Imaging the Earth (II): The Politics of Landsat

Landsat has outgrown NASA; it is going to have to move out, but where?

As the National Aeronautics and Space Administration's Landsat program enters its second decade, the government is searching frantically for some public or private entity that will run the satellites as a continuous service. It has become a high-stakes game, played at a very high level. Unfortunately, no one seems sure of the rules.

The first three Landsats, peering down at the earth with sensors atuned to both visible and infrared wavelengths, have sent home images that are widely used in such applications as crop surveys, land-use planning, pollution monitoring, and mineral and oil exploration. The thematic mapper, a second-generation sensor due for launch this July aboard NASA's Landsat-D spacecraft, promises to be even more fruitful. In principle, the technology is already there for private firms to operate remote sensing satellites for a profit. But there are a number of fundamental problems in the way.

For one thing, NASA was created in the post-Sputnik frenzy of 1958, when space was the ultimate challenge to science and engineering. It hardly seemed possible that space operations could ever become routine. So NASA was established purely as a research and development agency. Not only does it have no mandate to manage operational systems, but when various space technologies do mature, as communications and weather satellites did in the mid-1960's, the National Aeronautics and Space Act gives no guidelines on how to make them operational. Decisions have been made ad hoc: weather satellites, for example, were passed to another government agency, the Commerce Department's National Oceanic and Atmospheric Administration (NOAA); communications satellites were given to Comsat, a quasi-private firm chartered by the federal government. Until somebody makes the same kind of decision for Landsat, it will stay in limbo.

A second and thornier problem is that Landsat, unlike the weather or communications satellites, has no natural home. The market is inchoate and fragmented. Individual users may be enthusiastic, but they are scattered through hundreds of federal agencies, state agencies, universities, and private industries. There is no one entity that caters to all these interests. Worse, Landsat imagery serves both the public welfare (as in pollution monitoring and land use planning) and private profit (as in mining and oil exploration). People cannot even agree on whether Landsat should be operated by the public sector or the private sector.

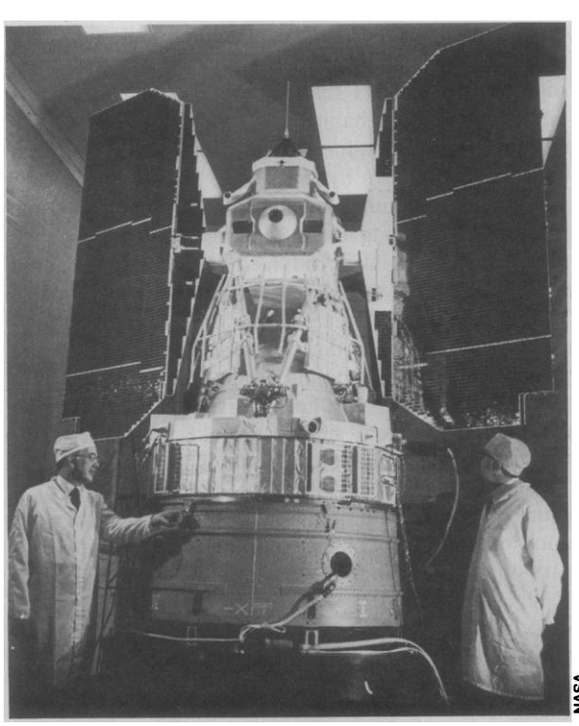
Consider the fate of rival bills introduced in the late 1970's by Senators Harrison Schmitt (R–N.M.) and Adlai Stevenson III (D–Ill.). Schmitt called for turning the satellites over to a private corporation along the lines of Comsat. Stevenson envisioned a remote sensing service set up within NASA. Both efforts foundered on the same rock: an operational Landsat, according to administration witnesses, was "premature." It needed more study. Cynics suggest that this was just an effort to put off making a decision. As long as Landsat stayed in NASA, nobody would have to take the flack for putting it somewhere else.

Finally, the front-end costs of an operational remote sensing program are daunting. NOAA has estimated that such a program, including the satellites, launch vehicles, and ground systems, would cost anywhere from $1 billion to $10 billion over 10 years. Yet the market for Landsat products is still relatively small; NOAA estimates $6 million per year. Ironically, many potential users may be hanging back from putting money into computers and Landsat-oriented software until they can be sure of a continuous flow of Landsat data—that is, until the program becomes operational. Given this state of affairs, it's hard to see how any private firm is going to touch it without some form of government subsidy to get things going.

The one thing that everybody does agree on is that Landsat is doing something uniquely valuable and worthwhile. Handled correctly, orbital remote sensing could become an important new industry for the United States, perhaps even a significant element in foreign trade. But handled as it has been, the chance could slip away. The United States is running out of time on Landsat.

"The curious thing about the U.S. program is the refusal to admit that the rest of the world exists," warns Charles Sheffield, vice president of the Earth Satellite Corporation, a Maryland firm specializing in the interpretation of Landsat imagery for private clients. "Commercialization of space remote sensing will happen in this decade," says Samuel W. McCandless, former project manager for NASA's Seasat program and now a private consultant on remote sensing. "But it may not occur in this country."

Europe apparently has no qualms



NASA

Landsat-1 undergoes checkout in 1972

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about the commercial viability of space. The European Space Agency is vigorously promoting its Ariane launcher as an alternative to the space shuttle. And in 1978 the French announced that they were buying into the commercial remote sensing market with a satellite called SPOT, due in 1984. The Japanese, meanwhile, are not far behind. If the United States keeps dithering with Landsat, say Sheffield, McCandless, and innumerable other critics, customers are going to turn elsewhere.

In November 1979, President Jimmy Carter tried to untangle the Landsat situation with Presidential Directive 54, which incorporated the recommendations of his space policy review panel. NOAA, he said, would take over temporary stewardship of the Landsat system in 1983 and operate it along with the agency's existing weather satellites, while charging enough to recover its costs. Once NASA finished proving out the second-generation thematic mapper on its new Landsat-D satellite, that, too, would be turned over. (NASA, of course, would continue its development of still newer technologies.) Meanwhile, NOAA was to work out a plan for the timely transfer of remote sensing technology to the private sector.

Implicit in all this was a commitment by the federal government to provide data continuity until the private sector could take over. Landsat-D′, a backup and successor to Landsat-D, was already under construction. At NOAA's suggestion, Carter included funds for two more spacecraft—Landsat-D″ and Landsat-D‴—in his valedictory budget request in January 1981. Together, these four spacecraft were to provide continuous coverage into the 1990's.

Then came Ronald Reagan and the great budget cuts of March 1981. Landsats-D″ and -D‴ went on the chopping block immediately; budget director David Stockman was philosophically opposed to any kind of "operational" activity by the government. Once Landsat-D dies in 1985 and D′ in 1987, says the OMB, that will be the end. Thereafter, by definition, the Landsat program will be in the hands of the private sector.

This is a deadline in the literal sense, and the prospect makes most observers shudder. "It's pretty well accepted as gospel in Washington and industry that the market for Landsat data today is totally inadequate for private sector investment, if that means building, launching and operating the satellites," says Wilbur Eskite, policy analyst for NOAA.

Or, as Sheffield puts it: "The Administration can't shift Landsat to private industry if private industry doesn't want to accept it." Commercialization is a wise way to go, he adds—but not all at once. "Why not have NASA keep on with providing the data stream, and have private industry get busy distributing and interpreting it?" Data dissemination, now done through the U.S. Geological Survey's EROS Data Center in Sioux Falls, South Dakota, could be commercialized right away. Later, as the market expands, the responsibility for operating the system could be handed over. Only when the market grows very large would the private sector start to develop and launch the satellites themselves.

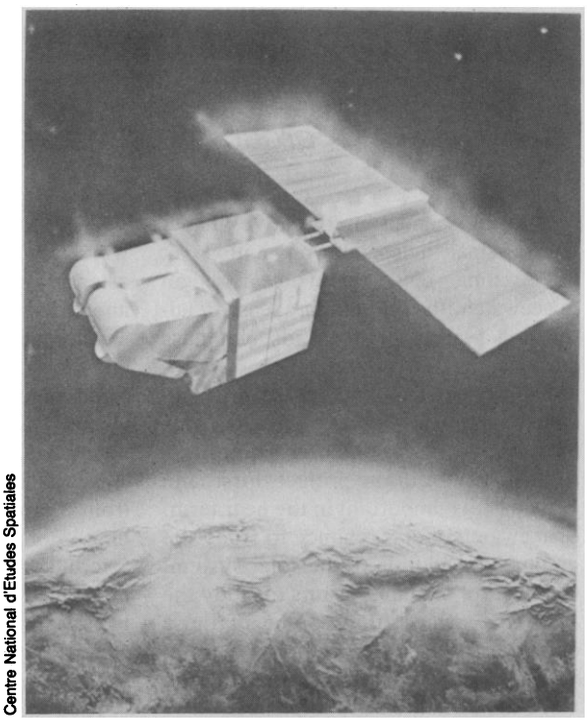
This kind of phased commercialization has been widely endorsed within both NASA and the user community, and is essentially what the Carter Administration had in mind. Another possible approach is that of Comsat, which has recently offered to take over both Landsat and NOAA's weather satellites lock, stock, and launch vehicle—if the government guarantees the company some hefty amount of remote sensing business per year. (Washington spends a good deal on weather and remote sensing already. Comsat likes to compare the guarantee to the government's introduction of airmail in the 1930's, which was basically an effort to provide security for the fledgling airline industry.)

By last fall, the Reagan Administration had begun to perceive that the commercialization of Landsat might require a little more than simple government withdrawal. The Carter directive 54 is technically still in effect, but now the question has been handed off to yet another study committee, in this case the Cabinet Council on Commerce and Trade, chaired by Commerce Secretary Malcolm Baldrige. The council looked over the issues at its December 1981 meeting, requested more information, and is currently trying to decide what it is that it wants to decide. Sheffield quotes Parkinson: "Delay is the deadliest form of denial."

Sooner or later, of course, the issue will be settled—either deliberately or by default. But was all the delay and acrimony really necessary? Is there a better way? Perhaps, as many have suggested, Congress should just expand NASA's charter to include routine operation of space systems, similar to what is now done by Comsat or NOAA. At a minimum, some clear, consistent, and stable policy on commercialization is needed from the presidential level (and not just for NASA's sake; the problem of technology transfer is government-wide). On the other hand, the elections of 1980 demonstrate just how gusty the winds of policy can be.

But one can hope that NASA and the current Administration will draw some useful lessons from the Landsat agony. NASA is already beginning to grapple with how to commercialize or otherwise "operationalize" the space shuttle itself. In a few more years it may be doing the same with a permanent space operations center, and perhaps space manufacturing technology. The decisions are not going to get any easier.

—M. MITCHELL WALDROP



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SPOT

The French spacecraft, due for launch in 1984, will be the first commercial remote sensing satellite.