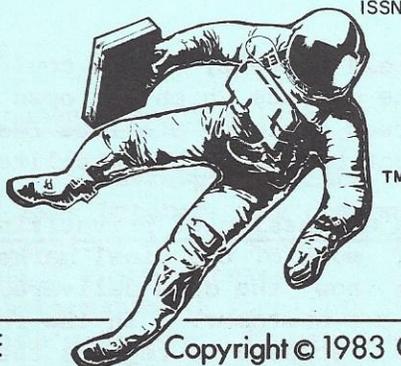


# THE COMMERCIAL SPACE REPORT



A MONTHLY NEWSLETTER ON FREE ENTERPRISE IN SPACE

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Dear Subscriber:

## Transfer of Satellite Systems to Private Sector Controversial

The Reagan administration supports a private-sector takeover of weather and earth resources satellites. The systems to be transferred would include four weather satellites, or Metsats (two in geosynchronous orbit, and two in polar orbits) and one earth resources satellite, the Landsat 4. Also included would be three ground tracking stations.

At present, this is all in a very preliminary stage, with the Department of Commerce, specifically NOAA (National Oceanic and Atmospheric Administration), being instructed merely to issue a request for proposals from private interests. Also, Congress has recently passed legislation which would require Congressional approval of any such transferral of the satellite systems.

Still, controversy has been heated, and stems from several sources. Consumer advocates and some scientists fear loss of important weather information that is now obtained "free" (read: at taxpayer expense) from the government. "What price do you suppose they will charge for forecasting a hurricane?" grumbled Ralph Nader, who believes the best things in life ought to be "free." In fact, the Commerce Department intends to see that all weather services presently available will continue with no change. This would presumably be accomplished by the government purchasing the data from the private company and distributing it "free" to those agencies which presently make use of it.

Another concern is cost-effectiveness. Given that the government is going to wind up paying for these services anyway, is it cheaper to keep doing it themselves, or could considerable savings be realized by buying the services from a private company that would have the responsibilities for maintaining the system?

NOAA's present satellite operating budget is about \$200 million per year for both the Landsat and Metsat systems. Whether or not a private company would improve this figure depends on who you ask. Guesses on the net prices the government would wind up paying range from about \$100 million per year (a savings of \$100 million) to about \$300 million per year (a loss of \$100 million). Obviously, more study needs to be done on this.

To us, a more important concern is a possible government-created monopoly. The Communications Satellite Corporation (Comsat) is a prime candidate to take over these satellite systems. Comsat is a government-created corporation, with a strong controlling interest (24%) in the Intelsat global communications network. Intelsat, by government decree, already has a monopoly on international communications (more on this later). Access to the lucrative weather and earth resources market at a greatly subsidized cost (Comsat made one offer of \$300 million for the system--the five satellites cost the taxpayer about \$1.6 billion) may give Comsat a monopoly in

this field as well, which could assist Comsat in maintaining a firm grip on other satellite markets which are open to competition. (Comsat ventures in these competitive areas include Satellite Business Systems, a corporate communications service, and direct broadcast TV satellites.)

The discussion of privatizing satellites seems to primarily center on hardware. In fact, much of the final market potential may depend instead on software, which dictates how the data delivered by the hardware is finally delivered in a useful form to the customer. In the following article, the effect of new analysis techniques is discussed as regards the earth resources satellite Landsat 4. Landsat is often considered to be the loss leader in the five-satellite package. This, as is pointed out, is not necessarily the case.

Donn Walklet, the author of this article, is president of Terra-Mar of Mountain View, California. Terra-Mar is currently involved in the analysis of policy and market potential of various space activities, leading to the financing and development of those concepts with the greatest commercial opportunity. At present, the company is concentrating on the potential of complete earth sensor systems.

The Government, through the NASA Landsat program, has significantly contributed to the future economic potential of satellite remote sensing. In spite of this contribution, however, an unfortunate lack of understanding has developed concerning the context in which remote sensing fits into a commercial environment. In NASA's sphere of operation, remote sensing is primarily an aerospace technology. In the commercial world, remote sensing is a computer and information technology and thus should be marketed accordingly.

No government agency has ever conducted marketing research to define the true potential of an information system based on real-time data acquisition from a network of low earth orbiting satellites. Knowledgeable private sector groups understand that the gross potential revenues derived from all components of an earth resources data industry can be numbered not in the millions, but in the billions of dollars annually. Market potential is the key issue in making any economic decision about the future disposition of Landsat and its follow-on projects. Otherwise, it will be impossible to fairly assign values to current government assets or to determine a potential stream of earnings upon which to value the proposals from the private sector for ownership, control, and operation of the land remote sensing system.

Future revenue from appropriate satellite sensors is directly tied to growth associated with the next generation of computer services. In this context, digital satellite imagery will be a valuable source of input into earth resources information services. Within the private sector, the infrastructure for this service capability is now in the development stage. Highly refined applications software which will convert imagery into information is on the threshold of greatly expanding the current limited user base. Furthermore, computer networks and distributed processing will provide convenient access to new markets from specialized earth resources data bases. This is a factual not a speculative scenario based on generally accepted trends which are fundamental to all computer service companies.

Terra-Mar's market projections derived from analyzing these technological trends provide the basis for pursuing commercial satellite remote sensing services. These projections assume an aggressive marketing environment--unregulated and very competitive. Consumers are best served in such an environment, and will include not only oil companies or the

government, but any individuals seeking information about the earth's surface. Under such commercial circumstances, concerns over unregulated "open skies" will be overcome by market growth. This growth will be stimulated by new applications software and modes of delivery, and driven by the opportunities to expand distribution to all levels of society.

The addition of the Thematic Mapper (TM) to Landsat 4 represents a very significant contribution to commercial remote sensing because it provides additional opportunities for exploiting the electromagnetic spectrum in areas that are of economic interest to the resource community. Improvements in Landsat 4's data processing and communications system will also contribute to the timeliness and reliability of data delivery.

On the other hand, Landsat 4 is encumbered with technical and political problems which make its transfer to the private sector somewhat complex. The original value of the satellite and data processing assets is significant; however, on the open market, that level of technology is considered obsolete. Given the computer technology which is available today and which will make another substantial leap by 1984, Landsat 4-type equipment, primarily oriented for R & D applications, could be considered in financial circles to be a commercial liability. There is also a negative stigma associated with "Landsat" as a commercial concept. The entire process of "analysis" has politicized Landsat to the extent that the financial community views Landsat with a certain skepticism. In a commercial environment, where Landsat is competing with other promising projects for capital, there is a perception of risk associated with Landsat--it is expensive, it is political, and the commercial opportunities have yet to be fully demonstrated.

However, there are some organizations which would exploit such a "hot potato", knowing that at a certain price, the problems of Landsat become bearable. Understanding that the potential of this business is in the billions of dollars, one potential operator, Comsat, is seemingly willing to make sacrifices in order to establish a dominant position. If the selling price of Landsat is the discounted or depreciated value of its assets, this operator will be paying a small price in exchange for assuming that dominant position.

Landsat 4 should be utilized as a tool to stimulate the development of a private earth resources data industry. At this point, it would be very difficult to designate one company to assume the operation of Landsat with the subsequent responsibility for developing the market. Terra-Mar research indicates that such a company with the appropriate operational and marketing skills does not exist. However, within the next five years, new companies or a consortium of companies will develop that will have the skills to assume these responsibilities in the long term.

In the meantime, improvements in data processing and data distribution will stimulate the groundswell of value-added activity which is already occurring, thereby increasing revenues from Landsat data sales as new applications become entrenched in the marketplace. Strength among private sector operators will eventually permit backward integration into data receipt and archiving as well as the development and operation of orbiting sensors. In this mode, healthy competition will encourage the creation of new applications software as well as encourage the companies with the best capabilities to assume a leadership role in developing a fully integrated earth resources information system.

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## Foreign Earth Resources Alternatives

The French are going to market their own earth resources satellite using the same semi-commercial approach used in marketing the Ariane launch system. In this approach, the government handles the research and development and bequeathes the marketing to a lucky "private" organization...roughly the same concept that the U.S. government seems to be considering for its earth resources and weather satellites.

The satellite is called SPOT, an acronym for "System Probatoire d'Observation de la Terre," and is scheduled for launch in 1984 on, of course, an Ariane 2. A second satellite is scheduled for later. SPOT will possess sensors capable of 20-meter resolution in a multispectral mode, and 10-meter resolution with black and white imaging. Multiple passes will allow SPOT to deliver stereo imagery.

French program officials do not consider SPOT a direct competitor with Landsat, but the system will offer comparable data and an aggressive marketing campaign will be directed at the United States, as well as many other countries.

Other nations are also working on remote sensing satellites including Japan, and even India, which is testing solid-state sensors on their Rohini satellite, launched April 17.

## Private Enterprise Earth Resources Alternatives

The AEROS (Advanced Earth Resources Observational System) program is a cooperative effort between three private space companies, Space Services, Inc. (SSI), American Science and Technology Corp. (AEROSpace), and the Aeros Data Corp. (AEROS-data) (C.S.R., July, 1982, p. 3; Nov. 1982, pp. 1-2). The objective is to launch three, or possibly four, small earth resources satellites. This system is not to be confused with the 12-satellite network, discussed in last month's C.S.R., which is a long-range concept. AEROS is an immediate priority for SSI and the rest of the AEROS group. In fact, the very first orbital launch of the Conestoga vehicle may contain the first AEROS satellite, AEROS-A.

The AEROS satellites would be launched by SSI's Conestoga booster into a sun-synchronous polar orbit with a 99 degree inclination and an altitude of 570 miles. The sensors would be solid-state, and provide Landsat-compatible data on an S-band transmitter. Goals are for shorter data delivery times to customers, and more frequent repeat coverage of the same land areas than is presently available (6-day intervals after two or more satellites are in place, compared to Landsat's 18 days). The sensors on AEROS-A would gather data in 6 visible bands at 80-meter resolution, and 2 visible bands at 40-meter resolution. More bands and higher resolution could be added to later satellites. Stereoscopic coverage will also be available.

Some private companies are concentrating on the data analysis market rather than the satellite sensor end of the system. Such companies include Terra-Mar, mentioned earlier, along with a number of others.

The AEROS system would also include a data-processing capability, using a new, proprietary Combined Environmental Data Information System (CEDIS). Processed information would then be marketed along with the raw data which would be directly available from customer ground stations.

This project is encouraging to supporters of free enterprise in this field. With any luck, while Comsat and others are wrestling over commercializing the lone Landsat (which hasn't been working too well lately anyway), private companies may make the whole question financially academic. It seems to us that the same private approach could also be applied to weather satellites, and investigation of such a prospect should be supported.

Private Company to Develop U.S. - European Satellite Link

The Orion Satellite Corp. is taking on Comsat in an attempt to place communications satellites over the Atlantic. Incorporated last October, the company's major obstacle may be receiving FCC approval over the objections of Intelsat. One of the most strident objectors is Comsat, the U.S. Intelsat representative. Intelsat, as mentioned earlier, possesses a legal monopoly on international satellite communications, and Comsat possesses 24% of Intelsat. Orion's founder, Thomas McKnight, is entering this battle armed with his experience as an FCC lawyer. Also working in Orion's favor is the general trend towards deregulation not only in the U.S., but in such important European countries as Britian and Germany. On the Pacific side, the Japanese are rattling the monopoly cage by expressing interest in providing satellite service to the Pacific basin. One other helpful legal distinction may be the fact that Orion intends to market its system to multinational corporations for private use, rather than supplying a common carrier service like Intelsat.

Orion has already obtained reservations on shuttle flights in Dec. 1986 and Mar. 1987, although the satellites can be launched by other systems if necessary. The estimated cost for the project is \$230 million. McKnight says he already has commitments for the full amount. Each satellite would have 22 transponders, providing video service as far west as Texas, and as far east as Egypt, although major service targets are the eastern U.S. and western Europe.

European Space Agency Studying Unmanned Space Platform Assembly

The ESA may get a piece of the market for large space platforms. The organization is investigating methods which would allow automatic docking of Ariane payloads to form large communications platforms in geosynchronous orbit. The components, similar in size and configuration to regular Ariane payloads, would be placed into a geosynchronous orbit near each other. They would then be docked together automatically, after which the components would deploy to form the large platform.

Large communications platforms will eventually replace smaller comsats in order to make more effective use of the dwindling number of useful locations in geosynchronous orbit. The U.S. shuttle program is proceeding on the basis of manned assembly of such platforms from shuttle payloads, and no work is presently being done on remote docking systems.

If the ESA develops this system, it will be able to compete with the shuttle in the large platform market, formerly assumed to be restricted to manned operations. Proponents of the automatic system feel it will be more cost effective than utilizing manned operations for the same purposes.

It is our opinion that manned space operations are still superior. Robot, or even remotely operated spacecraft, while possessing a definite role in space exploration and exploitation, are still not as flexible in handling unforeseen circumstances as a man on the scene would be.

There have been many problems with automatic satellite deployment in the past. In the long run, manned assembly and checkout will be best. The outstanding examples of the tricky Apollo 11 lunar landing and the repair of Skylab are only two situations of many that have shown, all else being equal, that there is no automatic system that can match human performance.

Filament-Wound Shuttle Solid Rocket Motors May Not Be Reusable

Dr. Hans Mark, NASA deputy administrator, told the Senate appropriations

committee that there is no guarantee that filament-wound case (FWC) versions of the existing steel-cased solid rocket boosters could be reused. The lighter weight filament wound versions are intended to increase the shuttle's payload by about 5000 lbs., and are considered especially important for Vandenberg AFB launches. The filament-wound cases will work for one launch, but NASA is not certain that the cases would be acceptable for reuse.

If true, this is not going to make the shuttle any cheaper. At present, a pair of new steel-cased boosters costs \$50 million, and refurbishing them for another flight costs \$20 million. If the filament-wound prices are comparable, not being able to reuse them would add about \$30 million to each shuttle flight.

The whole filament-wound concept may be academic. Some analysts have pointed out that the FWC boosters are less stiff than the steel-cased ones. Because of this, aerodynamic and structural factors may require Vandenberg shuttle launches to fly into polar orbit along a less-than-optimal trajectory. The total payload capacity lost by doing this is approximately 4000 lbs., or almost the amount saved by using the FWC boosters in the first place.

#### Government to Support Launch Vehicle Commercialization

A document mandating commercialization of expendable launch vehicles, such as the Martin Marietta Titan, the McDonnell Douglas Delta and others, has been drafted by the White House Space Interagency Group (SIG). The document, called a National Security Decision Document, directs the Department of State to chair a committee to define the details of this policy. This will be done in cooperation with the FAA and the FCC among other agencies.

Such a policy is good news for private launch vehicle companies. Most affected will be companies seeking to commercialize existing launch vehicles. These companies include SpaceTran, which is investigating use of the Titan, and Transpace Carriers, Inc., which hopes to market the McDonnell/Douglas Delta. Companies seeking to build their own vehicles will also be favorably affected, since such a policy would not restrict development of new launch systems and new civilian launch sites.

Final details are expected to be ironed out by June or July, and will include discussion on use of government facilities and insurance requirements. Further developments on this will be reported in future issues.

Until next time,



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