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23 JUL 1981

THE WHITE HOUSE  
WASHINGTON

F: CM 106

CABINET MATTER

DATE: July 23, 1981

NUMBER: 018734 CA/CM 106

SUBJECT: Private Sector Transfer of LANDSAT Activities

ORIGINATOR: \_\_\_\_\_

- ASSIGNED TO:
- FULL CABINET
  - Cabinet Council on:
    - Commerce and Trade
    - Human Resources
    - Economic Affairs
    - Natural Resources and Environment
    - Food and Agriculture

VIEW	FYI	VIEW	FYI
<input type="checkbox"/>	<input checked="" type="checkbox"/> ALL CABINET MEMBERS	<input type="checkbox"/>	<input type="checkbox"/> Health & Human Services
<input type="checkbox"/>	<input type="checkbox"/> Vice President	<input type="checkbox"/>	<input type="checkbox"/> Housing & Urban Development
<input type="checkbox"/>	<input type="checkbox"/> State	<input type="checkbox"/>	<input type="checkbox"/> Transportation
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<input type="checkbox"/>	<input type="checkbox"/> Attorney General	<input type="checkbox"/>	<input checked="" type="checkbox"/> Counsellor to the President
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<input type="checkbox"/>	<input type="checkbox"/> Agriculture	<input type="checkbox"/>	<input type="checkbox"/> CIA
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<input type="checkbox"/>	<input type="checkbox"/> Labor	<input type="checkbox"/>	<input type="checkbox"/> U.S. Trade Representative
	NASA		CEA
VIEW	FYI	VIEW	FYI
<input type="checkbox"/>	<input checked="" type="checkbox"/> Baker	<input type="checkbox"/>	<input checked="" type="checkbox"/> Gray
<input type="checkbox"/>	<input type="checkbox"/> Deaver	<input type="checkbox"/>	<input checked="" type="checkbox"/> Beal
<input type="checkbox"/>	<input checked="" type="checkbox"/> Allen	<input checked="" type="checkbox"/>	<input type="checkbox"/> Dennis Kass
<input type="checkbox"/>	<input checked="" type="checkbox"/> Anderson	<input type="checkbox"/>	<input checked="" type="checkbox"/> Annelise Anderson
<input type="checkbox"/>	<input type="checkbox"/> Garrick	<input type="checkbox"/>	<input checked="" type="checkbox"/> George Keyworth
<input checked="" type="checkbox"/>	<input type="checkbox"/> Darman (White House Staffing)	<input type="checkbox"/>	<input type="checkbox"/> _____

DUE BY: \_\_\_\_\_

TENTATIVE CABINET  
DISCUSSION DATE: \_\_\_\_\_

REMARKS: A memorandum from Ed Harper on this issue is attached.

NOTE TO DENNIS KASS: We need to determine the action forcing event, develop an option paper and schedule for consideration the above captioned issue.

RETURN TO: Craig L. Fuller  
Deputy Assistant to the President  
and Director, Office of Cabinet Administration  
456-2823

CONTACT: Kenneth Cribb, Jr.  
Assistant Director  
Office of Cabinet  
Administration

456-2800






EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF MANAGEMENT AND BUDGET  
WASHINGTON, D.C. 20503

CM# 106

July 13, 1981

MEMORANDUM TO: CRAIG FULLER / MARTIN ANDERSON  
FROM: Ed Harper   
SUBJECT: Resolution of Issues Related to Private Sector  
Transfer of Civil Land Observing Satellite Activities.

The purpose of this memo is to request that a working group within the Cabinet Council system be established to consider the following two issues related to private sector transfer of civil land observing satellite activities:

- What is the best mechanism to implement the current policy of transfer of civil land remote sensing systems (LANDSAT) to the private sector as soon as possible?
- Should the Administration consider simultaneously private sector transfer of both civil weather and land remote sensing systems?

Background

With the revisions to the 1982 Budget the Administration explicitly stated its intention to hand-off operational responsibilities for land remote sensing to the private sector in the mid-1980's or sooner, if possible. This policy reflected the judgment that the Federal investments in the LANDSAT program contained in the revised budget were sufficient to evaluate the usefulness of this data and that, if the operational uses were significant, the private sector would provide follow-on satellites--there would be no need for the Federal Government to purchase additional satellites beyond the two new NASA budgeted satellites (i.e., LANDSAT D and D1). Thus, the Administration withdrew the Carter commitment to data continuity through the end of the decade and decided that additional satellites beyond the two new NASA satellites would depend on the private sector's willingness to invest in and operate follow-on satellites. We are not asking the Cabinet Council to revisit this policy.

The Department of Commerce (NOAA) is currently developing draft legislation designed to facilitate private sector transfer of land observing satellite activities. This legislation needs to be consistent with the policy decisions on the issues being referred to the Cabinet Council.

A potential private sector owner/operator has requested that the Administration consider transferring simultaneously both the civil weather and land remote sensing satellite systems to the private sector, and that selection of a private sector proposal or combination of proposals be based on the merits of the total package.



## Discussion of Issues

- o What is the best mechanism to implement the current policy of private sector transfer, as soon as possible? The options available to the Administration seem to be the following:
  - Laissez-faire approach--continue NOAA operation of satellites consistent with current policy and do nothing to encourage or discourage independent private sector initiatives.
  - A decision to consider transferring the current Government inventory of civil remote sensing satellites and ground equipment to a private corporation or consortium of private corporations in return for cash and/or future considerations.
  - A decision to provide some form of subsidy or long-term data contract (details to be specified consistent with budget of user agencies) in order to facilitate private sector transfer.
  - A combination of the two previous options.
  - A decision to establish a federally chartered for-profit private corporation to own and operate a civil, land remote sensing satellite system--along the lines envisioned in the Schmitt Bill introduced in the previous Congress.
- o Should the Administration simultaneously consider private sector transfer of both civil weather and land remote sensing systems?
  - Transfer of the civil weather satellite program to the private sector would place more emphasis on the private sector and market forces in determining the level and scope of these satellite activities. However, the assertion that such a transfer could reduce the Federal budget and increase the Federal tax base without incurring significant additional Federal risks has not yet been validated.
  - The Administration probably will not be able to determine if such a private sector transfer can be achieved on terms acceptable to the Government until proposals are received and evaluated.
- o The sub-issues that will need serious review and consideration include:
  - What type of Federal commitment, if any, would be appropriate for purchase of either weather and/or land satellite data? To what extent should the Federal Government continue related technology development (e.g., R&D on advanced sensors)?
  - What type of relationship should exist between the Government and any potential private sector owner/operator?
  - What Federal assets and data rights should the Government consider transferring to the private sector?

## Budget Assumptions

- o In light of the need for fiscal restraint, an increase in the Federal commitment to land remote sensing from space should be considered only to the extent that user agencies are willing to make tradeoffs against previously approved activities for 1983 and beyond in order to facilitate an expanded Federal commitment.
- o Since there are other options for reducing the Federal expenditures for needed weather satellite data (e.g., combining civil/military polar-orbiting satellites, reducing the number of civil weather satellites in orbit, and placing weather sensors on commercial communications satellites), it should be assumed that the 1983-86 budget projections for civil weather satellites may be revised downward.

The agencies affected include:

<u>Agency</u>	<u>Area Affected</u>
Department of Commerce	NOAA operation of weather and land satellite systems.
Department of Agriculture	Agriculture forecasting based on weather and land satellite data.
Department of Defense	Data from civil weather satellites (in addition to data from military weather satellites).
Department of Interior	Geological, mineral, and land management activities use land satellite data.
Department of State	International agreements on satellite remote sensing.
Central Intelligence Agency	National security.
National Aeronautics and Space Administration	R&D using satellite data and new sensor development for weather and land satellites.





12 MAR 1982

TO: Members of the Cabinet Council on Commerce and Trade

FROM: Malcolm Baldrige *MB*  
Chairman, Cabinet Council on Commerce and Trade

SUBJECT: Transmittal of Issue Papers on Land Remote Sensing and Weather Satellites

The Working Group has developed the additional material on Landsat requested at the December 16, 1981, CCCT meeting, and prepared the issue paper on commercializing the civil weather satellites for your consideration. The paper on Landsat (Paper I) provides additional information on benefits, required private sector investment, and the magnitude of an enhanced Federal commitment for continuing U.S. civil land remote sensing technology. Paper II examines whether the Administration should consider transferring simultaneously the civil weather and land remote sensing satellite systems to the private sector.

Four decisions by the Cabinet Council are needed:

1. Is the continuation of civil land remote sensing from space in the national interest?
2. If (1) is answered affirmatively, what level of financial commitment should be made to civil land remote sensing?
3. Should commercialization of weather satellites be considered at this time?
4. In order to implement the decisions, the CCCT should direct the Department of Commerce to (a) seek appropriate legislation and (b) begin the competitive selection process.

LANDSAT: With respect to U.S. civil land remote sensing, the CCCT must determine if continuation of civil land remote sensing from space is in the national interest. Unquantifiable, but tangible, benefits in the form of improvements in the balance of payments and efficiencies in the U.S. renewable and non-renewable resources industries are projected; these have not been adequately demonstrated to date. To make these benefits capturable by the private sector as an inducement to invest, basic changes would have to be made in U.S. international policies. These changes could impact negatively national security satellite systems and international relations to such an extent that the changes are considered by many to be unacceptable.



Continuing the U.S. civil capabilities provides intangible benefits considered by many to be of great value. Landsat, the current civil program, provides information, either by itself or in conjunction with other classified and unclassified data sources, that is of significant value in the Administration's development of national and international policies. Such continuation has its costs. Most Working Group members believe that, because of the present small market for data, and the inability of the satellite owner to capture the benefits from derived information, the private sector will be unable to finance the large investments required after the end of service from the present government satellites. Significant Federal participation will be required especially in the initial years when large capital investments must be made. This raises issues of increased Federal budgets at a time when the Administration is trying to reduce budget deficits. Federal participation also brings Federal intervention in a program that some feel should be a totally private enterprise in which the market place dictates decisions.

WEATHER SATELLITES: With respect to the simultaneous commercialization of civil land and weather satellites to the private sector, most Working Group members believe that the linkage between the two remote sensing systems is not necessary, and is indeed unwise from political and policy perspectives. Decisions on commercializing either system should be made on their separate policy and financial merits, they feel.

Within the Working Group, there are divergent views on commercializing the entire civil weather satellite program. Some see no insurmountable policy barriers and urge prompt analyses (OMB Circular A-76) to determine relative costs. Some suggest in-depth analyses of national security and international policy issues, followed by A-76 studies if warranted. Still others, convinced that these policy issues and complex program linkages are very significant, oppose further considering commercialization of the civil weather satellite systems at this time. They favor examining other alternatives to reduce the Federal costs for weather satellite data, and the commercialization of portions of the civil systems when it is cost effective to do so without raising serious policy concerns.

The accompanying papers summarize the views of the Working Group on these issues. The short summary papers are each supported by longer papers providing additional analytical detail.

Attachments

I.

BACKGROUND ATTACHMENT

DETAILED ANALYSIS

OF

LANDSAT BENEFITS,

COSTS, AND FINANCING



## INTRODUCTION

On December 16, 1981, the Cabinet Council on Commerce and Trade (CCCT) requested additional information on the benefits to the government and the Nation of continuing U.S. land remote sensing from space, on the private sector investment likely to be required, and on the probable magnitude of the suggested enhanced Federal commitment.

Section 1 of this analysis addresses the intangible or policy benefits from continuing U.S. civil land remote sensing from space. Section 2 provides information on quantifiable tangible benefits. Section 3 suggests a smaller, narrower range of private sector investment than was discussed in the December 14, 1981 CCCT Decision Memorandum and a somewhat smaller range of estimates of a possible enhanced Federal commitment. Section 4 examines the major alternatives for financing the enhanced Federal commitment. Section 5 discusses the need for urgent action if the United States is to retain its capabilities for land remote sensing from space after Landsat D and D'. Section 6 discusses issues on which CCCT decisions or concurrences are required.

### SECTION 1. INTANGIBLE BENEFITS

Experience with analyses and routine use of Landsat data has demonstrated the potential value of the derived information in establishing important national and international policies; in promoting vigorous U.S. energy, minerals and agricultural industries; in improving the management of resources on public lands; and in supporting the economic and national security interests of the Nation. Some of these benefits are available today because the derived data has been used. Some are potential because routine use has not yet been fully implemented. Some are tangible in that they are measurable in economic terms. Others are intangible because the value of improved information in policy and decision making cannot be measured in terms of dollars.

#### Improved Information on Global Crop Production

International trading of agricultural products is an important element in this Nation's balance of payments. In 1981, U.S. agricultural exports contributed about \$44 billion to the balance of payments. Global, timely and reliable information on major food and fiber crops, in terms of stocks on hand, domestic consumption and export needs, expected production and future supply are significant elements of national economic and political intelligence. Landsat data, in conjunction with data from weather satellites, has the potential for improving the accuracy and timeliness of information on foreign production over that available with conventional data alone. The value of such information can be traced across a broad spectrum of public and private sector activities.

Droughts, floods, severe storms, insect and disease infections, and shortages of fertilizers and pesticides can have dramatic effects on crop production. These events occur in agriculture areas around the world with disturbing regularity. Satellites can provide data which, with continued development of applications technology, will permit reliable detection of these events or their effects on crop production.



For over 50 years the export of surplus U.S. agricultural productivity has been a major factor in global commerce and in improving the U.S. balance of payments. Perhaps more importantly, it has become a major tool of U.S. foreign policy. Food shipments feed the starving, improve the standard of living in developing nations, and help to overcome the effects of major floods, droughts, and similar events. Limitations on the shipment of agricultural products to other nations have been used as tools of U.S. foreign policy. Although embargo of agricultural products is considered by some to be of questionable value in international policies, curtailments of shipments to the USSR and Poland were made recently.

### Benefits

Analysis of Landsat data contributes significantly to providing information that is invaluable in a variety of non-quantifiable ways, such as:

- o Landsat data is particularly valuable, and indeed is a unique source of information, over areas of the world where other information sources are restricted or not available. For example, Landsat data are a major source contributing to information on Soviet crop conditions and in developing nations where agricultural reporting systems are rudimentary or non-existent.
- o In the area of food shipments to avoid starvation, early detection of conditions using satellite data permits the development of sensible relief supply strategies to meet the emergencies most efficiently;
- o Control on food shipments as national policy instruments are not effective if production from domestic and allied sources are sufficient to meet needs. Satellite data permits assessments of this production and is an important input to strategy deliberations.
- o Timely monitoring of the 1980/1981 drought in Australian grazing areas was instrumental in the establishment of meat import quotas by the Department of Agriculture. This information allowed USDA to establish a quota for the largest meat supplier from a position favorable to the U.S. consumers.
- o A variety of special studies requested by U.S. policy officials can be conducted more effectively using Landsat data. (See the classified annex to this Analyses for more specifics on this point.)\*

### Improved Information on Fuel and Non-Fuel Minerals

The United States economy as we know it cannot survive without abundant supplies of non-renewable resources. In 1980 the Nation consumed over 2 billion tons of new non-fuel minerals and metals, 6 billion barrels of oil, 20 trillion cubic feet of gas, and 800 million tons of coal. The value of these raw



supplies exceeded \$200 billion, and the processed value was over \$500 billion. More than one-third of our petroleum is imported, much of it from distant and unreliable sources. More than one-half of two dozen highly strategic materials comes from imports. In 1980, the United States spent \$5 billion to import non-fuel raw materials, \$25 billion for processed materials, \$72 billion for crude and refined petroleum and \$20 billion for natural gas, or a total of \$132 billion for these materials alone.

Military preparedness is dependent on a continuous supply of certain critical natural resources. Current U.S. reserves of several of these resources are at levels sufficiently low to warrant concern. For many highly strategic materials, there are no commercially exploitable reserves in the United States.

The next two decades will bring more uncertainty into the international market as more and more nations are involved in their own location and control of non-renewable resources. There is some question whether there will be adequate supplies of these minerals to support a worldwide economic expansion. Both developing and developed countries will compete for the finite supplies of these resources. The U.S. must have knowledge of the location and availability of these non-renewable resources. Landsat D and D' will contribute to obtaining this knowledge, but enhanced remote sensing capabilities offer the opportunity for even greater contributions.

That Landsat data is very valuable in locating new sources of non-renewable resources has been documented. The U.S. minerals extractive industry is a strong advocate for continued and improved land remote sensing from space. In some cases, the use of Landsat data permits analyses in mineral prospecting that have never before been possible. In many areas of the world, other data collection methods are not possible for political or economic reasons. In still other cases, the use of Landsat data is simply a more cost effective way to conduct preliminary geological surveys.

### Benefits

For some strategic minerals (e.g., chromium, platinum and cobalt) the United States is almost totally dependent on supplies from only one or two nations. For a variety of political and policy reasons, it is sometimes difficult for the United States to maintain relationships with these countries. For example, South African racial policies are considered by some in this country to be sufficient cause to sever U.S. relationships with that nation, yet it is our principal source of chromium, manganese and platinum group metals. If, through the combination of remote sensing data and conventional data, additional sources of strategic minerals can be found, the President will have greater flexibility in establishing foreign policy.

U.S. industry now spends more than \$10 billion per year in the search for new mineral sources. Land remote sensing from space offers the opportunity to conduct those geological studies more economically and effectively. In the longer term, these increased efficiencies can be passed on as cost reductions to the U.S. consumers, including the Federal Government.



Other Benefits From the Continued Availability  
of Data From a U.S. Land Remote Sensing Capability

A land remote sensing satellite system provides intangible and economic benefits through information about global renewable and non-renewable resources. Other national space policy benefits include:

- o Availability and usefulness of Landsat data to developing and other countries have to a large measure muted approaches in the United Nations that would place restrictions on the conduct of U.S. remote sensing under the government's civil, military, and intelligence programs and by U.S. private sector communities. Initiatives to impose "prior consent of the sensed nation restraints" have been resisted to date.
- o The United States has established world leadership in land remote sensing through the Landsat program. Continuation of this U.S. capability by government or industry will ensure that the U.S. does not forfeit to aggressive foreign competitors the foreign policy and commercial gains of the past decade. The U.S. industry and government will continue to have access to U.S. space data considered by many to be crucial to the Nation's economic and national security interests. Dependence on foreign sources of these data will be avoided, as will "prior consent" restrictions negotiated with the operators of foreign satellite systems.
- o Continued United States prestige among lesser developed nations through the expanded use of data from U.S. space systems in national development efforts, as well as U.S. foreign assistance programs.

SECTION 2. TANGIBLE BENEFITS

Extensive studies by reputable firms have been conducted over the past decade on the economic value of the benefits accruing from an operational LANDSAT-type satellite system. These studies were conducted at considerable cost to the Federal Government. Some of the Federal agencies involved in these studies did not embrace all the contractors' conclusions, or endorse the benefit estimates as presented. Because of the many technical scenarios and assumptions on technological maturity of the data users, estimated U.S. benefits ranged from about \$130 million to as high as \$10 billion per year.

Three of these studies, those by the Earth Satellite Corporation, Econ, Inc., and ABT Associates, Inc., are highlighted here to indicate the range of potential benefits resulting from different program assumptions:

A. "Earth Resources Benefit Cost Study" by the Earth Satellite Corporation (ESC) with Booz-Allen Research Corporation, 1974

This study focused on the benefits likely from an operational system with characteristics similar to the first Earth Resources Satellite (ERTS-1). This satellite had 80 meter resolution with four spectral bands.



The study emphasized economic efficiency benefits, i.e., doing a current job more economically. While it considered impacts on social, environmental, and other unquantifiable uses, these applications did not receive equal priority with the benefits associated with economic efficiency. The study did not consider technological improvements in remote sensing or information extraction capabilities.

This eight-year old study estimated the annual benefits in 1985 to be between \$129 and \$337 million.<sup>1/</sup> The study concluded that major benefits would be from use in water resource and rangeland management, land use, and technology export. While this study also examined benefits from agricultural and mineral use, the benefits anticipated were one to two orders of magnitude less than from those applications discussed above.

- B. "The Economic Value of Remote Sensing of Earth Resources from Space," by Econ, Inc., 1974

This study also based its conclusion on a satellite with 80-meter resolution data, but assumed the addition of a thermal IR channel (which was added to later LANDSAT satellites). ECON also based their conclusions on measurable benefits only, but did consider potential benefits which result from assured continuity of data services, and from increased data use capability, recognizing that they could only provide order of magnitude values for them.

The ECON report, while written at the same time as the ESC report, concluded that agricultural applications would produce the major benefits, accounting for about half of the totals estimated. ECON stated that the balance of the benefits would accrue primarily from the same user areas in the ESC report, i.e., water resources and rangeland management and land use.

The ECON report estimated total annual benefits to be between \$3,272 million to \$6,280 million.<sup>2/</sup>

- C. "Benefits, Risks, and Costs of a Civilian High Resolution Multispectral Satellite-Based Earth Resources Sensing System" by Abt Associates, 1981

In 1974, when the ECON and ESC studies were performed, the technology existed for much higher resolution remote sensing capability than the ERTS-1 satellite, however, these firms were not asked to consider this

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<sup>1/</sup>The dollar value shown above for the Earthsat study have been adjusted for inflation between 1973 to 1985 for comparison purposes. The figures in the 1974 report were \$40 and \$106 million, respectively.

<sup>2/</sup>The dollar figures shown for the ECON study have also been adjusted for inflation to 1985. The 1974 ECON figures were \$1,028 to \$1,973 million.

advanced capability in their benefit analysis. Abt considered this technology and based its study on a hypothetical 10-meter resolution multispectral capability. Abt believes that this higher resolution will be of very high economic value to demographic sensing and to energy resource explorations.

Because of this, Abt estimates the total global net annual economic benefit to range from \$30,000M to \$35,000M. Abt's more restrictive finding of U.S. benefits only is \$5,000M to \$10,000M. The cost of a 10-meter system would of course be much higher than an 80-meter system.

Most of Abt's higher estimates of benefits not only assume that there will be a continuity of data, but also that there will be a substantial effort in technology development, user education, and data marketing.

It is curious that none of these studies projected significant economic benefits from the use of Landsat data by the minerals extraction industry. This is in striking contrast with the strong support given by that industry to continue this U.S. technology, and with the fact that roughly thirty percent of the Landsat data sold to date from the archives has been to that industry. Perhaps this is because the technological advances in use by the minerals industry since the major studies (ESC and ECON) were conducted in 1972-74.

These three studies demonstrated the wide range of potential annual benefits that can accrue to the Nation from an operational land remote sensing system: between \$130 million and \$10 billion. All three studies project certain market reactions to the availability of improved information. None examines the incremental value of the information contributed by analysis of Landsat's multispectral data versus the value of the information from other intelligence sources.

The three studies do seem to indicate, however, that the value of the information extracted from Landsat data could be quite high. A major problem in benefit analysis is the explicit identification of which user benefits and by how much. Many segments of the U.S. economy stand to capture these benefits, but mechanisms do not now exist for the satellite operator to capture them as an inducement to invest. A long history of United States policy on public non-discriminatory access to civil land remote sensing data precludes the private sector from treating data as proprietary as a mechanism to exploit derived information. Collection and public distribution of certain economic intelligence information, particularly in the area of global agricultural production, by government agencies under legislative mandate prevents the private owner/operator from capturing a major share of the benefits attributable to renewable resource applications. It should be emphasized that a change in U.S. policy on public non-discriminatory access to civil satellite data would likely undermine U.S. programs on the freedom for the U.S. to collect satellite data over other nations for peaceful purposes. Such a change in the U.S. position could be detrimental to all United States civil and national security satellite programs.



### SECTION 3. COST OF A COMMERCIAL LAND REMOTE SENSING CAPABILITY

The required private sector investment will depend on the data characteristics selected, the period of service for which continuity will be assured, and a number of other factors. Each potential owner/operator would probably approach these factors from a different strategy on marketing, and perhaps use different assumptions on policies governing the availability of data and derived information. Detailed proposals are not available from industry, nor has a competitive process been initiated to obtain costs on a system that meets common performance requirements.

#### Cost Estimates

Estimates must be considered as a very rough-order-of-magnitude estimate of the cost to build and operate one conceptual core national capability to provide land remote sensing data. Many different scenarios could be proposed, each would result in different cost estimates. The one used in this analysis provides data that would be similar to but not necessarily identical with that now provided by the Landsat satellites. Data services from this new private sector system would be supplied for at least 10 years, starting at the end of the Landsat D and D' series (circa 1987).

The estimated costs for such a system are:

#### Capital costs

Three spacecraft, including launches	- \$570 to \$770 million
Ground systems	- \$90 to \$140 million
Total	\$660 to \$910 million
Annual operating costs	\$35 to \$60 million per year.

Special data acquisition capabilities to meet the unique needs of certain user groups are not included in this concept. Stereoscopic data, higher resolution, or other forms of data could be added to this core capability as private sector initiatives without significant Federal involvement.

#### Enhanced Federal Commitment Required

The Decision Memorandum on Private Sector Transfer of LANDSAT Activities suggested that an enhanced Federal commitment would be required to enable the private sector to finance a commercial land remote sensing venture.

The lack of specific information from the private sector requires that only arbitrary estimates can be made in response to the CCCT request for additional information on costs. It is likely that it would require between \$40 and \$100 million annual Federal commitment to induce private sector to make this level of

involvement. It is likely that the first Federal funds would be required in FY 1984 or 1985, as part of a total investment plan. Formal consultation with the private sector prior to the preparation of this CCCT Information Memorandum has been neither possible or appropriate. Thus, more specific information on private sector investment needs and the magnitude of the enhanced Federal commitment cannot be provided at this time.

#### SECTION 4. FEDERAL FINANCING

The magnitude of the enhanced Federal commitment cannot be determined with certainty until specific proposals from the private sector are in hand, preferably as the result of a competitive selection process. Likewise, the form of this commitment cannot be specified. Sale of the government's Landsat assets will probably occur. The enhanced commitment might take any of several forms: loans or loan guarantees, grants, subsidy payments, or other forms to implement a government/industry joint venture. In this analysis, it is assumed that none of the Federal agencies involved in the Landsat program will have sufficient flexibility within their approved budget ceilings for FY 1984 and subsequent years to finance the enhanced commitment. If such a commitment is made, additional budget allocations must be made to the agency charged with negotiating the private sector handoff.

#### SECTION 5. THE URGENT NEED FOR ACTION

This Administration has reached a decision point if it wishes to assure future United States space capabilities to observe the land and its resources from space.

By February 1, 1982, both Landsats 2 and 3 had ceased to function due to failures on the spacecraft. Both have been returned to service, but permanent failure can occur at any time. The next satellite, Landsat D, is scheduled for launch at the end of July 1982, and will not be in routine service for several months thereafter. Initially, data collection over foreign areas will be limited because the satellite does not include a wide band tape recorder, and the Tracking and Data Relay Satellite System (TDRSS) capabilities will not be fully available until some time in fiscal year 1984. The follow-on satellite, Landsat D', which will be available for launch in mid-1983, will be launched when Landsat D begins to expire.

If both satellites perform as hoped, U.S. land remote sensing capabilities will continue through about mid-1988. However, Landsat D is a new spacecraft design, and the risks of malfunction are higher for new spacecraft than for those which have demonstrated reliability. Continuity of service through 1987 is a goal, not a certainty. There are no U.S. Government or private sector satellites under design, planned, or being fabricated to provide data services after Landsat D and D'.

It can be argued that continuity of Landsat data services is not critical or essential to many data applications, particularly in the Federal Government, because there are other reliable sources of data. All major Federal user agencies are convinced, however, that data continuity and evolutionary technological



improvement are essential to better meeting their mission requirements. They believe that Landsat's multispectral remote sensing provides information on renewable and non-renewable resources that is not available from any existing operational data source, and most believe that continuing and improving this U.S. space capability is in the national interest. No user agency is able to fund for more than their data purchases, however. Virtually all U.S. non-Federal users have expressed the same views with respect to continuing this U.S. civil remote sensing capability, as have some influential members of Congress.

If the Cabinet Council determines that the United States should assure data continuity and retain its leadership in this civil space technology, there are only two choices for action:

1. The Department of Commerce (DOC) should submit required legislation to the Congress as soon as possible. While Congressional action proceeds, the DOC should begin the preliminary work needed to request competitive bids for the private sector takeover. The formal bidding would proceed as soon as the legislation is enacted.
2. The government could immediately start fabrication of another Landsat satellite of an existing design\* which either could be launched upon failure of Landsat D' or transferred to the private sector along with the other Landsat assets. Such a satellite could be available for launch in about five years.

Neither of these actions will guarantee continuity of data services. The first will assure long-term continuity of U.S. land remote sensing capabilities. However, the legislative process, competitive bidding, and contract negotiation will take up to two years. The owner/operator would need four to five years before it could launch an operational satellite. Thus, it is unlikely that commercial services would be available before 1988 or 1989. A follow-on government satellite is the only option to avoid continuity gaps of two or more years before commercial operations. Initiation of the procurement of this government satellite cannot be delayed until fiscal year 1984 because of the long lead times needed.

#### SECTION 6. CABINET COUNCIL DECISIONS/CONCURRENCES

CCCT decisions or agreement on the following are required:

- o Decide whether or not continuity of U.S. civil land remote sensing from space upon the demise of Landsat D and D' is in the national interest.
- o If the decision is to continue the U.S. space technology, decide on the level of commitment the Federal Government is prepared to make in order to commercialize the program as soon as possible. The two options presented in the December 14, 1981 CCCT Decision Memorandum (page 3) are:

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\*Would require a Fiscal Year 1983 supplemental appropriation of approximately \$12 million.

Option 1 - The Federal commitment is limited to data purchases on the order of \$15 to \$20 million per year from the budgets of the user agencies. In the future agencies could allocate additional resources within overall budgetary allowances. This approach to commercialization would allow private participation in other government satellite programs, various forms of joint ventures, transfer of the government's Landsat assets in return for financing of services or other approaches that could be implemented at no additional cost to the government.

Option 2 - The Federal Government commitment would include the above Federal data purchases plus other forms of direct support to encourage investment. Support could include transfer of the Landsat assets, "free" government services, subsidy payments, loan guarantees, or other financial arrangements. The direct support required to encourage private sector investment of perhaps one to three billion dollars over the next decade is believed by some to total perhaps \$250 to \$500 million over a number of years (five to ten), but this amount cannot be determined with certainty until firm proposals are in hand.

The choice between these two options is required to establish the policies under which negotiations with the private sector can be conducted. Commitment to specific dollar limits is not requested at this time under either option. Final decisions on the magnitude and form of an enhanced Federal commitment (if one is approved) can be made by the CCCT at a later time, or handled in the budget process. It should be recognized, however, that an enhanced commitment cannot be accommodated within any of the agency's budget targets for FY 1984 and beyond.

- o If the CCCT decision is that continuation of this civil space technology is not sufficiently important to the national interest to warrant special efforts to encourage private investments, the CCCT should direct the Department of Commerce to commercialize the government's Landsat D and D' assets on the best available terms and rely on future private initiatives to respond to data needs.
- o To implement either decision, the CCCT should:
  - a. Achieve the transfer to the private sector as soon as possible under terms that are acceptable to the Cabinet Council. Federal assets available for transfer to the private sector (which have been built by NASA) include the two Landsat-D spacecraft and the new ground data processing system, plus the archive of Landsat data on file at the Department of Interior's EROS Data Center, Sioux Falls, South Dakota;
  - b. Supervise and regulate private sector activities consistent with Administration policies and applicable laws;



- c. Represent the interests of the Federal users in negotiations with the private owner/operator for data services to meet common data needs; and
  - d. Manage the Landsat program until it is transferred to the private sector.
- o The CCCT should agree that the Department of Commerce, in consultation with the interagency Program Board on Civil Operational Land Remote Sensing from Space (Program Board) and the Department of Justice and through the OMB, should submit Landsat legislation to the Congress within 45 days to establish by statute the land remote sensing responsibilities and authorities of the Secretary, including:
    - a. Authority for the Secretary to enter into an agreement with a selected firm to take over the land remote sensing program and to represent the common interests of the Federal Government for data services<sup>2/</sup>;
    - b. Authority to transfer the government's Landsat assets to the private sector<sup>1/</sup>;
    - c. Authority to regulate and supervise broad private sector remote sensing activities to protect national security and respond to United States treaty obligations;
    - d. Authorization to operate the system until its transfer to the private sector is achieved<sup>2/</sup>.
  - o Agree that the Department of Commerce, in consultation with the Program Board will initiate a competitive selection process to select the private sector organization(s) to take over the land remote sensing program.
  - o Concur that during the development of the legislation, initiation of the competitive selection process, and negotiating the resulting agreement, issues that cannot be resolved by the Program Board will be submitted to the Cabinet Council for resolution. Such topics might include: the extent and method of implementing any Federal commitment; certain data distribution policies; and the methods of financing any Federal commitments.

<sup>1/</sup> No such authority now exists except through the General Service Administration's authority to dispose of surplus government property.

<sup>2/</sup> Partially accomplished in the DOC request for fiscal year 1983 Landsat appropriations.

II.

BACKGROUND ATTACHMENT

DISCUSSION AND ANALYSIS

OF THE

ISSUE AND OPTIONS

ON

COMMERCIALIZING

THE

CIVIL WEATHER SATELLITES

MARCH 1, 1982



## I. Discussion of Issue

There are major policy, market, and potential cost saving differences between the land remote sensing system and the civil weather satellite programs which raise significant policy concerns over commercialization of the civil weather satellites:

- o While important national security concerns may arise as the land system technology advances, commercialization of the civil weather satellite programs will raise important national security concerns over military dependence (as a backup to military satellite systems) on a commercial system observing weather data critical to strategic, tactical, and intelligence missions, and over the ability of the Federal Government to control this important source of information in a national emergency. Concerns of the Department of Defense with respect to national security issues are discussed in a classified attachment to the CCCT Decision Memorandum.

- o No negative international reaction to the commercialization of the land program has yet been voiced. Several countries have already expressed concern over commercialization of the U.S. civil weather satellites. It is not known how widespread this concern will be. What position other nations will take on the free exchange of weather data from satellites and other sources with U.S. Government users is also unknown. Upward of 100 nations now receive weather data from U.S. satellites. If these nations were charged significant amounts for U.S. weather satellite data, they might either terminate the present international free flow of other weather observations that are essential to U.S. civil and military weather programs, or charge the U.S. Government for global data which it now receives without cost.

- o Revenues from non-Federal users to the operator of the land system in FY 1983 are projected to be between 40 to 50 percent of the total receipts. This figure is expected by some sources to rise to 60 to 70 percent in the late 1980s. In contrast, the Federal Government would likely provide 95 percent or more of the revenues from the sale of weather satellite data, at least during the balance of this decade.

- o Though land satellite data is used by a number of Federal agencies, such use does not approximate the complex cooperative arrangements for the sharing of meteorological data that now exists among a number of Federal users. Cooperative programs include the above-described backup use of civil polar orbiting systems by the military, the multi-agency sharing of hydrological data from the GOES system and the planned shared processing of weather satellite data between NOAA, the Air Force and the Navy.

In further considering this issue, the Working Group has considered the complex interactions and linkages of weather services within the United States itself, and between the United States and over 100 nations of the world. A significant change in any part of this intergovernmental network could adversely affect the overall effectiveness of civil and military weather services in the United States. Changes in the availability of satellite data or services could be catastrophic to the public, government agencies, and industry. Examples of



these complex interactions and linkages are:

- o Within NOAA, satellite data from both the polar orbiting and geostationary satellite systems play a major role in the National Weather Service's increasingly accurate and timely forecasts and warnings over the United States. These data are indispensable in providing prompt warnings of severe weather events and in preparing more reliable longer term weather forecasts.
- o Civil and military weather satellite systems are complementary and mutually supportive. Both communities operate polar orbiting systems designed to meet the unique needs of their respective service communities. Satellite data are shared between the civil and military users. NOAA, the U.S. Air Force, and the U.S. Navy have recently embarked on a formal shared data processing program. The Department of Defense makes significant use of the capabilities of NOAA's geostationary weather satellites.
- o The Departments of Agriculture and Interior, the Corps of Engineers and NOAA share hydrological data collected in regional networks of rainfall gauges and stream flow gauges operated by each agency to meet their particular needs. These data are collected by NOAA's geostationary weather satellites and are provided to the various Federal and state agencies concerned with flood forecasting, flood control, irrigation, and fresh water management.
- o Increasingly, the Department of Agriculture and other agencies use NOAA weather satellite imagery and information derived from satellite data, along with Landsat data, in forecasting production of wheat and other crops of great importance in international commodities trading.
- o National aviation weather forecast and dissemination responsibilities are shared between NOAA and the Federal Aviation Administration . NOAA's international aviation weather forecast area of responsibility meshes with those of other nations under the International Civil Aviation Organization. Civil weather satellites provide data that is indispensable in these aviation services.
- o Weather services provided by the private sector are based on NOAA's weather satellite images and data, basic weather products, and conventional global weather data.
- o Almost all the governments of the world have freely exchanged weather data, analyses, and forecasts for over a hundred years. For almost 20 years this international data exchange has included weather satellite data. Both civil and military weather services in the United States would be impacted if foreign satellites and non-satellites data either were no longer available, or available at a cost the Federal Government could not afford.



- o The dedicated satellite control facilities and data processing equipment used for the polar and geostationary meteorological satellites are not duplicated in NASA-developed Landsat-D equipment, nor in the equipment in commercial communications satellite systems. Consequently, although the aggregation of remote sensing satellites in the Department of Commerce provides a coherent focus for the activities, no elimination or consolidation of equipment is feasible for the current generations of satellites.
- o Modifications are presently underway in the method of incorporating meteorological satellite data into the forecasts of the National Weather Service (NWS). These include changes in the data processing flow and the polar-orbiting satellite's Equator crossing time to provide more timely inputs to the Limited Fine Mesh model. They also include the transition of the Visible Infrared Spin Scan Radiometer Atmospheric Sounder (VAS) from experimental to operational service. These activities are collaborative efforts between the National Earth Satellite Service (NESS) and NWS, and are not separable.
- o Processing of data from the meteorological satellites is accomplished on a large NOAA computer shared by NWS and NESS.
- o Cooperative opportunities remain unexplored for the use of a foreign polar orbiting satellite to complement the U.S. low-altitude systems, and to provide redundancy. The technology is available in Japan and Europe to produce and launch a unique, but compatible, polar orbiting metsat. Now that the Administration has decided to reduce from two to one polar orbiters, foreign entities, who are even more reliant upon the data than the United States, may find this to be an attractive international effort.
- o Federal procurement of data from a commercial operator may be more costly. A private firm will require a return on its investment and for the foreseeable future will probably look to the Federal Government (which now accounts for better than 95% of the market for weather satellite data) and, in particular to NOAA, for such a return. If the Federal Government adheres to its longstanding policy of cost-free dissemination of weather data worldwide, it must compensate the private owner accordingly, thereby increasing Federal costs. If it does not, the U.S. commercial entity presumably would charge other national governments for weather data. Both NOAA and DOD might then have to buy weather data from other countries, with a resultant net increase in cost to the U.S. Government to acquire the global weather data needed for civil and military purposes. Further, some economies related to government operation (i.e., DOD/NOAA joint procurement of satellites and interagency processing of civil/military data) might not be possible were the weather systems privately owned.

## II. Discussion of Options

There are three options for further analysis of commercializing the civil weather satellites: (1) initiate policy issues concurrently with preparing the work statement used in the competitive selection process described in OMB Circular A-76 to determine cost impacts, (2) after a preliminary analysis of the policy implications of commercialization, initiate the A-76 process, if appropriate, and (3) reject further consideration of commercialization of the civil weather satellite program at this time.

Pros and cons of these options follow:

Option 1. Address the national and international policy issues associated with commercializing civil weather satellite services concurrently with initiating the review process described in OMB Circular A-76 to determine cost impacts.

Pro

1. Avoids long-term policy studies which OMB, OSTP and NSC staff believe are not required.
2. Allows decisions to be made several months earlier than under Option 2.
3. Savings, if any, would reduce the Federal budget earlier.
4. Would provide a clear signal of the Administration's intention to meet its civil weather satellite data needs from the private sector, if it is cost effective to do so and policy considerations permit.

Con

1. Allows only a very short time to assess carefully and resolve the national security and national and international policy implications of commercialization.
2. There may not be time to consider options or the future Federal role in the provision of weather services.
3. Precludes consideration of other alternatives in reducing the total Federal costs for weather satellite data, such as increased mutual support of the requirements of the civil and defense sectors and possible forms of internationalization.
4. The preparation of performance specifications to which a private owner/operator must respond are complex and must be responsive to the policy determinations. Premature statement of these requirements could result in a service that is not responsive to future Federal needs. Subsequent amendment of these statements could necessitate a new bidding process with the result that the availability of the required cost information could be delayed longer than in Option 2.
5. Decisions made as a result of the A-76 bidding process will govern government civil and military weather activities for decades to come. Less than optimum decisions made prematurely could adversely impact both civil and military weather activities. They could result in greater rather than smaller long-term Federal costs.



Option - 2 Conduct analyses on the national and international policy issues associated with commercializing civil weather satellite services, make preliminary estimates of the cost impacts of various forms of commercialization, and, if warranted, conduct the A-76 bidding process to determine actual cost impacts.

Pro

1. Permits civil weather satellite policy decisions to be made based on more comprehensive analyses of national security and national and international issues.
2. Allows consideration of some alternatives other than commercialization to achieve the goal of reducing Federal civil and military expenditures for weather satellite data.

Con

1. Decisions to commercialize civil weather satellite programs would be delayed by perhaps six months. Savings, if any, would be delayed that long.
2. Does not provide as clear a signal that the Administration intends to meet its weather satellite data needs from the private sector, if it is cost effective to do so.
3. Initiates in-depth, detailed policy studies which the OMB and NSC staff believe are not required.

Option - 3 Conclude that the national security and international policy issues associated with commercializing civil weather satellites would so disrupt the complex linkages between these satellite services and the civil and military weather programs that commercialization would be unwise.

Pro

1. Avoids unnecessary national security problems which are considered by many to be very difficult to resolve.
2. Avoids an unnecessary and complex regulatory regime for the private sector.
3. Avoids problems in the international exchange of data.
4. Avoids complications and legal problems associated with the "freedom of information act."
5. Avoids military involvement in a commercial venture with possible foreign policy implications. (See classified attachment for further explanation.)

6. Permits DOC/NOAA and other agencies to continue investigation of achieving economies through cooperative weather satellite programs such as shared data processing.
7. Permits the government greater flexibility in responding to unforeseeable changes in weather services requirements (civil and military).
8. Avoids a single private sector operator creating a monopoly on weather satellite services and being in a position to dictate future services and prices for those services.

Con

1. One company has expressed interest in investing in both the land and weather satellite programs as a composite business enterprise. A decision not to commercialize the weather satellite program might well dampen that company's interest in Landsat.
2. Conceivably, private sector operation of the weather satellite program could prove more cost effective than governmental operation.