two-tiered access system for research, operational, and environmental monitoring users, and for commercial users. Under NASA's draft policy, both foreign and domestic research users have access to data at no more than the

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<sup>1</sup>A listing of the agencies participating in this international effort is included as part of appendix III.

<sup>2</sup>Land Remote Sensing Commercialization Act of 1984, 15 U.S.C. 4201.

marginal cost of filling the user request if they agree, among other things, to publish their research findings and not use the data for commercial purposes. Users at agencies providing operational or environmental monitoring public services, such as weather forecasting by the National Oceanic and Atmospheric Administration (NOAA), are also given data access at the marginal cost.

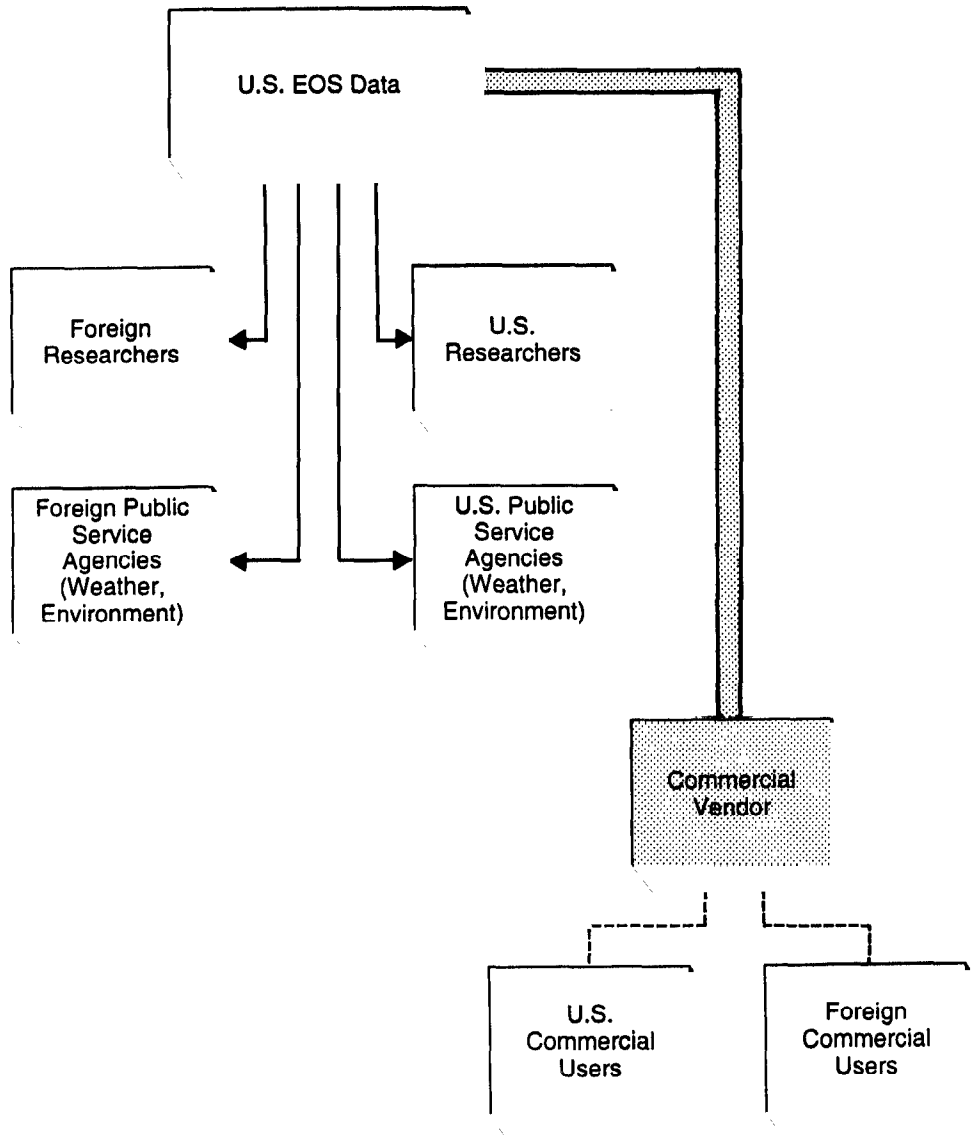
Commercial access to U.S. EOS data, on the other hand, is to be provided under current Landsat Act provisions through a competitively selected vendor.<sup>3</sup> The data are to be sold to the vendor “en bloc”—in a single mass—rather than in bits and pieces. This procedure is designed, in part, to prevent government competition with the private sector by restricting the government from selling data at a price below a private producer’s cost. The entity that is awarded rights to the data serves as the vendor for commercial users. Recently, legislation has been introduced to revise the Landsat Act, including the provisions on commercial access to federal remote sensing data, such as EOS.<sup>4</sup> Should NASA be required to use a commercial vendor to distribute data, it plans to follow the process highlighted in figure 1.1. Appendix II provides more details on NASA’s EOS user groups.

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<sup>3</sup>Consistent with draft international data exchange principles, foreign countries will be responsible for establishing data distribution policies for data from their instruments.

<sup>4</sup>H.R. 3614, October 23, 1991, proposes an amendment to the Land Remote Sensing Commercialization Act of 1984. The proposed revisions would, among other things, give NASA greater flexibility in formulating commercial access policy. For example, the proposed provisions do not include the competitive bid process or en bloc sale requirement. A Senate bill (S. 2297, Feb. 27, 1992) would also revise the act.

Figure 1.1: NASA Distribution Plans for U.S. EOS Data



———— Data available at no more than the marginal cost of filling the user's request.  
----- Data available at market-based price.

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## Data From EOS Instruments Could Have Commercial Value

While much of the data collected by EOS instruments will have only research or operational applications, some data may also have valuable commercial applications. Both a NASA Center for Commercial Development of Space study and an industry trade group's preliminary assessment identified three of the originally planned EOS instruments—the High-Resolution Imaging Spectrometer (HIRIS), the Advanced Space-Borne Thermal Emission and Reflection Radiometer (ASTER), and the Synthetic Aperture Radar (SAR)—as having commercial potential.

Figures 1.2 and 1.3 depict current commercial use of remote sensing data. Figure 1.2 depicts how Landsat remote sensing data are used to identify certain minerals and clays known to coincide with gold ore deposits in the area of Round Mountain, Nevada. Digital images were combined with other data to indicate areas, shown in red, with a high gold deposit probability.

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**Figure 1.2: Looking for Gold From Space**

Source: Terra-Mar Resource Information Services, Inc.

Figure 1.3 shows how remote sensing data analyzed by Resource Planning Institute, Inc. were used to identify concentrations of oil for targeting cleanup efforts in the Persian Gulf.



Figure 1.3: Oil Spill Cleanup



Source: RPI

HIRIS and ASTER may be useful for oil and mineral exploration and forest management, while SAR could have commercial applications for soil, vegetation, and moisture measurements and for geological mapping. Under current international data exchange principles, NASA would establish the commercial data distribution process for HIRIS and SAR, while Japan is responsible for its ASTER instrument.

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However, in September 1991, the EOS Engineering Review Committee issued a report recommending that NASA (1) reconfigure the EOS platforms onto smaller satellite clusters, and (2) set priorities among the EOS science objectives, including the order in which data are collected. In acting on these recommendations, NASA assigned a lower priority to some of the instruments with commercial potential, which may result in postponing or eliminating the collection of some data.

For example, of the three instruments with high commercial potential, only ASTER has been confirmed for early flight under the newly reconfigured EOS program. ASTER was originally designed with industry involvement to meet natural resource exploration and application requirements. Plans for ASTER were later broadened to support global change research, including that of U.S. scientists.

HIRIS, a U.S. instrument once scheduled for early flight, has been postponed until 2003. NASA plans, however, to review and finalize its decisions on HIRIS in 1994. In addition, SAR, another U.S. instrument, is no longer considered by NASA to be part of the EOS mission. Its flight will require a dedicated platform, new start approval from the Congress, and adequate funding from an international or domestic partner.

A number of other U.S. instruments may also have commercial value, but their application potential is not as clear. For example, the Moderate Resolution Imaging Spectrometer could provide information similar to that of HIRIS, but with a lower resolution image. Another instrument, the Stick Scatterometer, could be important for operational forecasting systems for the shipping and airline industries, if rapid data access is provided.

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## Commercial Access Is Not Assured

Although some EOS data could be valuable for commercial users, commercial access to the data is not assured under current NASA plans. EOS program officials told us that NASA's foremost priority for the mission is science and that commercial access procedures will be in place prior to launch of the first platform in 1998. Although NASA has generally stated that the data will be made available to commercial users, NASA has neither involved industry users in developing EOSDIS nor defined key access provisions such as what and when data will be made available. Also, previous NASA experience with distributing remote sensing data raises some concerns about the viability of a commercial vendor, and the ability to monitor and enforce NASA's plans is questionable. Lastly, no backup provisions exist in the event that vendor-provided access is not possible.

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### Commercial Users Were Not Represented in Early EOSDIS Planning

The importance of integrating scientific and commercial needs was emphasized by a NASA-established group in response to fiscal year 1984 congressional direction to develop an applications program.<sup>5</sup> The group envisioned that the EOS data system would satisfy a variety of needs and suggested that NASA involve industry users in developing the system. However, the panel chartered to review EOSDIS and how it is developed—the EOSDIS Advisory Panel—represents only scientists.

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### NASA Has Made Only Limited Plans for Commercial Access of Data

While the Landsat Act provides that federal experimental remote-sensing data gathered by U.S. spacecraft can be made available for commercial purposes, NASA's written commitment to provide commercial access is vague. For example, the 1991 EOS Reference Handbook says that "Procedures will be in place for commercial distribution . . .," but does not specify when or how. EOS program officials told us their goal was to have a commercial vendor on-board one year prior to the launch of the first EOS platform; however, no approved plan or strategy exists describing how NASA will accomplish this goal.

On the basis of past experience, industry is concerned about NASA's lack of commitment to making EOS data commercially available. One oil company spokesman stated that data from the 1984 Shuttle Imaging Radar-B (SIR-B) mission could be used for oil exploration, but that nearly 8 years later, NASA has not solicited vendor bids to distribute it, despite industry requests for the data. The NASA program official for SIR-B said that the agency postponed commercialization of the data even though the Landsat Act allows for such access. He stated that, at the time, the agency believed the act's provisions might be changed. Also, funding was not available for copying all data tapes, an initial step in the commercialization process. This funding was requested but not approved for 1993. According to the official, the agency still plans to make SIR-B commercially available, but after the proposed changes to the Landsat act are resolved.

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### Key Access Provisions Are Not Defined

Industry concerns about NASA's lack of planning for commercial access are reinforced by the agency's lack of definitions for two key access provisions. First, NASA policy has not described how the agency will interpret what is meant by the Landsat Act term for selling data "en bloc" to potential EOS vendors. The legislation itself does not define the term and it is therefore open to interpretation. NASA could define a bloc as data from

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<sup>5</sup>Contributors to this effort included representatives from industry, academia, and NASA.

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one instrument, one platform, or the entire mission. Only once before has NASA specifically defined the term. At that time, en bloc was defined for the Large Format Camera as all the data accumulated from the camera project. According to a NASA official, that same definition is not being considered for EOS.

Second, the time frame for access has not been defined. Data timeliness is crucial for commercial users such as fisheries and for certain agricultural predictors. According to an industry spokesman, a commercial "port" or gateway into the EOSDIS data system—similar to the access points being developed for EOS researchers—would meet commercial needs. EOS program officials stated that such a port is conceivable, and that timeliness could be a requirement in the commercial vendor's contract, as it is for researchers.

NASA does not plan to clarify these two key provisions in the near future. A program official stated that if the Landsat Act provisions remain unchanged, the agency will wait for bids from commercial vendors before specifying what data a vendor will provide. Although all EOS data will be offered in the competitive bid process, the data actually made available will depend on the vendor selected and the data the vendor proposes to provide. The agency will also rely on vendor proposals in determining how quickly the data are made available to commercial users and whether a commercial port is established.

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### Commercial Vendor Viability Is Uncertain

Another problem under the NASA plan is the basic uncertainty regarding whether companies will be willing to distribute EOS data, since vendor profitability is questionable. For commercial users, vendor viability is important because, without a vendor, commercial access to EOS may not be available.

One uncertainty affecting a potential vendor's profits is the possibility that the commercial market for EOS data could be undermined by users obtaining the data through unauthorized research avenues, rather than through the vendor. This type of research "leakage" was a problem in securing and supporting a vendor for high resolution photos from the Large Format Camera flown on a 1984 flight of the shuttle. All but 1 of 15 companies initially interested in distributing the camera data dropped out of the competition. This was partially due to concerns that the data were also available to researchers at a nominal cost through the federal Earth Resources Observation System data center. An official of the vendor

company said this concern was justified because leaks from the federal center to unauthorized users was a limiting factor in the company's ability to market the data. He said the federal center's process for verifying bonafide researchers was easily circumvented.

Similarly, the EOS program will also distribute data to researchers at low cost. At least seven major data centers and several affiliated data centers will serve researchers, further increasing the opportunity for leaks. Also, as with the camera data, researchers will sign agreements prohibiting commercial use of the data. Currently, EOS principal investigators receive a copy of the EOS data policy and are asked to confirm their commitment to the policy in writing. Such written confirmation may be in the form of a letter, handwritten note, or message by electronic mail. According to NASA, researchers will be asked to sign a more specific agreement before receiving any data, but details of the agreement are not complete.

To prevent leaks and to screen researchers who are more likely to be interested in the commercial applications of the data, NASA plans little beyond requesting their agreement not to violate the rules. For example, a NASA official said EOS data would not be withheld from a major oil or mineral company employee with a credible research proposal. Another NASA official said the agency does not plan a system for monitoring or detecting possible violations. If leaks are brought to the attention of NASA, there is no legal mechanism for enforcement in that no statutes have been broken. However, if violations occur, NASA can cut funding for agency-sponsored researchers, terminate the violator's EOS access account, or reclassify a researcher as a commercial user.

The commercial value of EOS data is uncertain, and this uncertainty affects prospective private sector vendors. Only a few of the proposed instruments may have high commercial potential. However, depending on how the Landsat Act "en bloc" clause is defined, a vendor might be required to bid for rights to large blocks of EOS data, not just the commercially valuable portion. Also, other remote sensing data could compete with EOS for the remote sensing data market, putting further limits on the marketability of the data. Spot Image, the French remote sensing marketer, plans a "new generation" remote sensing satellite tailored to serve commercial users after 1998, and the European Space Agency's (ESA) polar orbiting missions planned for the late 1990s may also provide data with potential commercial value.

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## Backup Procedures Lacking

Despite the uncertainty of using a vendor to provide commercial access to EOS data, NASA lacks a backup plan. Thus, if a company is not willing to become the EOS vendor, or qualified bidders are not available, then authorized commercial access could be thwarted. Lacking a vendor, the data may be offered at marginal cost to commercial users, according to a NASA official. However, NASA has not adopted a specific backup policy or reviewed the legal implications of such a policy against the Landsat Act commercial vendor provisions.

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## International Data Principles Are Not Yet Approved

International principles, drafted by the Earth Observation International Coordination Working Group to govern the equitable exchange of EOS data among international users, lay a foundation for fair access. However, these principles have not yet been formally approved by any of the international partners. The principles set up basic ground rules for providing data from EOS instruments to all international users. Appendix III lists the coordination group members, the applicable satellites, and the draft principles. In part, the principles mandate that the data be distributed on an equitable, or nondiscriminatory, basis to all users,<sup>6</sup> and at a marginal cost for noncommercial users. Agencies may also apply additional conditions for data from instruments they sponsor. For example, NASA will require that algorithms used to analyze EOS data from NASA be returned to EOSDIS for others' use, and ESA plans to add copyright requirements for use of ESA data.

For commercial users, access terms and conditions will be established by the agency providing the data, but distribution must be nondiscriminatory. NASA plans to contract with a vendor to distribute data from the U.S. EOS platforms; the vendor will serve domestic and foreign commercial users under the same terms and conditions. Japanese and European commercial data policies have not been established. Japan's Earth Resources Satellite Data Analysis Center (ERSDAC), which is partially sponsored by Japanese industry (such as the Mitsubishi Petroleum Development Company and the

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<sup>6</sup>A "nondiscriminatory basis" is defined by the principles as "All users in a clearly defined category (such as research use) [who] can obtain data on the same terms and conditions . . . [T]he categories are defined in such a way that all potential users have access to the data."

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Nippon Mining Company), may be the Japanese distribution center for the potentially valuable ASTER data.<sup>7</sup> According to official documents of the European Space Agency, the agency will strongly promote and facilitate private access, including commercial exploitation of data.

The proposed international principles lay a foundation for fair access to EOS data, but they have not been formally approved. As shown in appendix IV, approval of the principles must be obtained by incorporating them into Memoranda of Understanding (MOU) to be exchanged among the parties for each of the International EOS programs. Currently, none of the MOUs has been formally approved by any of the international partners, according to NASA. The MOU for the Japanese Advanced Earth Observing Satellite, which incorporates the principles, is now under review by the U.S. Department of State and the Japanese legal counsel. According to NASA, agreement between NASA and the international partners is expected by July 1992.

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## Conclusions

As a result of changing NASA priorities, the two proposed U.S. instruments with high commercial potential are no longer scheduled for the first EOS platform launch in 1998 but have been postponed until 2003 at the earliest. Aster, a foreign instrument with high potential for oil, mineral, and forestry applications (as well as science), is still planned for the 1998 launch. Other U.S. instruments on this platform, such as the Moderate Resolution Imaging Spectrometer and the Stick Scatterometer, may have commercial applications, but these applications are not as well defined.

If planned NASA policies and international principles are implemented as envisioned, U.S. and foreign industry could be on equal footing in obtaining all EOS data. NASA's two-tiered access policy (scientific and commercial) dictates the same commercial access procedures for U.S. and foreign industry, so U.S. industry would not be at a disadvantage. In practice, however, equitable industry access to the data cannot currently be assured because (1) commercial access policies developed under current Landsat Act provisions may not be workable, and (2) a failure to follow both NASA policies and proposed international agreements may raise additional challenges.

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<sup>7</sup>ERSDAC was founded in 1981 by the Ministry of International Trade and Industry and serves as a bridge between Japanese government and industry. Its prime objective is to apply remote sensing technology applications to the exploration of nonrenewable resources.

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In contrast to ASTER, where Japanese industry concerns were the originating force behind the instrument, U.S. industry concerns have been relegated to backseat status. This is evidenced by NASA not involving commercial interests early in the program, its limited commitment to provide EOS data at some point in the future, and the agency's unsuccessful track record of providing data to commercial users in the past. These factors lend evidence to support U.S. industry's concerns about timely and equitable commercial access to EOS data.

Officials in NASA's Office of Space Science and Applications told us they believed it may be premature to define commercial access processes and procedures precisely. The goal of EOS is the creation of a scientific observing system for global change research. Accordingly, the first and foremost priority has been science. Recognizing that some EOS data may be valuable for commercial purposes, NASA plans to finalize its strategy and procedures for handling such access later this decade. Waiting that long, however, could have negative consequences. If commercial access to EOS data continues to be structured as it is under the current Landsat Act, NASA may discover that no vendor is willing to take the risks of being the commercial distributor for EOS data. With no coordinated backup plan in place, additional changes to legislation may be needed to make the data available to private industry. Solving these problems could take months, if not years.

NASA has placed a high priority on science. We recognize that it may not be prudent for NASA to immediately embark on a concentrated effort to work out specific details of commercial access, especially since proposed changes to the Landsat Act could affect such access. However, NASA could take some steps sooner to involve U.S. industry in planning for the EOS program.

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## Recommendations

We recommend that the Administrator of NASA direct EOS program officials to obtain industry input to verify which of the instruments, as approved for flight on the EOS platforms, have potential commercial value and how best to make data available from these instruments. Once the proposed legislative changes are resolved, the Administrator should require the program to fully develop its detailed strategy for commercial access. Should current Landsat provisions regarding commercial access remain unchanged, the Administrator should require the agency to develop a backup strategy, including a review of legal alternatives, since commercial access under the present provisions is uncertain.



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## Agency Comments

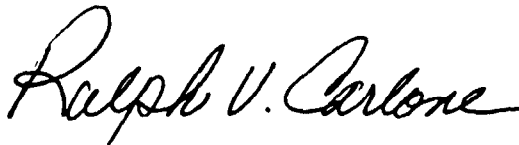
As requested, we did not provide a copy of this draft to NASA for review and comment. However, we discussed the report's contents with NASA Office of Space Science and Applications officials responsible for planning EOS access by commercial interests, and included their comments as appropriate. These officials generally agreed with the report's findings, and, given the congressional efforts to revise the Landsat Act, believe it is now time to begin addressing the specifics of commercial data access.

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We performed our audit work in accordance with generally accepted government standards, between July 1991 and March 1992, at various locations, including NASA headquarters in Washington, D.C.; John C. Stennis Space Center in Mississippi; and the Jet Propulsion Laboratory in California.

As arranged with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the date of this letter. We will then give copies to other appropriate congressional committees, the Administrator of NASA, and other interested parties upon request. This work was performed under the direction of Samuel W. Bowlin, Director for Defense and Security Information Systems, who can be reached at (202) 512-6240. Other major contributors are listed in appendix V.

Sincerely yours,



Ralph V. Carlone  
Assistant Comptroller General

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**Abbreviations**

ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
EO-ICWG	Earth Observations International Coordination Working Group
EOS	Earth Observing System
EOSDIS	EOS Data and Information System
ERSDAC	Earth Resources Satellite Data Analysis Center
ESA	European Space Agency
GAO	General Accounting Office
HIRIS	High-Resolution Imaging Spectrometer
IEOS	International Earth Observing System
IMTEC	Information Management and Technology Division
MOU	Memorandum of Understanding
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
SAR	Synthetic Aperture Radar
SIR-B	Shuttle Imaging Radar-B

# Objectives, Scope, and Methodology

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On November 7, 1990, the House Committee on Science, Space, and Technology asked us to initiate work on several aspects of NASA's EOSDIS development program. This effort focused on NASA and international policies for U.S. commercial interests in obtaining access to information collected by EOS satellites. Among other subjects, the committee was interested in learning more about

- the extent to which NASA's two-tiered data access policy (scientific and commercial) and/or other NASA policies could serve to disadvantage U.S. commercial interests vis-a-vis commercial users of EOSDIS data in other countries; and
- whether international data policies being formulated could permit Japan and European Community members, for example, to release data collected at U.S. expense sooner in those countries than in the United States.

To obtain information on NASA's data access policy we

- interviewed potential commercial users, including Atlantic Richfield Oil Company, Texaco, EarthSat, Terra-Mar, and Geosat (an industry trade group);
- discussed NASA data policy with knowledgeable officials, including those at NASA headquarters' Office of Space Science and Applications, Earth Science and Applications Division; Office of Commercial Programs; NASA's commercial centers; the National Oceanic and Atmospheric Administration, and the Consortium for International Earth Science Information Network;
- examined private company products and documents to obtain information on industry use of remote sensing data; and
- reviewed the Landsat Act, the Data Management for Global Change Research Policy Statements, NASA's draft data access policy and procedures, and EOS program and instrument documents.

To obtain information on international data policy we

- discussed international data policies with representatives from academia, industry, NASA, and the U.S. Department of State;
- interviewed Japanese and European space agency representatives and members of the International Coordination Working Group; and
- reviewed International Coordination Working Group meeting minutes and other information and documents on international data policy.

To obtain information on the sponsorship and potential commercial value of the EOS instruments, we

- abstracted data from NASA documents and information provided to us by the Japanese and European space agencies on the instruments; and
- obtained opinions from industry, instrument scientists, and NASA Centers for the Commercial Development of Space.

During our work we also learned that other government policies, aside from fair access to EOS data, can influence whether industry in one country has an advantage over industry in another country. Governments can promote commercial applications by offering domestic companies tax incentives, grants, or other assistance, any of which can provide an advantage over their international competitors. For example, companies from different countries could have access to data on the same terms and conditions, but one country may provide its industries large tax write-offs for their efforts, essentially reducing the cost of the data to their companies. We did not address these issues as a part of this effort.

# NASA EOS User Groups

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NASA has defined three categories of EOS users in the May 1991 EOS Reference Handbook. Access to data depends on which group a user is in. The categories are (1) research users; (2) operational and environmental monitoring agency users; and (3) other (primarily commercial) users. An additional user group category is expected to be added for applications (applied) users, according to a NASA official. The new category will be consistent with the applications user category proposed under the International EOS data exchange principles included in appendix III. Each group is defined below.

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## Research Users

Research users are those selected by NASA or by EOS partner agencies in Europe, Canada, or Japan (also referred to as affiliated users) who propose to use EOS data in a study or investigation to establish facts or principles. No preference or exclusive access period is allowed for those users specifically involved with the EOS program. Research users will sign an agreement stating they will abide by specific requirements. In exchange, they will be granted access to the data at no more than the marginal cost of filling the user request. In part, the agreement requires that research users publish their results and make supporting information available, including the algorithms and models used for analyzing the data, and that the data not be used for commercial purposes.

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## Operational and Environmental Monitoring Agency Users

Operational and environmental monitoring agency users will be made up of agencies that perform public services, such as forecasting weather and ocean conditions. This group includes any agency that uses the data for environmental observation and prediction as part of its responsibility to provide for the general public welfare. Parties affiliated with the agencies carrying out these tasks, as well as larger agencies that incorporate the agencies, may be included in this user group. EOS data may be provided to members of this group in real-time or near-real-time at no fee and at no more than the marginal cost of production and delivery for non-real-time users through international EOS archives.

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## Other (Primarily Commercial) Users

Other data users are made up of those users who are not affiliated with any of the participating agencies and/or who are interested in commercial purposes. According to NASA policy, procedures will be in place for commercial distribution on a nondiscriminatory basis to nonresearch/nonoperational users. These users will have to adhere to the

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stipulations on data access and use set by the Earth Observations International Coordination Working Group and the EOS program.

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## **Applied Users**

An applied group is expected to be added to the other three EOS user groups, according to a NASA official. The users in this group must agree to use the data either toward demonstrating its utility or operational uses. The users can receive a limited amount of data at the marginal cost of filling the request, but, as with research and operational users, applied users cannot use the data commercially.

# International Coordination Working Group

## Proposed Data Exchange Principles<sup>1</sup>

The Earth Observation International Coordination Working Group (EO-ICWG) was formed to coordinate data policy and other issues involved with earth observing, polar orbiting, platform programs. The group has proposed a set of data exchange principles to govern how data from instruments included under the International Earth Observing System (IEOS) will be exchanged among member organizations and made available to other users. The purpose of the data exchange principles is to ensure that data from the entire suite of IEOS satellites will be available to all users on a consistent and fair basis through any of the partner agencies. Table III.1 shows the EO-ICWG participating agencies, while table III.2 lists the planned IEOS platforms. Subsequent sections list proposed principles and related definitions.

**Table III.1: EO-ICWG Participating Agencies**

<b>Abbreviation</b>	<b>Organization</b>
AES	Atmospheric Environment Service (Canada)
CSA	Canadian Space Agency
ESA	European Space Agency
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
MITI	Ministry of International Trade and Industry of Japan
NASA	National Aeronautics and Space Administration
NASDA	National Space Development Agency of Japan
NOAA	National Oceanic and Atmospheric Administration
STA	Science and Technology Agency (Japan)

<sup>1</sup>The information in this appendix was provided by a NASA representative to EO-ICWG. It was current as of Dec. 4, 1991.



**Table III.2: Planned IEOS Platforms**

<b>Abbreviation</b>	<b>Platform</b>
EOS	NASA Earth Observing System (beginning with first EOS platform)
JEOS	Japanese Earth Observing System (beginning with ADEOS)
POEM	ESA Polar Orbit Earth Observation Mission series (beginning with POEM-1)
POES	NOAA Polar-orbiting Operational Environmental Satellites (beginning with NOAA-N)
TRMM	NASA/Japanese Tropical Rainfall Monitoring Mission

## Proposed Principles

1. All IEOS data will be available for peaceful purposes to all users on a nondiscriminatory basis and in a timely manner.
2. There will be no period of exclusive data use, except during an initial calibration and validation period, when necessary, which may not exceed three months from the start of routine reception of instrument data.
3. All IEOS data will be available for the use of each of the agencies at no more than the marginal cost of filling the specific user request for research, applications, and non-commercial operational use for the public benefit. For types of use other than the above, the data will be made available in accordance with terms and conditions established by the data providing agency.
4. Any of the agencies may designate users to be given access to data at no more than the marginal cost of filling the specific user request, for research, applications, and non-commercial operational use for the public benefit, provided the designating agency assumes responsibility for ensuring that all the terms and conditions for data use are met.
5. Agencies which designate users for research use and for applications use will do so through an announcement of opportunity or similar process. The designation will include a definition of the data to be provided. The results of research and applications users shall be provided to the designating agency and or to the data providing agency. Research users shall submit their results for publication in the scientific literature, and applications users shall publish their results in a technical report.
6. Each data providing agency will fulfill the data requests of the other agencies and their designated users to the maximum extent possible. In the event that these data requests exceed the data providing agency's planned

data system capacity, the data providing agency and designating agency will pursue alternative arrangements to fulfill such requests.

7. All data required by the agencies and their designated users will be made available on condition that the recipient ensures that the data shall not be distributed to third parties, or used in ways other than those for which the data were provided, without the written consent of the data providing agency.

8. Any of the agencies may delegate some of its functions to other entities; in which case, such agency will remain responsible for ensuring compliance with these data exchange principles.

9. Each data providing agency will establish the terms and conditions for access to its data for types of data use other than research, applications and non-commercial operational use for the public benefit.

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## Definitions

The following definitions apply in the context of these data exchange principles:

Applications Use: Applications use of data is a limited proof of concept study toward (1) the solution of an applied program to demonstrate the utility of the data, or (2) the demonstration of the operational use of the data.

Data: The term data refers to the original Earth observation sensor output and higher level products created from it by any of the agencies as part of its standard operations.

Data Providing Agency: The data providing agency is any of the agencies who is the owner of data from a particular instrument and/or responsible for the distribution of these data. The data providing agency will be defined in agreements between the operator of the platform carrying the instrument and the instrument provider.

Marginal Cost of Filling the Specific User Request: The marginal cost of filling the specific user request is the additional cost of resources, above the cost of the normal planned data system operations required to fill a specific user request. These costs may include media, labor, expenses for operating and maintaining equipment, as well as delivery charges for mail or electronic transmission. The above costs do not include non-recurring

costs such as research, development, and space segment capital cost. However, it may include a contribution to the additional capital cost of the data provision.

Non-commercial Operational Use for Public Benefit: Non-commercial operational use for public benefit is the utilization of data to provide a regular service for the welfare of the general public as distinguished from conferring an advantage on a particular user or group of users. This will generally constitute the use of data to carry out a mandate of environmental observation and prediction, e.g., weather, sea state, sea ice, hydrology, etc. These activities can be carried out by national or international agencies involved in operational forecasting activities or other entities designated by these agencies to support their public benefit mandate. Such a user may be requested by the data providing agency and/or the designating agency to provide a periodic status report back to them.

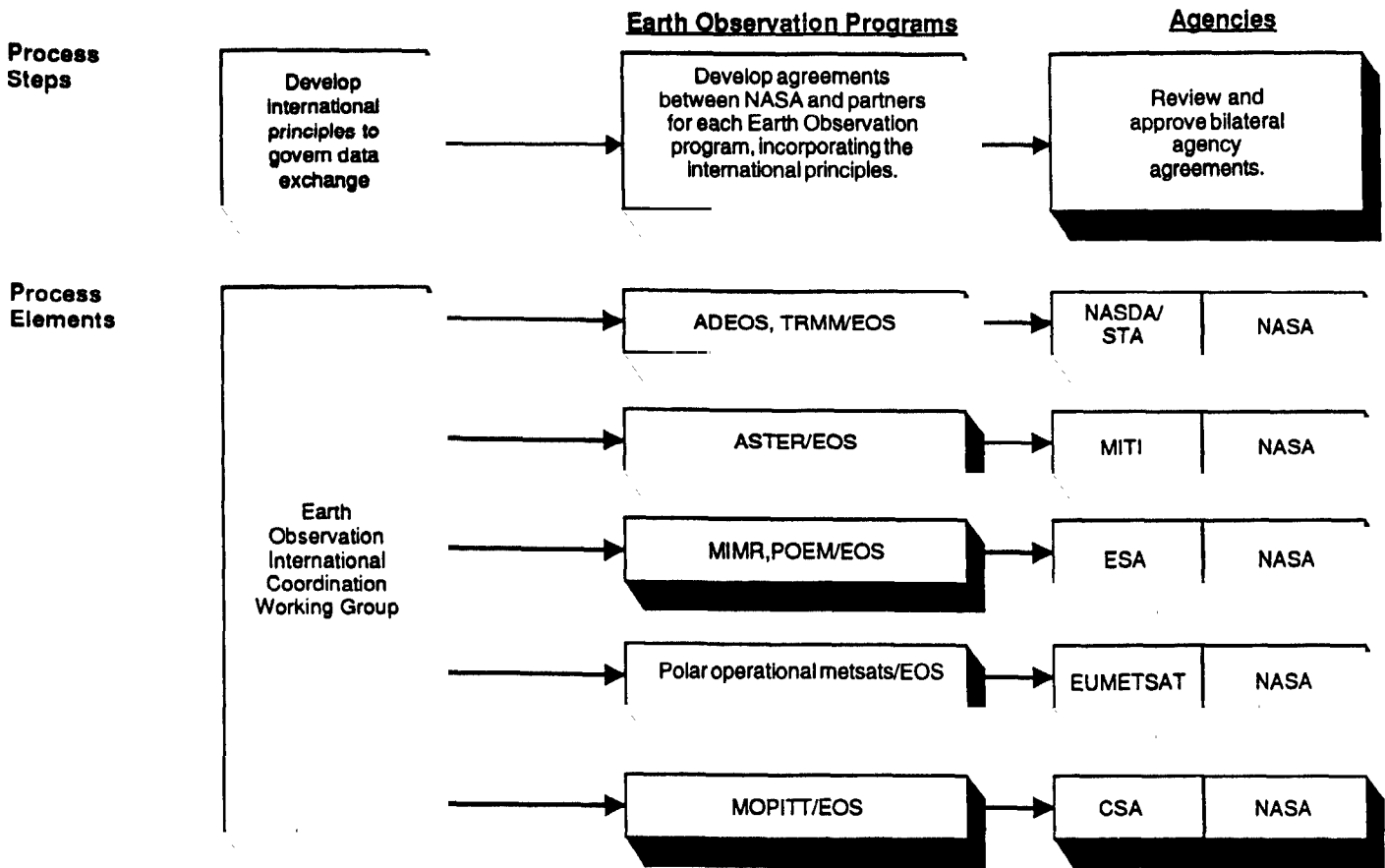
Non-Discriminatory Basis: All users in a clearly defined data use category can obtain data on the same terms and conditions, and the categories are defined in such a way that all potential users have access to the data.

Research Use: Research use of data is the utilization of data in a study or investigation which aims to establish facts or principles.

# International Agreement Process Incorporating Data Exchange Principles

Figure IV.1 illustrates the agreement (Memorandum of Understanding) approval process and related steps required to implement the international data exchange principles, as currently envisioned by a NASA official.

Figure IV.1: International Agreement Process



Note: Other agencies are also involved in the approval process; for example, the State Department reviews all agreements to be signed by NASA.

Legend

Earth Observation Programs

- ADEOS Advanced Earth Observing System
- ASTER Advanced Spaceborne Thermal Emission and Reflection Radiometer
- EOS Earth Observing System
- metsats meteorology satellites
- MIMR Multifrequency Imaging Microwave Radiometer
- MOPITT Measurement of Pollution in the Troposphere

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**Appendix IV  
International Agreement Process  
Incorporating Data Exchange Principles**

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POEM Polar-Orbit Earth Observation Mission  
TRMM Tropical Rainfall Measuring Mission

Agencies

CSA Canadian Space Agency  
ESA European Space Agency  
EUMETSAT European Meteorological Satellites Organization  
MITI Ministry of International Trade and Industry (Japan)  
NASA National Aeronautics and Space Administration  
NASDA National Space Development Agency of Japan  
STA Science and Technology Agency (Japan)

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Earth Observing System: NASA's EOSDIS Development Approach Is Risky (GAO/IMTEC-92-24, Feb. 25, 1992).

Earth Observing System: Information on NASA's Selection of Data Centers (GAO/IMTEC-91-67, Sept. 18, 1991).

Space Data: NASA's Future Data Volumes Create Formidable Challenges (GAO/IMTEC-91-24, Apr. 8, 1991).

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