

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. without assurance of competitive access to U.S. industry. We urge that both of these issues be corrected in the final form of H.R.3614, before it repeals the Landsat Commercialization 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.

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" 2.2 $\mu$  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.

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 Baldrige 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.*

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

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

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

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-

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*

APPENDIX A

<u>Date</u>	<u>Name</u>	<u>Testimonies and Statements</u>
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