MEETING AGENDA

SOURCE EVALUATION BOARD FOR CIVIL SPACE REMOTE SENSING

8:00 AM, July 11, 1983

NBOC-1, Room 303

0800	1. Update on current events (including nagging on Financial Disclosure Statements)	R. Kammer
0830	2. Review of revised RFP Outline	E. Neil
0900	3. Discuss expanded business sections of RFP	N. Scodari
1000	B R E A K	
1015	4. Review of issue status	R. Kammer
1200	L U N C H	
1330	5. Review TAC drafts	E. Neil
1600	6. Other Business	

DRAFT

1.2.5 Restrictions on Government Use of Data

In any contract that may result from this RFP, the U.S. Government will require access to space derived remote sensing data as described in Part___ of these specifications. The Government will also be conducting independent research and development using external remote sensing data obtained either by experimental sensors flown on the commercial sataellites or separate R&D missions; as well as foreign R&D or operational data obtained through foreign research investigations. The present procedures and methods for the obtaining land use of foreign remote sensed data for R&D purposes are described below.

1.2.6 Global Data Access for R&D

The established practices associated with the U.S. "open skies" data policy of public non-discriminatory dissemination have served us well in promoting a climate of legitimacy and acceptance for U.S. worldwide data acquisition from space. They have preserved U.S. freedom of action in this area, have benefitted U.S. commercial participation in growing market and have helped retard development of foreign competitive trusts that would pose a challenge to U.S. leadership in remote sensing.

The ability to engage in global research has been fostered by the U.S. open data policy. R&D programs have not been subject to geographical limitations. They have thus enjoyed uncontested access to data of areas of the world judged to be of prime scientific interest in reaching an understanding of global phenomena despite often restrictive practices placed on foreign scientific research by bureaucratic factions in a number of countries. Efforts to impose restrictive limitations have thus far been thwarted and the U.S. view has prevailed in the deliberations of the United Nations Outer Space

Committee.

The U.S. Government conducts a wide variety of space-based experiments to evaluate the ability of remote sensing techniques for basic and applied studies of the Earth. Experimental sensors placed on orbiting spacecraft can be used to collect remote sensing data in may different parts of the world. Wide dissemination of this data within the global research community is essential to fully evaluate its utility. Past experience with sensors such as the Shuttle Imaging Radar-A has shown benefits from research conducted by both domestic and foreign investigators. Limitations on the availability of such data would restrict the scope and extent of research, which, in turn, would reduce the Government's overall return on its investment in specific orbital experiments.

As indicated above, the U.S. Government achieves a significant "multiple effect" on the return on its research investment by permitting experimental data to be widely disseminated. Restrictions on the flow of R&D data into the reasearch community would reduce or diminish the overall R&D achievements of specific flight projects. The flow of such data into the worldwide research community plays an important role in expanding current awareness of the utility of space techniques.

1.2.7 R&D Requirement for Foreign Remote Sensing Data

A number of foreign nations/agencies (France, Japan, European Space Agency, Canada, India, Federal Republic of Germany, Brazil) are currentlyu developing or plan to develop either remote sensing missions. Research scientists have already made plans to obtain data from the German-developed Modular Optoelectronic Multispectral Scanner (MOMS) instrument scheduled for a June 1983 Shuttle experimental flight and the Microwave Remote Sensing Experiment (MRSE) instrument scheduled for flight on

Spacelab I in September 1983. We anticipate future research requirements for access to European Space Agency ERS-1 data (in particular ERS-1 SAR data) in the 1988 timeframe, Japanese MOS-1 data in the 1986 timeframe, and Canadian RADARSAT dat in the the early 1990s. Although we have not yet identified specific research requirements for French SPOT data, it is likely that scientists will have access to this data in the same manner as will other U.S. users -- through purchase of the data. In the other above-cited instances, it is likely that we will obtain foreign satellite data for experimental purposes through cooperative agreement in exchange for U.S. data, in support of U.S. investigators, or in return for U.S. ground truth support.

The U.S. may explore the possibility of direct readout of foreign remote sensing satellite data by U.S. ground stations for experiment purposes. Such arrangements could be patterned after similar arrangements whereby U.S. experimental satellite data was acquired by direct readout at foreign ground stations on the basis of negotiated agreements.

1.2.8 Foreign Participation in U.S. R&D Programs

R&D efforts benefit from the participation of foreign scientists and investigators. A number of foreign scientists and counterpart foreign agency personnel have demonstrated expertise in the area of earth seiences. Their own research often complements that of their U.S. peers. In the earth sciences area, foreign scientists/investigators have participated/continue to participate in the Landsat 1, 2 and 4 investigations, Shuttle Imaging Radar-A and -B investigations, and are associated with the Skylab, Nimbus-7, Magsat and Heat Capacity Mapping missions. Foreign involvement can be anticipated in virtually all of the future remote sensing programs; in particular foreign ground truth support and participation of foreign investigators will be crucial in

the development of an integrated NASA Global Habitability program.

Foreign scientists and foreign counterpart agencies have command of resources which are often of value in the context of cooperative programs. Foreign instruments have been contributed in the case of the TIROS and follow-on meteorological satellite series (UK instruments, French data collection system) as well as the Nimbus series of satellites (UK instruments). A currently envisioned cooperative activity is the joint flight of NASA's Shuttle Imaging Radar-C with the German Remote Sensing Experiment (initially flown on Spacelab 1) in the 1986 timeframe. Another example is the back-up tape recorder support at Landsat foreign ground receiving stations (operated at foreign agency expense) enabling attainment of U.S. Government data requirements not other wise attainable lin the pre-TDRSS era.

As foreign counterpart agencies develop their own earth science missions, we can expect reciprocity in receiving access to foreign-acquired data and participation by U.S. scientists and investigators on foreign mission science teams.

1.2.9 International Considerations

Like domestic investigators, foreign investigators associated with R&D efforts receive the data they need at no cost. In addition to bringing demonstrated expertise to the investigation and engaging in activities of specific interest, foreign investigators can provide valuable ground truth support and often resources of great potential value to the R&D program. At the same time, allowing foreign investigators to participate in R&D programs have required and will continue to rquire an exhange of U.S. remote sensing data (experimental land/or operational) in return for ground truth support or eventually for data from foreign satellite missions.

1.3.0 Dissemination of R&D Results

It is Government policy to report the results of sponsored research activities in an expeditious fashion. Meetings of sponsored investigators are considered to be open forums for scientific debate and discussion, and any interested investigators may attend. Publication and presentation of research results shall not be affected by commercialization.

All research results are considered to be public property and they reside within the public domain. The commercial operator may have a vested interest in remaining abreast of current sponsored research. However, the commercial operator can not be provided with early or proprietary access to research results.

1.3.1 Proposal Requirements

The proposal shall address in this part the understanding of the needs and purpose of remote sensing data for R&D and the approach to provision of operational data for research. Of particular interest is the proposed approach to:

A. Restrictions on duplication rights, if any, for purposes of R&D use of data;

B. Restrictions , if any on the use of foreign data for R&D purposes; and

C. The methods proposed to maintain organization of R&D results for purposes of system or product improvements for commercial use.

FIRST DRAFT:ENeil:LYV:7/11/83:443-3925

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3.0 PROPOSED FOREIGN REMOTE SENSING SYSTEMS

3.1 Foreign Land Remote Sensing Systems

Two space systems planned by other nations are the French, SPOT (Systeme Probatoire d'Observation de la Terre), and the Japanese MERES (Mineral, Energy and Resources Exploration Satellite) systems. These systems are scheduled to start operating in the mid-to-late 1980's. Table II compares the capabilities of the Landsat-1, -2, -3, -D, the SPOT, and the MERES systems.

Both of these foreign systems have some characteristics (spectra bands and spatial resolution, for example) that are comparable to the Landsat-D System. However, one of the differences is that both the French and Japanese have pointable capabilities (using rotating mirrors) that will increase the frequency of observation of any point globally. The SPOT system, with one satellite would cross over a point every 26 datys, and the pointing instrument could observe a point every fifth day. In addition, stereoscopic capability would also be available on the French and Japanese systems. SPOT will have direct readout to foreign ground stations, and two on-board recorders (22 minutes each). Both the SPOT and MERES Systems will use push-button (solid state) scanning technology rather than the mechanical scanners now in use by the United States. Each line of the image is formed by a linear array of detectors located in the instrument focal plane, the scanning of the line being performed electronically. The successive lines of the image are produced as the satellite moves forward along its orbital track. The advantages of this type of sensor is the exposure time for each ground point is automatically maximized, and the mechanical simplicity of the instrument ensures image of excellent geometric quality.

A market for SPOT data is ecpected to be found among those involved in oil and mineral exploration, topographic and land use mapping, crop and environmental monitoring, coastal zone studies and general research activities. SPOT Image, the privately-owned company that will market SPOT, plans to establish agreements with ground stations, giving the stations exclusive rights to market Spot within their own countries. The payment fees to these stations are structured so as to e essentially proportional to the amount of data received by them. SPOT Image has tentatively priced their product (high density tape) at about $1,000 per scene. A SPOT scene is approximately one-forth the area of a TM scene (currently prices at $2,800) and has three spectral bands, as compared to the TM's seven.

3.2 Foreign Meterological Satellite Systems

3.2.1 Geostationary Satellites

There are several operation or planned geostationary satellites operated by foreign countries. These are summarized in the Table below:

GEOSTATIONARY SATELLITES

Name	Operator	Location (Longitude)
METEOSAT	EUMETSAT and the European Space Agency	0°
GMS	Japan	135°E
INSAT	India	72°E
GOMS (Planned)	USSR	74°E

All provide Visible IR Imagery, WEFAX (except India) and DSC.

Coordination among the operators of the international geostationary weather satellites is accomplished by an ad-hoc group called Coordination of Geostationary Meteorological Satellites (CGMS). The WMO serves as an advisor to the CGMS.

3.2.2 Meteosat

The European Space Agency operates METEOSAT, which has a subpoint of 0°E. This position gives Meteosat an areal coverage from the South Atlantic to Greenland and from Saudi Arabia to Brazil. This satellite offers visible, infrared, and moiture channel data. Limited amounts of METEOSAT data, also in WEFAX format, are available to GOES-TAP customers.

The spacecraft is a spinning satellite with its spin axis parallel to the earth's axis. Spin rate is 100 rpm.

Sensors and services

a. Viewing sensor - 3-channel, high resolution radiometer operating in three spectral bands.

1) Visible band (0.4-1.1 micrometers), resolution 2.5 km, 5,000 lines/image.

2) Infrared band (10.5-12.5 micrometers), resolution 5.0 km, 2,500 lines/image.

Data are stored in an on-board computer during the earth viewing portion of a spin (1/20 of a revolution). During the remaining 19/20 of the spin the data are transmitted to the ground at a transmission speed of 166 kbs. Images are acquired on a half hourly schedule.

b. Data Collection System - Operates both an international and a regional DCS. The international system operates on the platform reply frequency 402-402.1 MHz, divided into 33 3 kHz wide reply channels, and currently accepts only self-timed platforms. An interrogation frequency is available at 468.875 MHz, but is not presently in use. The regional system operates on the platform reply frequency 402.1 to 402.2 MHz, divided into 29 3 kHz wide channels (four channels are reserved). Allthree platform types - self-timed, interrogated and alert - can be accommodated. The interrogation frequency is 468.925 MHz.

c. Direct Broadcast - Two types of direct data dissemination are provided, a high-resolution image broadcast and a weather facsimile (WEFAX) broadcast. The high resolution broadcast is at 1694.5 MHz. These images are broadcast in digital form and may include one or more spectral bands. No panoramic distortion corrections is made. Three area coverages are provided: (1) whole disk, (2) SEuropean area, and (3) the Americas, north of 20°S. (This latter is a rebroadcast of GOES data.) data are repeated no less frequently than three hourly intervals. Delays from original image receipt to picture transmission are one to two hours.

The WEFAX broadcasts are made at both 1691 and 1694.5 MHz, and are analogue transmissions. For these transmissions the full disk is divided into designated sectors. The successive transmission of all sectors will provide full disk coverage. Each transmission contains data from just sone spectral band. Repetition

rates for the WEFAX sectors vary from one to three hours, with delays after original data receipt being generally 30 minutes. In addition to METEOSAT and GOES imagery, cloud top height analyses and selected weather charts are transmitted in WEFAX format.

Centralized Processing

At present five operational products and one experimental product are produced routinely using an automated computer-based system. Of the operational products, three are prepared twice a day at 00 and 12 UT. These are cloud motion vectors (winds), sea surface temperature, and upper tropospheric humidity, expressed as relative humidty. These three products are disseminated in the SATOB code on the GTS. The two other operational products are cloud analysis and cloud-top height maps, which are produced four times per day, at 00, 06, 12, and 18 UT. The cloud analyses are also distributed on the GTS in SATOB code, while the cloud-top height maps are disseminated via the satellite in the WEFAX format. The experimental product, radiation balance data, is being evaluated and is not now disseminated.*

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*Additional information on the METEOSAT system and services is available in WMO-No. 411, Chapter I.

3.2.3 GMS

Japan operates GMS, which has a satellite subpoint at 135°E. This position gives GMS an areal coverage from the South Pacific to Siberia, and from Hawaii to India. Limited amounts of GMS are available to GOES-TAP customers. GMS data are transmitted in WEFAX format. The spacecraft is at an altitude

of 35,800 km and has a spin rate of 100 rpm.

Sensors and Services

a. Viewing Sensor - The Visible and Infared Spin Scan Radiometer (VISSR), a high resolution scanner operating in two spectral bands.

1) Visible band (0.5-0.75 micrometers) resolution 1.25 km, 10,000 lines/image.

2) Infrared band (10.5-12.5 micrometers) resolution 5 km, 2,500 lines/image.

Data are transmitted to the ground station during the scanning portion of each spin at a rate of 14M bits/s.

b. Space Environment Monitor. Measures flux of solar protons, alpha particles, and electrons. Used to monitor solar activity and space environment.

c. Data Collection System. Operates both an international and regional DCS. The international DCS is the same as for METEOSAT. The regional DCS operates on the platform reply frequency 402.1 to 402.4 MHz, divided into 3 kHz wide reply channels. The interrogation frequency is 468.924 MHz. Both self-timed and interrogated platforms can be accommodated.

d. Direct Broadcast. Two types of direct data dissemination are provided, a high resolution image transmission (HR-FAX) and a WEFAX-type

transmission (LR-FAX). HR-FAX is an analogue signal and is transmitted at 1687.1 MHz with a recorder drum speed of 400 rpm. Two formats are provided, a full disk image with no panoramic distortion correction and a Mercator mapped image, covering the area from 35°N-35°S and from 90°E-170°W. Full disk IR images are transmitted every three hours beginning at 00 UT. The SIR Mercator images are transmittted every six hours beginning at 02 UT. Full disk visible images are transmitted at 0130, 0400, and 0730 UT. Delays after VISSR operation range from five minutes for the IR full disk to slightly over two hours for the IR Mercator.

The LR FAX transmissions, which are fully compatible with WEFAX , consist of eight sectors which which provide full disk coverage. There is no panoramic distortion correction. The set of eight LR-FAX sectors are transmitted every three hours starting at 0021 UT with a time delay of 21 minutes after completion of VISSR imaging. (Note: For both HR-FAX and LR-FAX, the transmissions expected at 15 UT are delayed one hour to 16 UT because of the lack of a VISSR image near local midnight during eclipse periods.)

Centralized Processing

Japan produces cloud motion vectors (winds) using an automated computer based system. These winds are disseminated on the GTS in the SATOP code form.*

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*Additional information on the gms system and services is available in WMO-No. 411, Chapter II.

3.2.4 INSAT

Proposed, two geostationary satellites (INSAT-I, A, and B) located at 74°E and 94°E longitude, respectively, to be operated by India. These are combined communications/meteorological satellites and are three axis stabilized.

Sensors and Services

a. Viewing sensor - A Very High Resolution Radiometer operating in the visible (0.55-0.75 micrometers) and the infrared (10.5-12.5 micrometers), with resolutions of 2.75 km and 11 km, respectively. Full frame images are available every 30 minutes. Will be used for continuous monitoring. Products expected include synoptic weather observations, sea-surface and cloud-top temperatures and water-body, andsnow mapping.

b. Data Collection System - A 200 kH bandwidth data channel in the 402.75 MHz (earth to satellite) band for relaying meteorological, oceanographic, and hydrologic data from unattended land- or ocean-based data collection and transmission platforms.

There is no WEFAX or direct broadcast. The meteorological data is multiplexed with the communications links. Initially only Indian stations may receive the data.

3.2.5 GOMS

Russia has proposed, one geostationary satellite (GOMS) located at approximately 70°E. The satellite is planned to be three axis stabilized.

Sensors and Services

a. Viewing sensors

1.) Television-type scanning equipment in the visible band of the spectrum with a resolution of 2-4 km.

2.) Infrared scanning equipment in the infrared atmospheric window (8-12 micrometers) with a resolution about 12 km. Images will be taken every 30 minutes and transmitted to the Primary Data Utilization Stations (PDUS) in Moscow, Novosibirsh and Khabarosh.

Data Collection System

Planned to be compatible with the DCS as recommended by the CGMS.

WEFAX

Two WEFAX channels are proposed. The first will be an international channel with transmissions orginated from the principal PDUS in Moscow. This channel will be operative for 20 minutes out of each half hour. The visible image will be transmitted in nine sectors, the infrared image as a single sector. Two of the 20-minute intervals will be required for transmission of the ten sectors. Images will be transmitted two hours after observation. Initial plans call for four image transmissions per day, with the other WEFAX periods being used for the transmission of standard meteorological charts. The second WEFAX channel will be a regional channel and input will be from all three

PDUS'. This channel will operate continously. Its primary purpose is for the exchange of meteorological charts between the Hydrometeorological Centre and the regional centres, and for support of the Hydrometeorological Service.

3.3 Polar Meteorological Satellites

3.3.1 METEOR

At this time polar-orbiting meteorological satellites are being operated by two countries, the U.S.S.R. and the U.S.A. The Soviet satellites are of the METEOR series.

Spacecraft

The current spacecraft in the Soviet polar-orbiting meteorological program is the METEOR-2 improved operational meteorological satellite. Prior to the introduction of the METEOR-2, the METEOR satellite was used, with 25 of these satellites being launched. With the introduction of METEOR-2 the earlier satellite was discontinued. METEOR-2 will continue as the basic operational meteorological satellite through 1985. The decision on possible changes at that time has not yet been made.

Two or three satellites are normally in operation at the same time. These spacecraft fly in a near polar orbit at a height of 900 km. The orbit has an inclination of 81° to the equator and the spacecraft completes one revolution about the earth every 102 minutes. The particular orbit flown was chosen to provide for the collection of data twice per day, at times approximating the meteorological synoptic hours (0300 and 1500 Moscow time).

Sensors

METEOR-2 carries five sensors, as follows:

a. A scanning telephotometer. This instrument acquires data in the visible band of the spectrum from 0.5-0.7 micrometers. The width of the viewed swath is 2,600 km, the resolution of the data is 2 km. This instrument provides the input to the automatic picture transmission (APT) direct broadcast service.

b. Television-type scanning equipment. Acquires data in the visible band of the spectrum from 0.5-0.7 micrometers. The width of the viewed swath is 2,200 km; the resolution of the data is 1 km.

c. Infrared scanning radiometer. Acquires data in and near the infrared "window" in the spectrum, operating from 8-12 micrometers. The width of the viewed swath is 2,600 km, the resolution of the data is 8 km.

d. An eight-channel infrared scanning radiometer. Acquires data in the frequencies 11.1, 13.33, 13.70, 14.24, 14.43, 14.75, 15.02, 18.07 micrometers. the width of the viwed swath is 1,000 km, the angular resolution 2^{o}. This instrument provides information on the vertical distribution of temperature. It is not carried on all METEOR-2 satellites.

e. A penetrating radiation radiometer. This instrument acquires data on the fluxes of penetrating radiation in space near to the earth.

Data processing

The data available from these sensors provide the capability, through analysis, to determine a number of parameters:

- o Global distribution of clouds
- o Global distribution of snow and ice cover
- o Global radiation temperature of the underlying surface
- o Height of cloud tops globally

The foregoing are produced operationally twice perday, at times approximately the meteorological synoptic hours. In addition, the system provides the capability to obtain operationally regional data on cloud distribution through the data provided by the automatic picture transmission system.

Experimentally, world-wide data are obtained which can be used to calculate the vertical distribution of temperature. Finally, data are obtained which indicate the strength and frequency of the fluxes of penetrating radiation in space near the earth.*

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*Additional information on the polar-orbiting satellites of the U.S.S.R. is contained in WMO-No. 411, Section III, pages 1-81.

The proposer shall state the proposer's understanding and awareness of the current

and planned foreign satellite systems, either Landsat or meteorological, or both as appropriate and address proposed mechanisms, procedures and plans for incorporating such foreign data into his system. The proposal shall clearly state the role, if any of the U.S. Federal government in the proposed procedures; any limitations proposed on the use of such foreign data by agencies of the U.S. Government, universities, private organizations or other enetities of the U.S.

The proposal shall also state what procedures if any might be developed or incorporated in colloboration with such foreign sensing systems together with the benefits such action(s) would accrue to the U.S.

Based on the proposer's knowledge of these foreign sensing systems, the proposal shall indicate the methods and plans to maintain and foster current U.S. leadership in remote sensing and/or atmospheric measurements, as appropriate.

FIRST DRAFT: ENeil:LMD/LYV:7/11/83:443-3925

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8:00 AM, July 5, 1983

NBOC #1, Room 303

0800	1.) Briefing on development of business provisions for RFP	L. Klingensmith
0830	2.) Review of Issues in work - From SEB #2 - Others	L. Heacock
1130	3.) International commitments	L. Rose
1200	LUNCH	
1330	4.) July SEB Meeting Schedule	R. Kammer
1400	5.) Federal Data Collection System (DCS)	W. Shope
1500	6.) Liability Issues	J. Levine
1530	7.) Recapitulation of new actions	R. Kammer
1600	8.) Any other business	
1700	9.) Adjourn	

Next 4 Page(s) In Document Denied

UNITED STATES DEPARTMENT OF [illegible]
Office of the Secretary
Washington, D.C. 20230

June 30, 1983

Memorandum for: The Source Evaluation Board

From: Joseph Levine JL

Subject: Liability Issues in the RFP

At its July 5 meeting, the SEB will have to decide on the guidance it wishes to provide to the BAC on how the liability issue should be addressed in the RFP. Attached for background information and guidance is a copy of the LAC's final version of the liability issues. It does not differ in any significant way from the version distributed previously. If you do not have time to read the entire paper before this item comes up on the agenda, I urge that you at least become familiar with pages 7 - 10.

Attachment

GENERAL COUNSEL OF THE
UNITED STATES DEPARTMENT OF COMMERCE
Washington, D.C. 20230

JUN 20 1983

MEMORANDUM FOR: Joseph M. Levine
Chief, General Law Division

FROM: M. Timothy Conner
Staff Attorney

SUBJECT: Liability Issues Regarding Transfer of LANDSAT and Weather Satellites to Private Sector

The current U.S. program in civil space remote sensing consists of a single operational land satellite (LANDSAT) and four operational weather satellites (GOES and TIROS-N) in orbit. The Administration has proposed the transfer of these satellites to the private sector and has established a Source Evaluation Board to evaluate the proposal. This study is in response to your request for an examination of the liability issues involved in the transfer.

In discussing the matter, this memo will touch on the following questions:

(1) What is the current liability status of the satellite programs?

(2) If a transfer is effected, what liability does the private entity incur if persons or property are injured by one of the satellites?

(3) What liability, if any, does the private entity incur in its provision of, or failure to provide, data upon which weather forecasts or similar predictions are based?

(4) What liability, if any, does the United States retain concerning the events outlined in questions two and three?

(5) Should the liability issues be addressed in the RFP?

It should be kept in mind that these liability issues and situations are really ones of first impression, since, even though space vehicles and their fragments have been falling back to earth since Sputnik was launched, no serious injury has been reported.

1. What is the Current Liability Status of the NOAA Satellite Programs

There are two hypothetical situations here. The first involves damage or injury to a foreign (non-U.S.) national or foreign property. The second is if the victim is a U.S. national. The satellites of course are government owned at present.

International Liability of the U.S. Government

In the first scenario, there are four international conventions which would apply to the existing NOAA satellites. These are the Convention on International Liability for Damage Caused by Space Objects, March 29, 1972 [1973] 24 U.S.T. 2389, T.I.A.S. 7762 (hereinafter cited as Liability Convention); the treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (hereinafter referred to as the Outer Space Treaty), October 10, 1967 [1967], 18 U.S.T. 2410, T.I.A.S. 6347, 610 N.N.T.S. 205; the Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, April 22, 1968 [1968] 19 U.S.T. 7570, T.I.R.S. 6599, 672 U.N.T.S. 119 (hereinafter cited as The Rescue Agreement).

The Liability Convention

Article II of the Liability Convention states: "A launching state shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight." The reference to "its" space object in Article II is not entirely clear. Does this mean only a space object of the launching state, meaning the government itself, or a space object owned by a some private entity of that country, or both? Under Article I the term "launching State" includes: (1) A state which launches or procures the launching of a space object; or (2) A state from whose territory or facility a space object is launched. It would seem that this language indicates a desire to make the launching state, or in our case the U.S. Government, absolutely liable to foreign governments, businesses, and individuals for personal and property damage caused by space objects under the control of the U.S. Government or one of its nationals.

Article II makes it clear that there are three elements which must be proved before recovery can be had. First, there must be damage; second, there must be a space object; and third, the damage must be caused "by" the space object. Proof of negligence is not required since the launching state is absolutely liable-irrespective of any fault on its part-for damage caused on the surface of the earth or to aircraft in flight. However, as to the unlikely event that a satellite were to hit another object in space, a negligence standard would apply.

The Outer Space Treaty

This Treaty provides in Article VI that states which are parties to the Treaty shall bear international responsibility for national activities in outer space. Article VII goes further by stating that each state which launches or procures the launching of a space object, and a state from whose territory or facility an object is launched, is internationally liable for damage to another state or its natural or juridicial persons on the earth, in the air, or in space.

It is doubtful that the Outer Space Treaty could be regarded as imposing more liability than the Liability Convention. This becomes quite apparent from the fact that the Treaty does not mention absolute liability which is incorporated in the Liability Convention with respect to damage on earth or to aircraft in flight. Also, the three essential elements, namely that there must be damage, that is must be done by a space object and that there must be proximate causation are equally important under the Outer Space Treaty. In addition, the Liability Convention, unlike the Outer Space Treaty, refers to principles of justice and equity in determining the compensation which the launching state is liable to pay for damage in order to provide such reparation as will restore the person on whose behalf the claim is presented to the condition that would have existed if the damage had not occurred.

The Rescue Agreement

Another convention which may be considered is the Rescue and Return Agreement. Under the provisions of this agreement there are two situations in which expenses associated with the recovery and return of space objects would have to be borne by the launching authority: first, if that authority requested the recovery of its space object and second, if the launching authority requested the return of its space object. If either or both of these conditions are met, the launching authority is required to pay the expenses associated with the recovery and return.

The provisions of the Outer Space Treaty concerning liability are covered in more general terms than those of the Liability Convention, which came later, and appear to be an elaboration of the principle of liability enunciated in the Outer Space Treaty much the same as the Rescue and Return Agreement is, to a great extent, an elaboration of the principles incorporated in the Outer Space Treaty concerning the rescue and return of astronauts and the return of space objects.

Domestic Liability of the U.S. Government

Since the Liability Convention excludes its coverage from situations where the damage is caused by a launching state to one of its nationals, an injured American national would have to look for other remedies to pursue a claim against the U.S. Government for harm caused by one of its space objects.

Under the Federal Tort Claims Act, 28 U.S.C. § 1346(b) et seq., the government has given its consent to be sued for "...money damages... for injury or loss of property, or personal injury or loss of property, or personal injury or death caused by the negligent or wrongful act or omission of any employee... while acting within the scope of his office or employment, under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred." The words of the statute "negligent or wrongful act" have been interpreted to mean that liability will be imposed only upon the theory that the employees of the government have failed to exercise ordinary care or have engaged in some other conduct constituting misfeasance or malfeasance. See Dalehite v. United States, 346 U.S. 15 (1953); Laird v. Nelms, 406 U.S. 797 (1972). Liability, however, is not fully coextensive with that of a private individual, for these are a variety of types of claims that are expressly excluded from its coverage. 28 U.S.C. § 2680. Of interest to the present discussion are the so-called "discretionary function" exception, 28 U.S.C. § 2680(a) and the misrepresentation exception, 26 U.S.C. § 2680(h).

The discretionary function exception provides:

> The provisions of this chapter and section 1346(b) of this title shall not apply to -- (a) Any claim based upon an act or omission of an employee of the Government, exercising due care, in the execution of a statute or regulation, whether or not such statute or regulation be valid or based upon the exercise of performance or the failure to exercise or perform a discretionary function of duty on the part of the federal agency or an employee of the Government, whether or not the discretion involved be abused. (Emphasis added)

There is a substantial body of case law interpreting the discretionary function exception. See, Dalehite v. United States, supra.; Indian Towing Co. v. United States, 350 U.S. 61 (1955); Rayonier, Inc. . United States, 352 U.S. 315 (1957); Dahlstrom v. United States, 228 F.2d 819 (8th Cir. 1956). The traditional inquiry for determining if the discretionary function exception applies is an analysis of whether the particular act of a government agent is one involving the formulation of government policy or whether the act in question occurs in implementing a policy at an "operational" level. The judicial interpretations of this distinction provide no clear standards for determination of the applicability of the discretionary function exception. Rather, the judicial constructions of 28 U.S.C. § 2680(a) have tended to examine all relevant factors in an assessment of whether the act in question was at a policy making level which Congress intended to place beyond judicial review or at the functionary or operational level which was intended to be reviewable. See, Downs v. United States, 522 F.2d at 997; and Sami v. United States, 617 F.2d 755, 765-68 (D.C. Cir. 1979).

Therefore, a potential plaintiff injured by falling debris from a NOAA satellite will have a difficult enough time establishing negligence, but even if he did, he would then have the very difficult hurdle of discretionary function to overcome. The act of placing a satellite in space would appear to be covered by the exception and even though it is known that someday some part of it may fall back to earth, I believe the exception would still apply unless some gross misfeasance or nonfeasance were shown. However, this issue has never been litigated in this context and a court could reject the discretionary function argument.

In the area of weather forecasting, the discretionary function exception as well as the misrepresentation exception have consistently been held to bar suits alleging negligence in the formulation of such forecasts. In Bartie v. United States, 216 F.Supp. (W.D. La. 1963), aff'd 326 F.2d 754 (5th Cir. 196), cert. denied, 379 U.S. 852 (1964), the plaintiff sued the Weather Bureau as a result of the death of his wife and children which occurred during a hurricane. Plaintiff's claim was based on the negligence of the Weather Bureau in failing to give adequate warning of the intensity of the impending hurricane. The Court in a well reasoned opinion held such allegations constituted allegations of negligent misrepresentation and as such are barred by the Federal Tort Claims Act. Similarly the Eighth Circuit also concluded that the misrepresentation exception of 28 U.S.C. § 2680(h) was applicable where there were allegations that the National Weather Service negligently disseminated information in regard to the rising flood stage of a Kansas river immediately prior to a flood. National Manufacturing Co. v. United States, 210 F.2d 263 (8th Cir. 1954), cert. denied, 347 U.S. 967 (1954). In National Manufacturing Co., supra, the Court went on to say that, not only is the misrepresentation exception a bar to suit where the

allegations are one of dissemination of data and information, but also includes allegations involving negligence in failing to inform or warn that a flood is coming.

In Bartie, supra, the court in not only finding the misrepresenation exception as being applicable, stated that the discretionary function exception to the Federal Tort Claims Act was equally controlling. The Court stated that considering the background and the knowledge and the continual evaluation which is made in the analysis of meteorological data that, "these evaluations involved the exercise of judgment and discretion." Bartie, supra at 14. Further as to allegations of improper prediction and dissemination of forecast information subjective judgment is necessarily employed in decisions that are made, and the means and methods of obtaining observation data require continual exercise of judgment and discretion. Bartie, supra at 19. Recently in the case of Williams v. United States, 504 F.Supp. 746, 750 (E.D. Mo. 1980) the court in rejecting plaintiff's claims of negligent prediction, stated that the "the forecasts or omissions of forecast is a discretionary function excepted from the Federal Tort Claims Act."

It has never been alleged to my knowledge that the basis of an improper forecast was either faulty data or the lack of data from a satellite, so the likelihood of such a claim remains remote. The reason we have never seen such a case is probably because of the acknowledged reliability of satellite data and the fact that much more goes into formulating a weather forecast than satellite information.

We are currently litigating a case in Boston (Brown, et al. v. U.S.), which should go to trial later this year involving alleged negligent weather forecasting as a result of faulty and incomplete data from a NOAA weather buoy, and the result could be analgous to the satellite situation.

Most of the U.S. activity involving space objects involves NASA. While NASA is certainly covered by the Federal Tort Claims Act, they also have special authority to consider claims where the injuries or damage have arisen from the "...conduct of the Administration's (NASA's) function...". 42 U.S.C. § 2473. There is no requirement that the claimant allege or show negligence or other wrongful conduct. Nor does the claimant have to show that the direct cause of the damage resulted from acts or omissions of Federal employees. It need only be shown that the damage was the proximate result of the activities of the agency's space or related programs. The only limitation to the statutary authority is that it is limited to a maximum of $25,000.00 per claim. Claims for more than this, if not considered under the FTCA, could be submitted to Congress for its consideration.

The Secretary of Commerce and NOAA have a similar statutory claims authority found at 33 U.S.C. 853 for acts for which the agency "is found to be responsible", but this is presently limited to only $500.00 and therefore has little significance to the present situation. An attempt to increase this amount to $2,500.00 has been on-going for about four or five years but never seems to make it all the way through Congress.

2. If a Transfer is Effected, What Liability Does the Private Entity Incur if Persons or Property Are Injured By One of the Satellites?

Presumably this would encompass situations where a satellite or part of it fell to earth and caused some injury or damage, or perhaps by going out of its orbit damages another space object.

The Liability Convention does not address itself to the accountability of private corporations to persons injured by fallen space objects owned by them. This is a serious omission in light of the fact that the Outer Space Treaty places responsibility upon parties to the treaty (which includes the U.S.) for space activities whether the acting entity is governmental or nongovernmental. Arguably, a claimant could attempt to impose the responsibility of the Outer Space Treaty through the medium of the Liability Convention upon the launching state, or United States in our case. The private entity itself would also be liable, but not under one of the treaties. Liability could be predicated on a general theory of negligence, although a better theory to proceed upon would be strict or absolute liability. Space activities would seem to be the type of high-risk activities upon which a foundation for the imposition of absolute liability could be grounded. Thus it would appear the private entity would have liability exposure in this area as an owner of the satellites. In addition, the U.S. could require a contractor to indemnify the U.S. for damage under the Liability Convention.

3. What Liability, if Any, Does the Private Entity Incur in Its Provision of, or Failure to Provide Data Upon Which Weather Forecasts or Similar Predictions Are Based?

The private entity would presumably assume responsibility for the accuracy and contents of its products and would accordingly be liable in tort for negligence in the promulgation of this data. It is anticipated that the private entity would want to join to the lawsuit any recipient of the meteorological data which issued a negligent forecast such as a private weather concern or the National Weather Service.

The private business would of course not have the protection of the discretionary function and misrepresentation exceptions to the Federal Tort Claims Act so its exposure in this area would

be greater than that of the U.S. However, liability seems remote at present because the satellite data has never, to date, been the cause of a negligent weather forecast or the lack of some severe storm warning that I am aware of. This could of course change if weather forecasting techniques become more dependent on satellite information, especially in the area of hurricane and severe storm monitoring. In addition to weather information, however, any type of data interruption could potentially be a source of liability for the private entity.

4. What Liability, if Any, Does the United States Retain Concerning the Events Outlined in Questions Two and Three?

It seems likely that if, after a transfer was effected, one of the satellites caused damage or injury to someone, the United States with its "deep pocket" would be made a party to the claim or litigation.

If the injury or damage occurred to a foreign state or its property, or a foreign business or national, the U.S. Government would continue to remain absolutely liable under the Liability Convention and most likely under the Outer Space Treaty.

As to injury or damage to U.S. nationals or companies, the U.S. would still presumably be brought into the case even after the transfer for any number of reasons and liability, while unlikely, would remain a possibility.

As for weather forecasting by the United States, we will remain in the same basic legal position vis a vis the user of our forecasts, whether they be private concerns or the public, as before such a transfer. We still would have a duty to use reasonable care given the state of the art in our forecasting. Of course, if the reason our forecast, or lack of a forecast, was found to be actionable was because of negligence by the private satellite owner, we would have an indemnity or contribution action against the private entity.

In addition, if the Space Shuttle or other NASA equipment were to be used to launch a new satellite or service one of the currently orbiting NOAA satellites, and the Shuttle and/or its contained payloads were to cause damage to a third person, under traditional U.S. tort law all of the users and NASA would have potential liability to the injured third person, based on concepts either of negligence or strict liability. Actual liability, or course, would depend on proof of a causal relationship between the damage or injury and the acts or failures to act of a user. Insurance and indemnification requirements as to use of NASA facilities and space vehicles would be worked out between the private entity and NASA.

Using the NASA situation as a model, it would appear to be in the best interest of the government to require the private

entity to enter into an indemnification agreement with the U.S. and to procure liability insurance. Under NASA's current policies, commercial users are required to obtain third-party liability insurance (or self-insure for third-party liability) and that insurance (or self-insurance) must protect the United States from potential tort liability resulting from injury to third parties. Such policies are written by Lloyds of London and are normally required to cover up to $500 million in liability.

Presumably our private entity would obtain insurance covering its own interests anyway. The issue is whether or not we should require them to name the United States as an insured and whether we would require an indemnification agreement as part of the transfer package. I believe it would be essential for the U.S. to require such an indemnification of the Government, especially for injury or damage for which the United States would become liable under either the Liability Convention or Outer Space Treaty, where the U.S. was free from fault itself. Such indemnification should also cover domestic situations where the U.S. is held responsible, such as in the forecasting area, but the actual negligence is attributable to the private entity. In addition, in order to make this a realistic goal we should require that the private entity procure a substantial amount of liability insurance to cover itself and enable it to indemnify the U.S. where appropriate.

It should also be kept in mind that the U.S. would be absolutely liable in the international arena and potentially liable domestically for claims above and beyond the insurance coverage of the private entity, or whatever corporate assets could be reached.

5. Should the Liability Issues Be Addressed in the RFP?

In line with the previous discussion, I believe these issues should be dealt with in the RFP. Any entity wishing to purchase and assume responsibility for the NOAA satellites should be required to purchase substantial liability insurance and sign an indemnification agreement with the United States.

Assuming the insurance required to be in the $500 million range, this still leaves open the possibility, although remote, of liability exceeding this amount and a decision will have to be made as to whether the U.S. will require indemnity above this figure or whether the U.S. will become, in effect, an insurer of the private entity's activities over a certain sum.

Conclusion

In summary, at present the United States is absolutely liable to the international community for damage caused by one of the NOAA satellites under the Liability Convention and Outer Space

Treaty. As to U.S. nationals and companies, there is potential liability under the Federal Tort Claims Act depending on the circumstances of the incident.

If a transfer is effected to a private concern, the U.S. will still remain absolutely liable under the Liability Convention to foreign nationals or entities. As to U.S. nationals, the U.S. may or may not retain liability depending on the nature of the claim and the actual circumstances of the case, i.e., weather forecasting, as a seller of an inherently dangerous product, etc. Of course, the private entity which assumes control of the satellites will be potentially liable under theories of negligence or strict liability. Foreign nationals would presumably submit claims against the U.S. under the Liability Convention since they wouldn't even have to prove negligence, giving rise to an indemnity action by the U.S. against the private entity. Potential indemnity actions also would exist against the private entity for domestic claims as well.

As a result, it would seem prudent that the private concern be required to prove liability insurance to cover any damages or to indemnify the United States if appropriate. Lastly, there is the issue of what to do about liability over and above the limits of the insurance coverage, which would fall against the United States in most cases whether the U.S. was negligent or not.

SEB 31 May - 1 June Meeting Issues

First Draft of a Solution for Issue N (31 May - 1 June):

"How shall the national interest be protected in the event of failure (financial) of the private operator?"

1. Lien/mortgage on private operators critical (minimum needed for operating satellite system) capital facilities and equipment for a specified number of years, e.g. ten.

a. This should prevent sale or disposal of essential operating capabilities the government would need to resume control of operations.

b. This could be arranged under delayed ownership transfer through time payment vs. up-front payment for government owned resources. Arrangements could be specified in other legal agreements.

c. If private sector does not want and does not buy government equipment and facilities, then minimum operating equipments should be maintained by the government in "mothball storage" or in operational use for other requirements.

2. Occupation or reoccupation plan prepared by NOAA and private company(s) before the fact of financial failure to be reviewed bi-annually. The plan would transfer to NOAA control of those essential operating facilities necessary to insure continued flow of data to government agencies.

a. This should include DOC funding (cash) plans (salaries, consumables) in addition to assumption of control and ownership of mortgaged assets.

b. This plan could be separate or a part of the plan for assumption of command and control for other national emergencies. Such a plan could be similar to the Civil Reserve Air Fleet (DRAF) program for using commercial airlines' planes and pilots to augment military airlift.

3. Backup capabilities and plans should be prepared by NOAA in event the private operator ends up without minimum essential facilities or satellites for the government to operate.

a. The Defense Meteorological Satellite Program (DMSP) can provide data as backup for civil polar orbitors. However, NOAA must maintain a capability to process this data on short notice, e.g., within 90 days.

b. A space DMSP satellite may be required in hot storage (in-the-can) for short notice launch, e.g., within 120 days.

c. There is no U.S. Government system to backup GOES. A government owned in-th-can GOES for short notice launch, e.g. within 120 days, is the most likely solution.

d. A government owned in-the-can GOES could be launched by the private company at specified times in the program and replaced with a more recently built satellite to prevent obsolesence of in-the-can satellites. Government in-the-can requirements could simply be part of the manufacturer to launch pipeline.

e. There is no U.S. Government system to backup Landsat. Some backup capability similar to that described above for GOES would be optimum. However, current government Landsat uses do not require an in-the-can short notice launch capability.

A Business Strategy Should Address:

- o Define what the products on services of the business in terms of what they do.
- o Designate what markets will be served now and for the future designed to serve.
- o Designate the channels through which the markets will be reached.
- o Designate the means by which the business will be financed
  - safety of capital (sources and level of growth)
  - income return (stockholders and creditors)
  - source of funds consistent with marketing growth
- o Designate the size and kind of organization which will be the medium of achievement of the strategy.

Criteria for Evaluation of a Business Strategy

1. Is the strategy identifiable and has it been made clear?
   - Is there an analysis of opportunity?
   - Is there a determination of corporate strengths and weaknesses?
   - Is the strategy purely the reflection of an individual or is it currently being demonstrated by present corporate practice?

subjective - Rephrase

2. Does the strategy exploit fully domestic and international business environmental opportunity?
   - Demonstration of gathering of environmental information
   - Demonstration of a balance between projected growth and corporate resources.
   - Demonstration of the relationship between organizational development and market opportunity.
   - Recognition of the effect of market share to competitive vulnerability.

3. Is the strategy consistent with corporate competence and resoures, both present and projected?
   - Availability of additional financial and managerial resources along a practicable time scale.
   - Can productive capacity be increased fast enough to counter moves of other large competitors.

4. Are the major provisions of the strategy and the programs of which it is comprised internally consistent?
   - Coherence, compatibility and synergy.

5. Is the chosen level of risk feasible in economic and personal terms (top executive)?

- The riskiness of any future plan should be compatible the economic resources of the organization and the temperament of the key management.

6. Is the strategy appropriate and consistent with the personal values and aspirations of the key managers?
   - conflict between the personal preferences, aspirations, and goals of the key members are a sign of mediocre performance or failure.

7. Is the strategy appropriate to the desired level of contribution to the society or pressures from society?

8. Does the strategy constitute a clear stimulus to organizational effort and commitment?
   - Generally, the bolder the choice of goals and the wider the range of burden is spread, the more successfully they will appeal to the capable membership of the organization.

9. Are there demonstrated early indications of the responsiveness of markets and market segments to the strategy?
   - Show me some proof!

FINANCIAL CONDITION SPECIFICATIONS FOR COMMERCIALIZATION OF LANDSATS AND METSATS (BAC Draft of June 28,1983)

One of the key issues that the final contract for commercialization must address is the maintenance of some assurance that the government will not have to unexpectedly get back into the MET/LAND SATELLITE business because of commercial failure of the successful bidder (post commercialization). This risk for the government may be minimized by regulating/ controlling factors dealing with the capitalization of the successful bidder.

BACKGROUND

The capitalization of a corporation refers to the value of the (source of) funds which is usually invested in plant and/or equipment whose productive services will be utilized over a considerable length of time, usually many years. The usual sources of these funds to the corporation are depreciation allowances, retained profits, equity financing, and debt financing. The mix of these sources of funds can be explained by the characteristics of the type of business as well as the differences in management attitudes and policies concerning risk.

In addition to the capitalized or fixed assets of the corporation, management must finance the current assets. These current assets (i.e., cash, marketable securities, spare parts, and inventories) are necessary to cover the annual or recurring costs of the firm for the near term, usually less than one year time frame. Examples are salaries, and contract maintenance charges.

The total of these assets may be financed in various ways. In some cases the owners will have all the capitalization in the form of equity with the exception of relatively small amounts owed on current liabilities (i.e., outstanding invoices to O&M contractor, accrued salaries, and withholding taxes). Total assets may be financed almost entirely by reinvested profits or by the issuance of additional shares of capital stock. This (would indicate that management wants the company to be self-sufficient and) frees the company from the restrictions and controls that might be imposed by outside creditors. This also provides more security in the event of business reversals. In contrast, other companies have large amounts of debt in the capitalization structure (high debt/equity ratio). This allows management to obtain some of the benefits from debt financing (e.g., leverage) and may indicate the management feels confident that the risks (e.g., - fixed interest payments) are not too great in relation to the advantages that can be derived.

As I previously stated the capitalization of a company can be explained by the peculiarities of the industry in which the company operates. Plant and equipment assets may be relatively large in amount on the balance sheet of a manufacturer of heavy

equipment; whereas, in an industry that does not depend so much upon machinery and equipment in its manufacturing operations, the investment in current assets may be large when compared with plant assets.

The nature of the product itself has an influence. An automobile dealer will have large outstanding notes to the manufacturer among his current liabilities, large amounts in inventories, and receivables from finance companies who extend credit to his customers. On the other hand, a retailer who deals in products having a low unit value will likely make the bulk of his sales on a cash basis and will have little or nothing in the way of customer accounts receivables.

A public utility has an asset and equity structure that is markedly different form that of a competitive commercial concern. A telephone company, gas company, etc., enjoy a monopolistic position, subject to regulation in the public interest. Because of the stability of demand and profits, they can operate safely with a greater proportion of debt. In summary, the composition of the assets and the equities of any company will be set to some extent by the nature of the industry, the peculiarities of the product lines or services, and by customer trade practices. Within this framework, however, it is possible for the management to plan and control the asset and equity structure of the company.

At this point it can be seen that there are various options available to management in planning the financial structure of the firm. The <u>issues</u> to be dealt with for each bidder concerning their structure are:

1. Liquidity
2. Leverage
3. Lease or Purchase the fixed or capital assets?
4. Dividend Policy

<u>Issue 1. Liquidity</u>

Liquidity is the net of current assets minus current liabilities. This is also referred to as Net Working Capital. By increasing current assets and converting them to cash and marketable securities, the (conservative) management gains certain advantages over its less liquid competitors:

a) The company will be in a better position to face emergencies or business reverses.

b) With liquidity there is independence. Less reliance will be placed upon outside sources of credit.

c) When attractive business opportunities arise, funds are available.

d) Purchases can be made in large economic lot sizes.

e) All discounts can be taken with ease.

Excessive liquidity, however, is undesirable. A management that accumulated cash or securities beyond the reasonable needs of the business can be criticized because the return on these assets is less than the return on the company's fixed investment, otherwise the company should not have made the investment to begin with.

Conclusion

Liquidity will be of significant importance to the evaluation of the bidders because of the long lead times, and large front end loadings involved with spacecraft and launch services procurements. The form of this specification may be as general as the maintenacne of a specified current ratio (current Assets divided by Current Liabilities), or very specific in terms of a specified cash or ready cash value (marketable securities) on hand. The ratio or amounts required because of the possible variations in types of businesses of the bidders cannot be specified in the RFP, but should be part of the final negotiations.

Issue 2. Leverage

Capital acquisitions can be financed in various ways. Capital resources may be obtained directly by the owners through the sale of capital stock or may be obtined indirectly by the owners through the reinvestment of profits that have been retained (not paid out in dividends). Capital may also be furnished by outsiders either in the form of short-term credit or long-term debt. Ordinarily, a business will employ resources that have been furnished by both owners equity and outsiders debt; and a balance will be maintained between debt and the owners equity.

Seemingly, debt is undesirable because it imposed an obligation, and it would appear that management would avoid debt financing wherever possible. But this is not necessarily true. Management will sometimes try to increase the rate of return on the owners' equity by using resources furnished by outsiders. If borrrowed assets can be put to work to earn a return in excess of the interest cost, the owners will benefit. Suppose that $1,000,000 can be borrowed at 10% and put to work to earn 20%. The owners receive a $100,000 return without any investment on their part.

Conclusion

Because the successful bidder may enjoy a monopolistic positon it would be conceivable that the debt/equity ratios could exceed 100% (e.g., Long Term Debt - $100M, owners equity - $50M; Debt/Equity Ratio=2). High debt/equity ratios have long been exhibited by public utiity, telephone companies, etc., that have enjoyed monopolistic positions. Commercial lenders and bond holders assume that because of stability of demand and profits, they can operate safely with a greater proportion of debt.

However, high debt/equity ratios carry with them potential penalties to liquidity in the form of fixed interest payments which must be met, otherwise they total amount of the debt may be due on demand precipitating bankruptcy. Therefore, a maximum limitation of debt/equity ratio should be specified in the contract.

Issue 3. Lease or Purchase the Capital Assets

Various long-lived assets such as buildings, equipment, and satellites will be needed for the satellite business. These types of assets are usually purchased by funds obtained by borrowing, and/or funds obtained from the sale of stock, or by renting under a long-term lease agreement from the satellite or equipment manufacturer.

When property is purchased, the cost of the property is recorded in the accounting records. If debt has been incurred to finance property acquisition, the amount of the debt will be rcorded as a liability.

Under most circumstances, a rented property is not recorded as an asset, and no liability is recorded for future rental payments. The rentals are charged to operations in the fiscal periods to which they apply.

The decision between lease versus buy rests on perceived advantage by management in the following two areas:

1) Reduction of business risk.
2) Income tax advantage.

1) Reduction of business risk. A lease may be preferred because it involves less risk than ownership. The property owner is to an extent a speculator. He hopes that he can purchase the property at favorable prices and with proper handling it can be traded or sold at a later date for no less than the unrecovered cost. Property may become obsolete. Equipment may become outmoded. When new models come out, the owner may not be able to replace without loss. The renter may avoid these risks. Under many lease agreements, the renter will receive up-to-date models of equipemnt when they become available.

2) Income tax advantage. If property is owned, there may be a loss of purchasing power when the cost of replacement is taken into account. The full amount of a rent payment can be deducted in the computation of income taxes; whereas, when property is owned, only the original cost of the property can be deducted over the years as depreciation. With high inflation the company may not recover the original purchasing power invested (through depreciation).

It will cost more to rent property than to own it. The lessor is well aware of the risks of ownership and will set the rental fee accordingly. Additionally, it is very doutful that any of the hardware manufacturers would sign a lease agreement

without a large up-front commitment in the form of funded liability. The successful bidder would become in effect a middleman with no obvious advantages to the Federal Government who may be majority user. Should the satellite equipment last longer than the lease, the lessor may become a competitor to the successful bidder. If this becomes the case, what may happen to any long term data purchase guarantees between the successful bidder and the U.S. Government? The contract should specify ownership of the satellite system, by the successful bidder.

Issue 4. Dividend Policy

In planning equities, management may follow the policy of reinvesting a large portion of the earnings in the business. In fact, reinvested earnings play an important part in plans for business growth. In general, a mature company that is growing at a moderate rate will be more likely to pay out a large percentage of its earnings as cash dividends. In contrast, a rapidly growing new company will need its cash to finance its growth. In lieu of paying out a cash dividend, a rapidly growing company has the option of declaring stock splits or stock dividends. These have proven to be attractive alternatives for rewarding the stock owners.

Conclusion

If the U.S. Government has provided a substantial investment either in terms of turnover of assets and/or a guaranteed long term data purchase agreement, then a review/concurrence provision for changes to dividend policy should be included in the contract.

Received at 5 July SEB meeting

STATUS OF CURRENT ISSUES

(R) - Resolved; (U) - Unresolved

#	Issue	Position SEB	Position Congress	SEB Status	Action	Due	Responsibility /Location
(1)	National Security	Transfer can take place without compromise to Nat'l Sec.	House S&T & Appropriations concerned that trade off not be made to diminish Nat'l Sec.	Working papers have been drafted--	Analysis of Launch Vehicles o (war surplus o launch o vehicles)	TBD	Q. Wilkes (DOD) Kammer
2	R&D (Missions)	Ref. PDM - R&D will continue by Gov. ASK CALIO TO see what SIG Space will be doing this summer.	House S&T Committee concerned R&D will slip. Favor U.S. leadership.	NASA Position due NOW (Draft in hand)	Develop R/D Strategy (All agencies)	TBD	(Bishop/Raney ?)
3	International Commitments	Metsat=Status Quo Landsat=Marketplace	Congress favors the existing free exchange of weather data.	Paper Done 6/24 Malone OK 6/24 Horner OK 6/27 marked as resolved 7/5 at SEB Board	SEB discuss IB-COESS UN impacts - State wants to keep it within state. Brief to SEB.	7/5 7/15 7/15	Rose et. al. Rose (Bishop ?)
4	Design of RFP	Bids for -GEO -LEO one or all -LSAT Whole System	A desire to allow small private firms to compete.	SEB Pos. 6/5 IB-COESS 6/15 Testimony 6/21	RK plans to brief Congressman Volkmer & Scheuer Neil to prepare	Early July	Neil
5	Inclusion of Metsats			U			Levine
6	Special Services weather			U			Levine

Kammer says that if Govt fees to charge for such things as first frost warning the whole sale issue will be down! He has told Calio.

#	Issue	Position SEB	Position Congress	SEB Status	Action	Due	Responsibility /Location
7	~~Potential Monopoly~~ Liability			U paper			Levine
(8)	Regulatory Mechanism			U			Levine Lawsuit & mitigation
9	Copyrights			U			Levine
10	Small Business Participation			U			Scodari
11	Cost to Gov. SAVE GOVT money vs. Provide data ... Unsettled.			U			Scodari
12	Problem of allocation of radio frequency raised by transfer of CRSS to Private Sector FCC	R+D band that sat. now uses the (current generation) sat. will cont. to use... Frequency is a govt asset.		U			Levine mitigation — NOAA/GC
13	Archiving			U			Sheila
14	NASA/Commercial Operator Relationship present (NASA/NOAA) Q is This a necessary issue ? See #22,			U			Raney

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#	Issue	Position SEB	Position Congress	SEB Status	Action	Due	Responsibility /Location
15	Turn Over of Existing Procurement (e.g. GOES-"G", "H", "I", & NOAA H, I, J. can you transfer the K?	what methods? what implications?		U			Scodari
(16)	DOD Analysis of Future Sensors			U			Wilkes Raney to do ; meets to review
17	Satellite Servicing in Orbit ? The shuttle capability			U			Raney geostat many sats. are too high to be serviced in orbit in near future Q. what constitutes "operational"?
(18)	U.S. Firm			U	By 11 July suffic. assets in OS to grab for C+C purposes		Levine
19	Propective Offeror/ Performance (Bid) Bond may not be an issue now			U			Scodari
20	Provider of Weather Data (A gov. Function) Cong. Q / study see also # 6	This is a fundamental Q - SEB seems to have decided yes.		U			Kammer
21	Can EROS Data Center Be Commercialized Landsat, partially			U			Pettinger

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#	Issue	Position SEB	Position Congress	SEB Status	Action	Due	Responsibility /Location
22	Provision for R&D &/or Search & Rescue Packages & distribution of data from future R&D sensors to users See NASA paper handed out at some SEB paper			R	Tech. advisory comm. to Draft lang.		Raney
23	When should handover to the private sector occur earliest - calendar 1986 ! -	must specify Bd TO Be good until ...		U		20 July	Scodari (Klingensmith) ? TAC
24	Consideration be given to detailed plan for transaction from Gov. to private sector			U		20 July	Scodari (Klingensmith) ↓ see these together - Note timing may be diff for land & met.
25	How long should the gov. contract for services Split land & met.	K is for price of data report. DOD nat'l security leg. 10yr. for land.		U		20 July	Carnahan ? Business Committee
26	Must all U.S.G Agencies purchase all/ some data through NOAA? to purchase all data. met data — NOAA to purchase all data & then distribute. But land data individually purchased.			U			McArdle

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#	Issue	Position SEB	Position Congress	SEB Status	Action	Due	Responsibility /Location
27	How should proposers commitment to R&D be resolved	No Req. That contractors do work on new sensors. Improve efficiency R+D is wanted. Mkt devel + improve efficiency - Bidders to address		U	TAC TO WRITE INTO RFP.		Raney
28	Anti-Trust Implication			U			Levine Justice Dept, Anti Trust Div.
29	Can private operator engage in "value added" data processing This may be called R+D.			U			Levine
30	Policy regarding uniform pricing and unrestricted availability of data for U.S. users			U			Levine
31	What will be the availability of TDRSS to private sector			R working paper avail. & ref. to Fed Reg. public in Focus			Raney

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#	Issue	Position SEB	Position Congress	SEB Status	Action	Due	Responsibility /Location
32	What measures can properly be taken to stimulate private sector interest in the RFP	use tower Rocks ?		U			Bishop (Raney)
33	How should the provision of instrument packages by foreign gov. be treated See Int'l Commitments paper			U			Rose
34	Gov. fallback position in the event full commercial-ization is not possible			U Nothing has happened If Bids terrible Then what do we tell sicy Baldridge ?			Bishop

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CIA
Rm 7D19
OGC

UNCLASSIFIED

DEPARTMENT OF STATE

Washington, D.C. 20520

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7/
8:00 AM

June 23, 1983

To: OES - Mr. Malone
OES/S - Mr. Horner

From: OES/SAT - Lisle Rose (SEB Member)

Subject: Source Evaluation Board Paper on International Specifications for Commercialization of the LANDSATS and METSATS

Enclosed for your review and approval/disapproval/revision is the Source Evaluation Board (SEB) paper on international specifications for Commercialization of the LANDSATS and METSATS. This paper is submitted to you in conformity with the decision reached at the last IB-COESS meeting that the SEB would prepare such a paper for State's review and for subsequent submission to the IB-COESS as an agreed interagency position on the international aspects of LANDSAT/METSAT commercialization.

Since this is an agreed SEB paper, drafted in consensus by representatives from State, DOD, Commerce, NASA and DCI, it is recommended that you approve thepaper and that it be forwarded to the IB-COESS at its next meeting on July 15.

10
T
OES

OES/SAT:LARose/lar

Verne Malichi — A Bailey

Lisk Rose OESPAT

Seems o.k. to me. D've made a couple of marks here and there. D'd rather not refer to "military operations" or to "national security" -- esp. on page three -- if it's possible to avoid it.

INTERNATIONAL SPECIFICATIONS FOR COMMERCIALIZATION OF THE LANDSATS AND METSATS

(SEB Draft of June 23, 1983)

The President has directed that the civil land remote sensing and weather satellite systems be transferred to the private sector in conformity with existing international obligations, national security requirements and foreign policy considerations. This paper sets forth the international obligations and foreign policy concerns of the U.S. Government. It defines the areas where the Department of State must play a key role. However, the precise institutional mechanisms to regulate/supervise the activities of private operator(s) remain to be determined. For the purpose of effective analysis of the international specifications for commercialization, the weather satellite (METSAT) systems and programs and those of the land remote sensing satellites (LANDSAT) are divided into the following components: satellites, sensors, and data derivation/dissemination. The analysis is based upon interagency input through the Source Evaluation Board (SEB), previous Department of State foreign policy specifications, Department of Defense documentation on national security concerns, and the NOAA "tutorial" conducted by Dr. John McElroy entitled "International Sharing of Satellite Data."

I. METSAT System

A. Satellites:

1. A private operator of the U.S. civil geosynchronous and/or polar-orbiting weather satellites shall operate these satellites as determined by contract. However, such operator/

owner shall act under constraints set forth by international treaty obligations entered into by the U.S. The United Nations Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space (October 10, 1967) stipulates (Article VI) that "States Parties to the Treaty shall bear international responsibility for national activities in outer space. . . whether such activities are carried out by Government agencies or by non-governmental entities". To implement existing international obligations, which include the UN Outer Space Treaty of 1967 and related conventions on liability and on registration, (for a complete listing see Tab 2) the U.S. Government (Department of State and other Federal agencies) must have adequate authority and opportunity for review and approval of:

(a) the compliance by private owner(s)/operator(s) of space programs/systems with overall U.S. space policies and international treaty obligations;

(b) the relations of the private owner(s)/operator(s) with foreign governments, agencies and persons, and international bodies.

2. In order to fulfill these responsibilities, the U.S. Government (Department of State and other Federal agencies) shall:

(a) require that the private owner(s)/operator(s) provide notification of foreign business negotiations so that the Department of State can advise the owner/operator of relevant foreign policy concerns and provide such assistance as the Department of State deems appropriate;

(b) review and approve/disapprove the decision of the private owner(s)/operator(s) on matters and issues involving foreign policy and international obligations, including those set forth in the international conventions on liability and on registration of vehicles in space.

3. Private operators of civil METSATS must conform their systems configuration and operation to national security.

4. A private operator of the civil geosynchronous weather satellites (GOES) will also have to provide the U.S. Government with information regarding intended relations with the Japanese and European operators of international geosynchronous weather satellites. At present, the U.S., Japanese and European systems are bound together organizationally and operationally in the following important ways:

(a) an ad hoc but vigorous coordinating mechanism exists. The primary purpose of the CGMS (Coordination of Geostationary Meteorological Satellites) is to maximize technical and systems coordination. Such cooperation by U.S. Government agencies will continue under a private geostationary METSAT operation;

(b) at present, the U.S. receives data on a continuous no-cost basis data from the European METEOSAT positioned at the equator over western Africa and from the Japanese GMS satellite over New Guinea. This data supports NWS, DOD and international maritime and aviation activities by the U.S.;

(c) in case of failure of any geostationary weather satellite, U.S., European and/or Japanese satellites could be

repositioned to maintain maximum global coverage;

(d) U.S. GEOSATS, the European METEOSAT, and the Japanese GMS share a common WEFAX transmission frequency which provides near-global access to WEFAX services which are vitally important to U.S. commercial shipping, military operations and weather forecasting.

Whatever relations are developed between a U.S. private owner/operator and current or future foreign geostationary METSAT operators will be subject to appropriate supervision/oversight by the Department of State and other Federal agencies as necessary and appropriate.

B. Sensors

A number of foreign sensors are deployed on U.S. civil polar orbiting weather satellites. Their configuration and recommended disposition are as follows:

1. ARGOS/SSU (AMSU). Under a Memorandum of Understanding with NOAA, France currently provides an operational data collection and relay platform ("ARGOS") on our polar METSATs at no cost to the U.S. ARGOS collects and relays environmental data from buoys, balloons and platforms located anywhere on the earth's surface, and is the only system capable of locating moving platforms. The UK provides an operational Stratospheric Sounding Unit (SSU) under a 1974 Memorandum of Understanding with NOAA extended in 1982. The SSU is a primary component of the TIROS Operation Vertical Sounder (TOVS) and serves to reduce NOAA systems costs. The British Meteorological Office has

proposed to upgrade their contribution in future years by replacing the SSU with a part of an operational Advanced Microwave Sounding Unit (AMSU).

Therefore, a private owner has the option to use or replace the above foreign instrument payloads on the polar orbiters as he wishes, but with the stipulation that the U.S. Government (Department of State and other Federal agencies) must have the authority and opportunity to review and approve/ disapprove any change in existing or future relationships with suppliers of foreign instrument payloads.

2. Search and Rescue. France and Canada provide the search and rescue instrument packages and the U.S. provides the satellite (polar METSAT) for the system which, together with a complementary Soviet space-and-ground component forms the COSPAS/ SARSAT international Search and Rescue Satellite Assisted Tracking program. Ground stations in support of this program are in existence or are under construction in the U.S., Canada, France, the Soviet Union and Norway. Since its inception in September, 1982, this international experimental program has been credited with saving over forty lives worldwide. In the U.S., and elsewhere, search and rescue have traditionally been government responsibilities, and the SARSAT program is a part of a much broader effort conducted as a mission responsibility by the Coast Guard, Air Force and other Federal agencies.

The U.S. is committed to maintaining the SARSAT program. If bidders indicate that they will maintain SARSAT with French and Canadian instruments, the U.S. Government (State and other

Federal agencies) must have the opportunity and authority to supervise the necessary negotiations between the private operator and the foreign entities. If a private bidder indicates a desire to maintain SARSAT with U.S. or other foreign search and rescue instrumentation, the U.S. Government (State and other Federal agencies) may be called upon to provide foreign policy assistance, guidance and direction.

C. Data

1. In order to encourage and promote private commercial operation of all or a portion of the METSAT system and programs, the U.S. Government is willing to grant (the) potential private owner(s)/operator(s)/vendor(s) exclusive ownership of all data produced by the civil meteorological satellite(s) under (his) their management after having met all contractual obligations to the U.S. Government (the international aspects of which are set forth in paragraph 2 a-c below). That is, the operator may after appropriate consultations with responsible Federal agencies enter into any international business relationships with the data from his satellite(s) that are outside the scope of U.S. Government requirements set forth below.

2. Notwithstanding the provisions of paragraph 1 above, weather data derived from the geostationary/polar METSATS is of direct, immediate and often critical use to numerous U.S. Government agencies in pursuit or fulfillment of a variety of international mission responsibilities. Chief among the U.S. international obligations is continued commitment to the world-

wide flow of weather data through the WMO World Weather Watch and other international arrangements, under present terms and conditions of participation. Therefore, the following stipulations should be clearly set forth to all potential bidders for private ownership/lease/operation of the polar and/or geostationary METSATS:

(a) WMO-World Weather Watch: The private owner(s)/operator(s)/vendor(s) of all or a portion of civil METSATS will be obligated to provide the same volume and quality of satellite-derived data for the World Meteorological Organization (WMO) World Weather Watch as is provided by the same METSAT system currently under U.S. Government ownership and operation. In order not to disrupt existing national security and domestic weather forecast benefits derived from the free, no-cost exchange of global weather data through the WMO, private operator(s) must be prepared to sell the volume and quality of data from their satellites required by the WMO to the U.S. Government under commercial terms and conditions deemed reasonable by the Government for transmittal by the U.S. Government to the international user community through the WMO network;

(b) Direct Readout: private owner(s)/operator(s) of civil polar and/or geostationary METSATs will be obligated to provide the same volume and quality of satellite-derived or communicated data to individual foreign ground stations through direct readout (i.e. WEFAX, DSB, VISSR, APT, HRPT, etc.) as is currently provided by the METSAT system currently

under U.S. Government ownership and operation. The U.S. Government will be assessed appropriate charges by the private owner(s)/operators under commercial terms and conditions which the U.S. Government deems reasonable for maintaining the flow of direct readout data to all stations worldwide.

(c) International Research/Data Application: AID, NASA, NOAA, the National Science Foundation (NSF) and other U.S. Government science, technical and foreign assistance agencies are employing METSAT derived data in a wide variety of ways and programs ranging from the Global Atmospheric Research Program (GARP) to a number of foreign disaster early warning and monitoring programs such as the Tsunami Early Warning System, the Agroclimatic Monitoring and Reporting System for early warning of potential world food shortages, the Global Seismic Network utilizing satellite telemetry links through the GOES satellites for early warning of pending volcanic and seismic disturbances, and the Severe Storm Surge and Wind Threat probability warning system for the Caribbean, Indian Ocean, and western Pacific. In view of the importance of U.S. civil METSAT data to the U.S. Government's international research programs, its international scientific and technical exchange programs and interests, and our developing interest in foreign disaster early warning and monitoring, the following stipulation should also be clearly set forth to all potential METSAT bidders:

(i) private METSAT operator(s) must provide on commercial terms and conditions that the U.S. Government deems reasonable an adequate volume and quality of data from their

METSATS (polar and/or geostationary) to support U.S. Government participation in international research programs and all other cooperative international activities utilizing civil meteorological satellite data (Tab 3 [to be supplied]);

II. LANDSAT System

A. Satellites

1. A private operator of the U.S. civil Land remote sensing satellite(s) shall operate the satellite(s) as determined by contract. However, such operator/owner shall act under constraints set forth by international treaty obligation entered into by the U.S. The United Nations Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space. . .(October 10, 1967) stipulates (Article VI) that "States Parties to the Treaty shall bear international responsibility for national activities in outer space. . .whether such activities are carried out by Government agencies or by non-governmental entities." To implement existing international obligations, which include the UN Outer Space Treaty of 1967 and related conventions on liability and on registration, the U.S. Government (Department of State and other Federal agencies) must have adequate authority and opportunity for supervision of:

(a) the compliance by private owner(s)/operator(s) of space programs/systems with overall U.S. space policies and international treaty obligations;

(b) the relations of the private owner(s)/operator(s) with foreign governments, agencies and persons, and international bodies.

2. In order to fulfill these responsibilities, the U.S. Government (Department of State and other Federal agencies) shall:

(a) require that the private owner(s)/operator(s) provide nofitication of foreign business negotiations so that the Department of State can advise the owner(s)/operator(s) of relevant foreign policy concerns and provide such assistance as the Department of State deems appropriate;

(b) review and approve/disapprove the decision of the private owner(s)/operator(s) on matters and issues involving foreign policy and international obligations, including those set forth in the international conventions on liability and on registration of Vehicles sent into space.

B. Sensors

No foreign sensor systems are deployed on the U.S. Landsat satellite(s).

C. Data

1. In order to encourage and promote private commercial operation of the LANDSAT system and programs, the U.S. Government is willing to grant (the) potential private owner(s)/operator(s)/vendor(s) the following:

(a) exclusive ownership of all data produced and circulated by the land remote sensing satellite(s) under (his) their management; acknowledging the copyrightable character of this data and the right of (the) owner(s)/operator(s)/vendor(s) to protect his (their) copyright interests;

(b) exclusive right to dispose/distribute data internationally from land remote sensing satellite(s) under his (their) management, including the right to enter into data/pricing/finance systems contracts of his (their) own determination with any foreign ground station operators (this shall include the right to negotiate with foreign Landsat ground station operators limits of liability, definitions of terms under which contracts shall cease, procedures for the settlement of disputes, and other miscellaneous provisions);

2. Notwithstanding the provisions of 1(a) and 1(b) above, (the) private owner(s)/operator(s)/vendor(s):

(a) should seek to conform their programs as closely as is commercially possible to traditional U.S. practices of providing civil land remote sensing satellite data to international users on an equal, non-discriminatory basis;

(b) will consult with the Secretary of State (and other Federal agency heads as the Secretary may direct) to obtain concurrence that policies and practices remain in conformity with international obligations, and foreign policy objectives;

(c) will provide an adequate volume and quality of data to Federal users on commercial terms and conditions deemed reasonable by the U.S. Government to support U.S. Government participation in international research programs and other cooperative international activities utilizing civil LANDSAT data. In this connection, it should be emphasized to potential bidders that numerous Federal agencies including NOAA, NASA, USGS, and especially AID have employed LANDSAT data extensively and successfully over the past decade in

a variety of space technology assistance programs worldwide. Such assistance programs include, but are not confined to, training, population census, mapping, agricultural crop assessment and forecasting, mineral resource evaluations, etc. (The civil LANDSAT programs of just one Federal agency - AID - are set forth at Tab 1.)

3. Over the past decade, the U.S. has actively encouraged the participation of foreign entities in the civil LANDSAT program; participation has taken the form of a dozen ground data receiving/processing/transmission stations (seven of which are currently fully active) located in both developing and allied countries. As a condition of participation in the U.S. civil LANDSAT programs, foreign data distributors have had to conform to U.S. Government policies that emphasize data exchange on a low-cost, open, non-discriminatory basis. Any private operator of the civil LANDSAT system will obviously have to make a determination about the disposition of the existing foreign LANDSAT stations. He should be guided by the following considerations:

(a) retention of foreign LANDSAT ground stations and U.S. Government data exchange/distribution policies is not a condition of private ownership/operation of the civil LANDSAT program;

(b) a private operator must, however, obtain the concurrence of the U.S. Government (Secretaries of State and Commerce) before terminating or initiating relations with an existing or prospective foreign LANDSAT ground station operator.