STATEMENT OF
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BEFORE THE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
THE U.S. HOUSE OF REPRESENTATIVES
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Mr. Chairman and Members of the Committee:

On behalf of the members of the Geosat Committee and the resource industries we represent, we appreciate the opportunity to present testimony on H.R.3614, the "National Land Remote-Sensing Policy Act," and on the Administration's plan for meeting the President's commitment to data continuity after Landsat 6. We applaud the efforts of your Committee to eliminate the government indecision and delay in determining the future of the Landsat Program. We support the effort to provide for the continuity of this important program that serves the interests of government, the public good, and the private commercial user worldwide. The Geosat Committee has testified before Congress twenty-four times over the last fifteen years on behalf of continuity of civil land remote sensing in the United States. H.R.3614 provides some positive amendments to the 1984 Landsat Act in recognizing the importance of data continuity and the growing interests of Landsat type data to the Department of Defense and to the global change research community. It also improves management supervision of the Landsat Program by both the Administration and Congress.

On the other hand, H.R.3614 has some flaws from the perspective of the resource and value-added industries as represented by the Geosat Committee. While the proposed H.R.3614 would set near term policy for Landsat development after Landsat 6, it does not appear to deal with other overlapping civil earth observing programs (such as NASA's EOS system) nor does it adequately provide for the current and evolving competitive needs of the U.S. resource industries in their global competition on behalf of the U.S. economy. This is demonstrated by the fact that most of the geological sensor recommendations made to the government by the Geosat Committee in 1976 and supported in our past twenty-four Congressional testimonies are being developed outside the U.S. <u>without assurance of competitive access to U.S. industry</u>. We urge that both of these issues be corrected in the final form of H.R.3614, before it repeals the Landsat Commercial-ization Act of 1984 and becomes the law which will govern U.S. civil and impact international remote sensing for the next decade. H.R.3614 should provide for data access and other provisions to oversee the development of NASA's EOS Program and for a National Civil Remote Sensing Council to the Joint Program Office under DOD and NASA, which includes participation of all appropriate segments of U.S. society, including its industrial base.

LOSS OF THE LANDSAT PROGRAM LEADERSHIP IN PROVIDING CONTINUING COMPETITIVE GLOBAL INTELLIGENCE DATA REQUIRED FOR THE U.S. RESOURCE INDUSTRIAL BASE: THE NEED FOR A NATIONAL CIVIL REMOTE SENSING COUNCIL

Since the 1972 launch of the Landsat Program, the system has provided excellent global data for many applications, including some forms of geologic mapping. But to date, recommendations to improve the Landsat Program for geologic applications have generally not been provided by the Landsat Program. The apparent reasons for this failure to provide such data capabilities lie in the institutional limitations of the U.S. system, wherein no government agency has a charter responsibility to support the U.S. industrial resource base by providing economic intelligence such as satellite data to U.S. industry. All other satellite producing countries do have such an institutional government role in support of the international competitiveness of their resource industrial base in recognition of the national importance of access to global resources to their national economic security. Examples of such governmental roles include MITI, ERSDAC, RESTEC, and JAROS in Japan; BRGM and IFP in France; the Ministry of Mines and Resources in Canada. In the U.S., only the Geosat Committee has provided a voice as to the needs of the U.S. energy and mineral resource industry over the past 15 years. Moreover, only Congress has paid any heed to Geosat's recommendations in our 24 Congressional Testimonies to date (see Appendix A).

Provision of Global Economic Intelligence Data by U.S. Competitor Nations

Evidence that the data needed by the U.S. energy and mineral resource industry has not been provided by the U.S. Landsat Program, but is being provided by other countries for their global industrial resource needs are provided below.

Geosat 1976 Geological Recommendations to NASA	Data Source	
	Satellite/Country	Launch Year
STEREO	SPOT/France	1986
	JERS/Japan	1992
RADAR	SEASAT/U.S. (terminated)	1978
	ERS/ESA	1991
	JERS/Japan	1992
	RADARSAT/Canada	1995
ADD SWIR SPECTRAL #S	Landsat/U.S. 2.2u	1984
	JERS/Japan 3 SWIR #s	1992
	ASTER	1998

MULTISPECTRAL THERMAL IR	ASTER/Japan	1998
10-30m IFOV	Landsat TM/U.S 30m	1984
	SPOT/France 10, 20m	1986
	ERS/ESA 30m	1991
	LANDSAT 6/U.S. 15m	1992
	JERS/Japan 18m	1992
	RADARSAT/Canada 8-28m	1995

This geological sensor capability list for operational satellites demonstrates the importance of global resource information to the programs of U.S. competitors and the limited response of the U.S. Landsat Program to its industrial base's global information needs. For example, while the abbreviated 1978 U.S. SEASAT satellite provided some excellent radar data, it was terminated for technical and/or security reasons. Proposed continuous U.S. global radar satellite programs have been deferred politically beyond the year 2000. Thus, while the U.S. has developed a marvelous global radar mapping capability for Venus, Japan will possess the first cloud penetrating global radar coverage of the world, including all of its oil bearing sedimentary basins. The Japanese JERS-1 satellite was developed through joint industry and government interests originated by the Ministry of International Trade and Industry (MITI) to develop a state-of-the-art explorational geological mapping satellite. A main purpose of this satellite is to provide Japanese industry with a competitive global geological mapping capability to explore for and develop basic global energy and mineral resources needed by Japan's industrial base.

Unfulfilled Needs of the U.S. Industrial Base by the U.S. Civil Land Remote Sensing Programs

Meanwhile, the U.S. Landsat program has poorly responded to the U.S. resource industries needs. Spatial resolution has been improved from the early Landsat MMS of 78m to the present 30m of Landsats 4 and 5 TM, and the planned 15m of Landsat 6, and the important "Clay" 2.2μ SWIR band was added to the TM of Landsats 4 and 5 in partial response to the urging of the Geosat Committee. However, the other major requirements of Stereo, Radar, other SWIR bands, multispectral thermal IR bands, and higher spatial resolution are being provided by other countries. On the assumption that these data will be available on a timely, non-discriminatory access basis to U.S. industry and other users, perhaps these data sources will suffice. But we still await assurances regarding completely open and timely access to the Japanese JERS satellite data. The loss of continued U.S. leadership in developing operational state-of-the-art sensors for land and ocean remote sensing concerns us in that it leaves U.S.

industry at the policy mercies of other governments in providing access to their state-of-the-art data for competitive global economic resource intelligence.

A main reason why the U.S. Landsat Program has not responded to our resource community needs is the institutional lack of a funding agency chartered to provide such information. Neither NASA, the Department of Defense, nor the Departments of Commerce, Energy, Interior, or State have expressed a willingness to fund satellite data to provide such information to U.S. industry. Moreover, the Department of Commerce/NOAA contract with EOSAT does not provide for such sensor development on behalf of U.S. industry. In addition, under that contract, neither EOSAT nor its parent companies General Motors and General Electric have seen fit to invest monies sufficient to develop these new sensor capabilities and markets in order to expand the usefulness of the Landsat Program. From the point of view of the sensor needs of U.S. industry, it was unsatisfactory to see the 1987 effort of EOSAT, NASA and NOAA to develop and fund a $15 Million Multispectral Thermal IR sensor for Landsat 6 be defeated by political OMB-agency funding squabbling and the unwillingness of EOSAT to fund such a research instrument because an established market did not exist for the yet untried sensor. It is also unsatisfactory to note that NASA has supported, through JPL, the development of a multispectral thermal IR sensor to be developed in Japan for the ASTER program to be flown as part of the EOS Program. While this development may be good for NASA's long term research needs, the U.S. system has not responded to its industry's requirements. Whereas MITI on behalf of Japanese industry has provided the development funds for the ASTER multispectral thermal IR sensor.

THE NEED FOR A COMPREHENSIVE NATIONAL REMOTE SENSING COUNCIL

The lack of institutional U.S. government support for its industrial community needs has been evident throughout the history of the Landsat Program. It concerns us that the proposed H.R.3614 Bill will place the Joint Program Office under the DOD and NASA, neither of which have shown any interest in supporting U.S. industry needs. Further, in the case of NASA, the Office of Space Science and Applications has removed all industrial representation of U.S. resource industry and commercial user communities from its advisory committee and no such representation exists on the NASA Advisory Council. User industries are represented on the CPAC advisory council of the commercialization division of NASA, but this division appears to have no clout in developing and operating satellite programs such as Landsat and EOS. The commercial division and the CPAC have shown little interest in developing U.S. industry's sensor needs beyond its useful charter function of assisting entrepreneurial commercial spin-offs of current NASA remote sensing technology.

The role of the Department of Commerce (DOC) in support of the resource industries needs for global economic resource intelligence has also been disappointing. The DOC and NOAA under Secretary Baldridge and Administrator Calio were strong supporters of the continuing development of the Landsat Program. Under the direction of Secretary Mosbacher and Administrator Knaus, DOC and NOAA support for Landsat including funding and new sensor development has diminished significantly. Moreover, DOC has declined to take a strong role in supporting the U.S. energy and mineral industries internationally through supporting the acquisition of global economic resource intelligence by civil land remote sensing programs or other means.

The problems described above again point to the weakness of the U.S. institutional system in developing basic science and new technology leadership without the coordinated ability of U.S government and industry to transfer this technology to U.S. industry to maintain U.S. industrial leadership. The "leap-frogging" of new civil land remote sensing technology and applications from the U.S. to France, Japan, Canada, and Europe described above demonstrates the weakness of the U.S. system. This weakness stems from a lack of cooperation, coordination, and planning between U.S. government and industry and from the relative short-term planning and funding on the part of both. If not corrected for civil land remote sensing, the U.S. will continue to see this loss of technology leadership in the world market place.

If this fundamental U.S. technology transfer problem is to be improved for civil land remote sensing, coordinated industry-government planning and oversight is needed. A first step would be to create a truly National Remote Sensing Council to oversee the Landsat and other civil and remote sensing programs in the U.S.

RECOMMENDATION: The Geosat Committee strongly recommends to the Committee that H.R.3614 be changed to create a National Remote Sensing Council to the Joint Program Office and that the Council be so constructed so as to include representation of all appropriate U.S. civilian institutional interests in civil land and ocean remote sensing implied in the civilian, military, commercial, and foreign applications called for in Sections 2 (5), 201 (c)(2), 403 (b) and 501 (b)(1), in 1978 the proposed H.R.3614. The representation must include meaningful representation and participation from the U.S. resource industrial base including its energy, mineral, food, and fiber resource industries and their basic and applied scientific and operational needs. The Geosat Committee has previously testified on several occasions (see Appendix A) as to the need to include the industrial base in the development and oversight of U.S. civil land and ocean remote sensing programs on behalf of the national economic and security interest of the United States. We urge that a truly National Remote Sensing Council be included in any new law governing the Landsat Program and other U.S. civil land remote sensing systems.

GEOSAT COMMITTEE COMMENTS ON SPECIFIC PROVISIONS OF H.R.3614

As previously stated, the Geosat Committee applauds your Committee's efforts to resolve the fate of Landsat and U.S. civil remote sensing by introducing H.R.3614. While not knowing the current status of the oft-delayed policy recommendations by the National Space Council regarding of the future of the Landsat and EOS programs, the following reflects some of our concerns on provisions of H.R.3614 as introduced. The sections below cover our concerns on issues associated with the management, data policy and spacecraft issues.

Management

The management provisions of H.R.3614 to place the Landsat Program under DOD and NASA with a supervisory role for the DOC may well improve the management of the program. However, it does not address the real issue of determining the fundamental roles of the Landsat Program and related civil land remote sensing systems, such as the EOS Program. Furthermore, it represents a reversal of the original Integration and Privatization Studies of 1979 that led to the efforts to privatize and commercialize the Landsat Program. Moreover, it returns Landsat to NASA, and creates an integrated civil-military system as conceived under the Carter Administration in 1978. <u>This is a clear repudiation of the previous Administrations efforts to commercialize civil land remote sensing as represented by the Landsat Program.</u>

Originally developed as a "proof-of-concept" research mission at NASA, the user success of Landsats-1 (ERTS-1) and -2 led the Carter Administration to resolve the problems of the continuation of the Landsat Program on an operational basis, determining who it should serve and who should pay for it. The fundamental "Catch-22" for Landsat was that its data clearly benefited the public sector for the public good, and the private sector as a commercial commodity. Driven by OMB and Congressional fiscal challenges to fund both civil operational land remote sensing and classified systems, the Carter Administration under Presidential Directive NSC-42 conducted two studies, the "Integration Study" and the "Privatization Study." These studies analyzed operating a joint military-civil land observing system and the alternative of privatizing the civil system in an effort to recover partial costs of the civil system through user fees.

The problem of government developing an operational system dedicated to recovering costs from both the public and the private community use of the same data has been the bane of the "commercialization" effort. The goal of the DOC/NOAA contract with EOSAT was to operate the Landsat Program, develop Landsat 6 (and originally 7), and develop a self-supporting commercial

success which would support both the space satellite segment and the ground data, management and distribution segment. The inability of EOSAT and NOAA to achieve this goal, in spite of the growing markets for Landsat data, have been fraught by many problems brought on by both the government and private sector partners, and from some events beyond their control (e.g., the Challenger disaster). Their experience parallels that in France, where the government first thought that the SPOT program would become self-supporting before SPOT 3. France now recognizes that the government will have to pay for the satellite segment through SPOT 4 or 5 before market conditions warrant a truly commercial self-supporting land observing satellite and ground segment system, if then. This also parallels the long-term view of the Japanese government. This continual struggle for government funding support for the Landsat Program while privatization efforts proceeded is attested to by the numerous testimonies of the Geosat Committee and others provided to this and other Congressional Committees since 1985 on behalf of the "Continuity of the Landsat Program". It has been Congress, and more recently the National Space Council, who have afforded the United States funding continuity to maintain the Landsat Program.

In setting up the management of the Landsat Program under the Joint Program Office under DOD and NASA, H.R.3614 clearly reflects the shift of the main goals of the future Landsat Program to providing marginal cost data to the DOD for their national security interests, to the global change researchers under NASA, and other federal agencies and nonprofit organizations. History clearly demonstrates that neither NASA nor the DOD have any internal or advisory expertise or interest in the commercial market for satellite data. In leaving the commercial market to be developed only for those using the data for commercial purposes, this management arrangement clearly removes the largest market segments (government and academic) and de-emphasizes the importance of commercialization to the Landsat Program. Furthermore, it leaves its commercial users at the mercy of unclear pricing policies (in particular, as to what really is a fair price) and without meaningful input or serious recourse in assuring that its satellite data requirements are met.

The annual opinion process under Sections 201(e)(1) and the Biennial Report to Congress requirement under Section 201(e)(2) give the user community no real assurance that our needs will be fulfilled. The biennial U.S. Remote Sensing Program Report to Congress, required of NASA and NOAA under the 1984 Landsat Commercialization Act, has been honored by NASA and NOAA only once; so much for agency compliances with Congressional law. The elaborate direction in Section 608 to the DOC to police possible abuse of commercial use by nonprofit organizations receiving marginal cost data seems to be an expensive, unnecessary and almost "Rube Goldberg" role and barrier to the use of arbitrarily

created classes of Landsat data for basic research, applied research, and commercial uses.

As described above, the creation of a truly meaningful National Remote Sensing Council to the Joint Program Office and reporting perhaps to the DOC under Section 608 and, more importantly, to the Congress might remedy these concerns. However, the system outlined by H.R.3614, while it attempts to place the Landsat Program back on a more realistic footing which recognizes the realities of "commercialization" today, it does not resolve the dual nature of the public and private uses of the Landsat data. H.R.3614 attempts 1) to achieve full commercialization of the U.S. remote sensing program through the Advanced Technology Demonstration and follow-on provisions of Sections (403, and 501) and 2) to ensure that data is available to federal and nonprofit global change researchers. Experience tells us that simultaneously achieving both 1) and 2) at the same time with the same satellite data is problematic at best. If the policy apparent in H.R.3614 is adopted to provide data at a marginal cost to large disconnected segments of the community, it will clearly undermine the formation of a commercial market which is an absolute prerequisite to ever being able to commercialize the program.

Weather satellites have been declared as not available for commercialization by Congress. Much of the EOS program will clearly provide data for global change research in the public good, while at the same time creating a huge remote sensing data base with much data that will be of use to commercial and other users. The Landsat program has clearly demonstrated its usefulness for both public good and commercial uses. H.R.3614 in its present form does not resolve the basic schizophrenic dilemma for the U.S. policy makers, whether 1) to support a strong commercial civil land remote sensing satellite program or 2) provide civil land remote sensing data at marginal costs to those using the data to maximize the government's investment.

While the Geosat Committee does not purport to know how the government should resolve the above issue, we strongly urge that clear goals be set for the Landsat Program and for the development of the EOS and other civil earth observing systems.

The U.S. economic base, including its energy, mineral, food, and fiber resource industries, is fundamental to the national security of the U.S. and to its people, and thus in the U.S. public good, even though the press and politicians in this country sometime lose sight of this economic truth. To support 1 above), government must strongly support commercialization by getting out of the remote sensing business, establishing real user technology transfer mechanisms to NASA's proper role in remote sensing research, and providing government funds for government research and operating interests to purchase the data from the commercial system. To support 2), the government must

decide to fund the space segment for the benefit of all users and provide the data at marginal cost to all users. Commercial remote sensing would then become the domain of the ground segment systems and value-added businesses who will generate commercial jobs, taxes, and even more uses for the data and the information derived therefrom.

> *RECOMMENDATION: While resolution of these two basic counter-poised goals have proved difficult in the U.S. and elsewhere, and while we hope that the pending report of the National Space Council will shed light on a solution to this policy dilemma, we STRONGLY RECOMMEND that the Congress makes every effort to determine which goal to proceed with - commercialization OR marginal cost data to all users including a commercial ground segment - will guide the further development of U.S. civil remote sensing BEFORE finalizing H.R.3614. H.R.3614 makes an effort to correct some of the problems that have evolved under the 1984 Landsat Commercialization Act, but it DOES NOT RESOLVE this basic issue of operating under two counter philosophies or goals, rather it appears to perpetuate some of the dual goal problems, such as operating and policing a two-tier pricing scheme.*

DATA POLICY

Any discussion of data policy largely depends on a clear decision as to whether the government's goal is to establish a commercial land remote sensing system or a system providing data at a marginal cost to all users in the public good. The following comments are provided for the proposed H.R.3614, which does not clarify under which goal the Landsat follow-on systems should proceed. This is a major weakness in H.R.3614.

POSITION OF THE GEOSAT COMMITTEE

The position of the Geosat Committee and many others of the resource industrial community sampled by the Committee can be stated simply as follows:

REMOTE SENSING DATA POLICY

TIMELY, NON-DISCRIMINATORY ACCESS OF ALL USERS TO ALL CIVIL GLOBAL SATELLITE DATA, INCLUDING GOVERNMENT SATELLITE DATA DEVELOPED FOR RESEARCH AND OTHER CIVIL ACTIVITIES, COMMENSURATE WITH REALISTIC OPERATIONAL REQUIREMENTS AND ECONOMIC CONSIDERATIONS.

This may be restated and further defined as follows:

Timely, Non-Discriminatory Access

No discrimination for: national identity; type of research, basic or applied; timeliness, available to all on a first-come, first-serve basis; pricing that is uniformly equitable, fairly based, and easily enforceable.

All Users

International equal access: No international differences for government-commercial industry access between governments exchanging research or operational data (a level playing field to all users between intergovernment agreements on data exchange).

All Civil Global Satellite Data

All international civil satellite systems, especially those with data trading or satellite remote sensing research agreements with the U.S., should be accessible.

Including Government Satellite Data for Research

Government funded programs; EOS and related ESA and NASDA Polar Orbiting Platforms (POPs or POPlets); Data policy to apply to all earth observing research systems, i.e., SIR-B, SIR-C, etc.

And Other Civil Activities

Weather and other operating satellite and supporting aircraft data.

Commensurate with Realistic Operational Requirements

Government systems to reflect funding agency requirements (i.e., DOD, NASA, NOAA), but resource industrial base and other major civil sector requirements to be included in the national interest. Need multi-sector National Remote Sensing Council with teeth.

And Economic Considerations

If government is to maintain control of civil systems and fund main satellite segments, then cost of data should be marginal to all, with data access through government, commercial distribution and value-added entities where equitable marginal and commercial access fees are paid by qualified users. For instance, an EOS-Landsat EOSDIS system with research and commercial data ports for commercial vendors might be ideal.

The main elements of concern to the Geosat Committee on data policy as proposed in H.R.3614 are data continuity, data access and the proposed two-tier pricing system, which we question as discriminatory and difficult to enforce.

Continuity

The House Committee on Science, Space and Technology is to be congratulated for introducing H.R.3614 to spur government decisions on the fate of Landsat 7 and its "follow-on" systems in support of the Presidential Policy for continuity of Landsat - type data systems. All of the twenty-four testimonies by the Geosat Committee over the past fifteen years have urged continuity of the civil land remote sensing as represented by the Landsat Program in the United States and as indicated in Section (2) (5) of H.R. 3614. In recent years, Congress has been the principal government supporter of continuity of the Landsat Program. In all of our testimony, the Geosat Committee has called for continuity of the basic Landsat system coupled with the addition of evolving state-of-the-art sensors.

In addition to collecting timely data for some types of surface mapping, the continued collection of Landsat-type data is vital to studying and monitoring change detection. While most geology (except volcanoes) does not change much over the life of a satellite, seasonal vegetational changes allow for enhanced mapping interpretation. Engineering companies such as Geosat member Bechtel, require the continuous coverage of recent data in its world-wide construction and engineering competition. Needless to say, the long term Landsat baseline is vital to global change resource and to environmental management of energy and mineral resources and construction engineering. With the growing need to comply with environmental regulations and the growing legal implications of past and current environmental engineering practices, the energy, mineral, food, fiber, engineering, land-use planning, and many other commercial industries need baseline continuity of Landsat-type repetitive spectral data coverage.

Data Access

Continuity of U.S. civil land remote sensing helps to secure world-wide compliance with the U.S. leadership "open-skies" non-discriminatory data access principles, which in turn supports continued international development of compatible and complimentary remote sensing satellite systems. International observance of timely, non-discriminatory access is critical to maintaining open data availability of different national systems to international government and industry users. If such open access is not maintained, then governments run the risks of proliferating systems competition between countries, resulting in unnecessarily redundant sensor systems. With the growing number

of international satellites, in particular the multi-sensor EOS type programs of the future, international data sharing should be eminently more efficient and economic than duplication of systems to satisfy national pride.

The Geosat Committee testified last year on our concerns about access to EOS data. We questioned how the provisions of H.R.3614 will apply to EOSDIS. We consider it imperative that in amending the 1984 Landsat Commercialization Act, any new evolving law from H.R.3614 that establishes a new national land remote sensing policy must clearly apply to the EOS and EOSDIS and other evolutionary programs. These and other new government land and ocean sensing programs must be included in the law governing civil remote sensing as to data access for both research and commercial use and other common issues. In addition, agreements for the exchange of research data between NASA and other countries, including Japan, ESA and Canada, must clearly come under the same research and commercial data access policy and must insure that commercial industrial users of one country will not have any unfair access advantage to government research data obtained from other countries.

Two-Tier Pricing

The access, distribution, marketing and ultimate usefulness of civil land remote sensing will depend very much on the final pricing policy established under H.R.3614. As previously discussed, this in turn will be dictated largely to the extent the Administration and Congress resolve the main issue as to the goal of these programs with respect to strongly supporting commercialization, or, the alternative of providing government funded satellite data to all users at generally marginal prices.

If the MAXIMUM VALUE of the federal land remote sensing programs to the American public is to be the government policy goal as stated the findings in Section (2) (5) and (10) and in Sections 201(c)(2), 403(b), and 501(b) of H.R.3614, then the American public clearly should include its corporate citizens. As a significant segment of the industrial base of the U.S. economy, corporate users should have full, non-discriminatory access to the data at the same marginal cost as all other nonprofit users. After all, the value of the data is nil to both user groups. Only the information extracted from the data by basic or applied science generates real "value". The current high cost of Landsat data prohibits broad use of the data even by present large companies. This is especially true for smaller users and customers of the value added industry. Lower cost of data would stimulate broader use of the real data product and information derived, which is the real generator of new mines, oil fields, construction projects, and other new product and service businesses. **These in turn are the providers of new resources, jobs, taxes and new real income to the U.S. economy**; far more

than will the uses of the same data for research, global change study, or military security. As important as the latter are, they do not create new wealth for the economic security of the United States.

If, on the other hand, the maximum value of the federal land remote sensing programs is deemed to be in the commercial marketing and distribution of land remote sensing data, then it should remain as a function of the private sector as in Section 2 (11). Moreover, the government must do much more to encourage commercialization than is provided for in H.R.3614. Most importantly, if commercialization is the ultimate goal of this legislation, then it appears folly to exempt the main portion of the total market for the commercial marketing and distribution system as called for in Sections 202(b)(1), 202(c)(3), 202(e)(3), 402(a), 601(a), and 601(b)(1) and (2). To remove the federal users, academia, and the ill-defined nonprofits from the market place for commercial marketing and distribution removes about 75% of the present market, depending on how the above institutions are defined or utilized. The removal of such a large market segment would seem to doom any real commercial land remote sensing system for many years to come. To make such commercialization successful, the government policy should be to fund the federal academic and nonprofit organizations as appropriate, with sufficient funding to purchase the data they need at acceptable commercial rates.

The proposed two-tier pricing policy espoused in H.R.3614 in the sections listed above appear to be unwieldy, difficult to administer and police, and possibly self-defeating. It seems wrong to pass law which spends more time instructing the DOC and others as to how to police and punish abusers of the arbitrary and discriminatory pricing system than on concrete measures designed to promote the development and use of the system, which in turn justifies its continuity with total or partial government funding for the satellite space segment of the system. Value-added members of the Geosat Committee feel that they will be adversely affected by real competition with marginal-cost academic and nonprofit "researchers," who even today do considerable business on behalf of the private sector. This "grey area" is a problem today and will only grow with broader distribution of marginal cost data under H.R.3614. On a positive note, this will undoubtedly provide work and jobs for the DOC regulators and for the ever-present but non-value producing legal community.

Another concern of the Geosat Committee is to what extent and why the government expects to recover some level of cost through commercial pricing to commercial users. And more importantly, who will set the pricing levels. Are these prices to recover portions of the satellite systems themselves, perhaps unfairly to the commercial users when compared to the non-

commercial user who benefits from the commercial users' taxes and fees?

Finally, in a mainly federally designed and funded user system, we feel strongly that the commercial user is being discriminated against with "double taxation," that is, paying access fees for public systems bought with taxes in which they have already paid their fair share. Moreover, the theme throughout the legislation specifically discriminates against the commercial users as to access and pricing without ever stating why and how much.

RECOMMENDATION: The Geosat Committee believes that the two-tier pricing policy as proposed is unduly discriminatory against the industrial sector in a marked departure from the 1984 Landsat Commercialization Act, is unwieldy, difficult and expensive to police nationally, and especially internationally, is counter productive to developing broader and newer entrepreneurial applications and uses and does not serve to maximize the value of the federally funded system to all segments of U.S. society. Industrial commercial users would probably be willing to pay a reasonable and well defined commercial fee where the justifications for such fees and the limitations on the pricing mechanisms are well established and understood.

Therefore, WE RECOMMEND that H.R.3614 be rewritten to clearly state the commercial objectives for future civil land remote sensing systems, to define the burden-sharing goals for the commercial fees and to establish realistic guidelines on how fair commercial pricing should be determined. Alternatively, we ask that the discrimination on commercial pricing of the valueless data itself be eliminated and marginal pricing be extended to all.

Spacecraft Issues

In general, the Geosat Committee is an industrial user group with little expertise on spacecraft issues other than the sensor systems they carry. In our testimony over the past fifteen years, we have focused on basic sensor capabilities needed for geological and, more recently, oceanographic mapping applications. These long-standing sensor requirements are discussed in a previous section.

During the fifteen years of the Geosat Committees activities, we have conducted extensive field simulation and evaluation studies of data from planned and new satellite sensor systems. Geosat conducted an extensive cooperative field demonstration program with NASA for the planned Landsat Thematic Mapper of Landsats 4 and 5, known as the Joint NASA/Geosat Test Case Study. This major study was followed by similar field studies of German MOMS data, French SPOT data and currently with simulated Japanese JERS-1 data. We are presently beginning a major evaluation program (Gulf Offshore Satellite Applications Study - GOSAP) with ESA for the ERS-1 data for multiple offshore oceanographic operational exploration and environmental

applications in the Gulf of Mexico. We also hope to evaluate in this study data from NASA, CNES's TOPEX, SIR-C, JERS-1 radar, and Canada's Radarsat. In addition to these studies, we are working with the USGS and JPL in evaluating the geologic mapping usefulness of AVIRIS and other airborne hyperspectral imaging systems. All of these activities are focused on evaluating and developing new applications for planned new sensor data and to determine recommendations for future satellite sensors.

In light of the above, we are concerned with certain areas of H.R.3614, such as Sections 202(b)(2), 202(c)(4) and 202(d)(3)(b) which direct that the successor systems to Landsat 6 provide for new sensor opportunities which are stipulated only to meet the requirements of the federal government, emphasizing Global Change Research Program and national security needs. If the federal supported systems are to maximize their value to the American public, then requirements from other sectors of the national economy, including its industrial base, must be considered. This requirement should be strengthened in H.R.3614, perhaps by mandating the previously discussed National Remote Sensing Council reporting to the Joint Program Office, the National Space Council, and to Congress.

Because the Geosat Committee strongly supports developing new capabilities for future land remote sensing systems, and strongly opposes developing only future clones or minor modifications of Landsat 6, we are encouraged by H.R.3614 amending Title V of the Land Remote Sensing Commercialization Act of 1984 from "TITLE IV - RESEARCH AND DEVELOPMENT" to "TITLE IV - RESEARCH, DEVELOPMENT AND DEMONSTRATION". We strongly believe that one of the weaknesses of the NOAA-EOSAT Landsat privatization experiment of the last seven years was the lack of dedicated and funded applications demonstration and technology transfer programs by NOAA and EOSAT. The need for strong applications demonstration programs for program and market development is fully understood and implemented in France and Japan.

We support in principle "Section 403. TECHNOLOGY DEMONSTRATION PROGRAM" as a major step to returning the U.S. to its previous leadership in developing advanced operational land remote systems. We similarly support "TITLE V - ASSESSING OPTIONS FOR SUCCESSOR LAND REMOTE-SENSING SYSTEM" for the same reasons.

RECOMMENDATION: Because of the importance to future systems of Title IV and V, WE STRONGLY RECOMMEND that the resource industry and other pertinent segments of the U.S. economic industrial base be included in the design, demonstration and applications development phases of the implementation of Titles IV and V. Again, perhaps this would be best accomplished under a National Remote Sensing Council and under provisions for government-industry cooperation such as suggested in Section 402(a)(2). We further recommend that

Congress provide for and follow up with full review of the public Congressional reports called for under Titles IV and V.

SUMMARY

The Geosat Committee strongly supports the efforts of the House Committee on Science, Space, and Technology to resolve the government impasse on setting policy for the future of U.S. civil land remote sensing programs by introducing H.R.3614.

The Geosat Committee supports the continuity of evolving Landsat-type civil land remote sensing in the United States.

We support the technology demonstration and assessment programs in support of developing an advanced civil land remote sensing system as long as the resource industries and other U.S. institutional interests are included in the requirements definition and in the implementation of the research development and demonstration programs.

However, before H.R.3614 becomes law, we believe that the Congress and the Administration must set policy for U.S. civil land remote sensing that clearly defines the program's goals as to whether commercialization or marginal cost of data distribution should guide future systems before H.R.3614 becomes law.

We do not support the two-tier pricing system as proposed until the competing overall government policy goals between commercialization or marginal cost of data distribution are resolved. In addition, we cannot support any two-tier pricing system until a fair and equitable commercial access fee is determined and equitable limits are set under an overall government policy as stated in H.R.3614.

We recommend the creation of a truly National Remote Sensing Council reporting to Congress to advise and oversee the management of the land remote sensing program managed by DOD-NASA, DOC and any other resulting agency management organization.

In general, the Geosat Committee position on data policy is for timely, non-discriminatory access for all users to global satellite data, including government satellite data developed for research and other civil activities commensurate with realistic operational requirements and economic considerations.

APPENDIX A

Date	Name	Testimonies and Statements
July, 24, 1990	Fred Henderson	International Cooperation in Earth observing systems' Activities
March 7, 1990	Fred Henderson	Landsat 4 and 5
March 1, 1990	Fred Henderson	Mission to Planet Earth
Aug. 31, 1988	Fred Henderson	Data Access
March 23, 1988	Fred Henderson	Landsat Program & Civil Land/Ocean Satellite Remote Sensing
April 2, 1987	Fred Henderson	Status of the Landsat Program
July 18, 1986	Fred Henderson	In support of Comm. Act of 1984 (PL 98-365)
Nov. 13, 1985	Fred Henderson	Land Remote Sensing Comm. Act of 1984
March 22, 1984	Fred Henderson	Land Remote Sensing Satellite
March 6, 1984	Fred Henderson	Land Remote Sensing Comm. Act 1984
Dec. 2, 1983	Fred Henderson	Land Remote Sensing Comm. Legislation
May 8, 1981	Fred Henderson	NASA Budget Approp. for 1982
March 4, 1981	Fred Henderson	NASA Budget Authorization for 1982
April 11, 1979	Fred Henderson	ERIS
March 2, 1979	Fred Henderson	NASA Authorization for F.Y. 1980
April 13, 1978	Fred Henderson	NASA Budget Approp. for 1979
March 1, 1978	Fred Henderson	NASA 1979 Budget and Landsat
March 7, 1978	Fred Henderson	NASA 1979 Budget and Landsat
June 23, 1977	Fred Henderson	ERIS
March 7, 1989	Mark Settle, ARCO	Landsat 4 & 5
March 4, 1981	Tony Barker, AMAX	NASA Budget for 1982 and Landsat
March 4, 1981	Ron Cormic, CONOCO	NASA Budget for 1982 and Landsat
March 7, 1977	Mike Halbouty, Halbouty	ERIS