

T E S T I M O N Y



RAND

**The Regulation of Commercial Remote
Sensing Systems**

Scott Pace

CT-112

March 1994

The RAND congressional testimony series contains statements of RAND staff members exactly as delivered to Congress.

*RAND is a nonprofit institution that seeks to improve public policy through research and analysis.
RAND's publications do not necessarily reflect the opinions or policies of its research sponsors.*

Published 1994 by RAND
1700 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
To obtain information about RAND studies or to order documents,
call Distribution Services, (310) 451-7002

The Regulation of Commercial Remote Sensing Systems

TESTIMONY OF

DR. SCOTT PACE
CRITICAL TECHNOLOGIES INSTITUTE
THE RAND CORPORATION

BEFORE THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY AND THE
PERMANENT SELECT COMMITTEE ON INTELLIGENCE,
UNITED STATES HOUSE OF REPRESENTATIVES

February 9, 1994

Mr. Chairman and Members of the Committees:

Good morning and thank you for the opportunity to be here today. Let me preface my remarks by saying that they are my own views and do not necessarily represent the views of the RAND Corporation or its sponsors.

I believe these hearings are important and timely. The commercial remote sensing industry is growing in importance as a source of new jobs, commercial opportunities, and environmental data at a time of great fiscal pressure on government-led efforts. What I would like to address today is the state of U.S. policy and legislation affecting commercial remote sensing, and what I see as important opportunities and challenges for the regulation of commercial remote sensing.

I rejoined RAND after several years in the Office of Space Commerce in the U.S. Department of Commerce (DOC). Part of my duties included coordinating the formulation of remote sensing policy for the Department and working with other agencies through the National Space Council to establish and implement remote sensing policy. I had the pleasure of working with the Committee on Science, Space, and Technology in the development of the Land Remote Sensing Policy Act of 1992 (P.L. 102-555). The leadership and persistence of this Committee were vital to reforming private remote sensing regulations and the creation of new opportunities for U.S. industry.

It is not hard to imagine the remote sensing industry as an important part of the National Information Infrastructure. Images taken from space could be custom-ordered from distant locations, calibrated with GPS signals, mixed with other data sources, and delivered to homes, schools, factories, and offices. The future commercial potential of remote sensing will thus be enhanced to the extent it becomes less of a "space technology" - exotic, expensive, and driven by governments - and more of an "information technology," common, inexpensive, and driven by markets.

Can remote sensing satellite systems be created at significantly lower cost than current systems? Are there commercial markets for new, lower cost, remote sensing products? The answers are almost certainly yes. The cutting edge issues for the remote sensing industry have less to do with technology than with markets and government actions. For example:

- When will the operating license process come into compliance with the requirements specified by Congress?
- Will governments compete with and restrict private data providers?
- Will industry and the national security community be able to create a relationship of mutual trust to protect both their interests?

These may seem like difficult policy problems requiring many months of interagency review and Congressional hearings. They are not. As a result of work already completed, the United States has adequate policies and laws in place. What has been largely lacking has been a clear and consistent implementation of those existing policies and laws.

GLOBAL COMPETITION IN SPACE-BASED REMOTE SENSING

Over 60 civilian remote sensing satellites or sensor packages are either in operation or planned for deployment in the 1990s. These systems represent a great diversity of civil, scientific, and commercial applications by all spacefaring nations. They also represent a great diversity in technologies,

including multispectral and radar imaging of the earth, atmospheric sensing, and ocean characterization.

The leading spacefaring nations such as the United States, France, and Japan are being joined by new participants such as Brazil, India, South Korea, and possibly South Africa. As in launch vehicles, France is a leading competitor to the United States in commercial remote sensing. France has also been a partner and data from both Landsat and SPOT satellites were routinely combined for military use during the Persian Gulf War. Russia, whose remote sensing efforts have long been dominated by military considerations, is showing increasing interest in commercial ventures that involve the sale of high-resolution visual and radar imagery. Both Russian and European firms are seeking business partners around the world.

The space-based remote sensing field is not synonymous with spacecraft and attractive pictures. The acquisition of raw data is only the first step in the process of creating information products that governments, scientists, and businesses will buy. Data from satellites must be processed, displayed, interpreted, distributed, and increasingly combined with other sources of data to provide a final product. In fact, the "value-added" segment of the remote sensing has seen demand for its products grow and diversify much faster than the demand for raw data. Continually declining costs for computer power have made it possible to create new "data fusion" products that make use of raw data from multiple sources. Global Positioning System (GPS) signals and commercial receivers are already a crucial part of the remote sensing industry in surveying and mapping. Data brokers and distributors could create a more predictable worldwide markets for new providers of raw data as well as a one-stop supply for value-added firms.

U.S. REMOTE SENSING REGULATIONS

Given the well-known problems with Landsat, some users of remote sensing data have advocated the creation of a regulated international monopoly - in a sense, giving up on the creation of commercial markets - and depending on continual Government subsidies for remote sensing data. It was the view of the Commerce Department that suppliers and users of remote sensing data

would benefit most from a competitive market in which there are many buyers and sellers rather than Government direction and regulation of what data and services are offered.

Achieving a competitive market in commercial remote sensing led the Commerce Department to seek the removal of burdensome regulations which chilled new investment and erected barriers to entry. U.S. regulation of private remote sensing falls into three general categories: operating licenses, radio frequency licenses, and export licenses. Procurement practices influence the ability of the government to be a commercial-like customer and thus the size of available markets.

Operating licenses

Prior to passage of the 1992 Policy Act, only two licenses had been granted, one for Landsat and the second for the Large Format Camera which flew aboard the Shuttle. Since the 1992 Act, Commerce has granted one license to the WorldView Imaging Corporation for a small multispectral imaging system and is currently reviewing applications from the Lockheed Corporation for a high-resolution Commercial Remote Sensing System (CRSS) and the Orbital Sciences Corporation for a license to operate its Seastar ocean color sensing satellite, as well as a high-resolution system called Eyeglass. I am convinced that these companies would not have come forward if the Congress had not supported changes to the Commerce Department's licensing process.

The DOC has been responsible for licensing private remote sensing satellite systems since passage of the 1984 Landsat Act. This Act and its accompanying regulations treated private remote sensing satellites and Government systems as if they were the same. Private operators were told that they would have to sell their data at the same prices, terms, and conditions to all potential customers. This barred many competitive pricing practices and prevented start-up ventures from attracting capital via exclusivity clauses. The 1992 Act allows private remote sensing systems to sell data to whomever they wish at market terms and conditions with one exception. In line with U.S. international commitments and U.N. principles, raw data concerning the territory of a sensed State must, upon request, be

made available to that State as soon as it is produced and at reasonable terms and conditions. Unlike aerial photography, no permission is required to fly a satellite over someone's territory and a State should have reasonable access to information about itself gained from overflights of civilian spacecraft.

The National Oceanic and Atmospheric Administration (NOAA) within the DOC is responsible for processing license applications and supporting the ability of the Secretary of Commerce to respond to completed applications within 120 days. The Department of Commerce is required to consult with the Departments of State and Defense to see if a proposed license raises any national security or foreign policy concerns. These interagency consultations typically are the greatest source of uncertainty in the license process. The review of the WorldView license took slightly longer than 120 days, but I thought the next applications would go more quickly. Sadly, this has not been the case. Detailed regulations conforming to the new law have yet to appear.

Radio frequency licenses

Notwithstanding changes in the Commerce license process, private remote sensing systems still require a separate license from the Federal Communications Commission (FCC) to use the radio spectrum for communications. An FCC license is not a prerequisite for a DOC license, but the 1992 Act did include a provision requiring the FCC to respond to applications within 120 days.

The main barrier for new commercial ventures is that the FCC does not yet have a license fee schedule specifically for private remote sensing systems. If the FCC uses the communications satellite fee schedule, for example, a remote sensing venture would have to pay a six-figure fee to enter a market that is dramatically smaller than that for communications. It is my hope that the FCC will define a reasonable fee schedule that will not in itself create a serious barrier to new entrants.

Export licenses

Some U.S. firms would like to export civil remote sensing satellites either for use by foreign customers or launch on foreign rockets. Other firms are building environmental satellites as part of international efforts and they must transfer remote sensing technology and equipment to foreign sites. Both activities are subject to U.S. export controls since, like many space technologies, remote sensing systems are considered sensitive for national security and foreign policy reasons.

The United States categorizes remote sensing systems as "munitions" and thus part of the U.S. Munitions List (USML) managed by the Department of State. Interagency efforts have been underway to reclassify weather satellites and older remote sensing systems as "dual-use" technologies and move them to the Commerce Control List (CCL) managed by the DOC. The main effect of such transfer would be to make the licensing process more predictable and timely for exporters. It would not, however, necessarily make it easier to get permission to send a controlled item overseas.

Much of the interest in changing the classification of remote sensing systems stems from a desire to create greater consistency between U.S. and allied control regimes and the expectation of large-scale international cooperation in environmental monitoring. The participation of U.S. firms in international satellite projects will be significantly hindered if the United States continues to keep all remote sensing systems on the USML. It is my understanding, however, that the publication of new export control rules is being delayed by disagreements between the Departments of State and Commerce over the treatment of controlled missile technology components that may be embedded in spacecraft and satellites.

It should be noted that technology and hardware are subject to U.S. export controls, not the remote sensing data products produced by civilian systems. Thus the export of a ground station or satellite may require a government license, but not the reception of unencrypted data from space. Data from U.S. Government systems may be classified for national security reasons, of course, but not data from private systems unless specified under a Government contract. Application of export controls to privately produced

data is only done for special cases (e.g., nuclear weapons) as both First Amendment and practical considerations make enforcement virtually impossible. Computer networks routinely transmit increasing amounts of data and images around the world and remote sensing is already part of this trend.

Government as a customer

What role will the Government play as a provider and user of remote sensing data? Some believe that the Government should supply data from space at low cost to all who want it, whether for commercial or scientific purposes. Others believe that the Government should not compete with potential private providers of data by selling products at below market rates. These issues will likely become more serious as nations discover commercial applications for remote sensing data from international scientific cooperation and national security "burden-sharing."

Traditional U.S. industry interests have supported the Government's development of new technologies and contracting for building and operating satellites. However, in those parts of industry interested in commercial space markets, there is a growing interest in having the Government be only a customer for data and services. The Government might be a "first buyer" or an "anchor tenant" for data from new commercial systems. Aside from its buying power, U.S. Government purchases are important internationally as other countries often look to NOAA, DOD, or NASA as the definers of data standards and quality.

NOAA has requested information from industry on the potential commercial purchases of global wind data. NASA researchers have identified possibilities for data buys in lightning, climate data, and ocean color. I would urge the Committee to support these and other experiments with market-like procurement mechanisms. For example, NASA and NOAA might be authorized to issue vouchers enabling researchers to buy data directly from qualified commercial sources. Such efforts can provide incentives for commercial businesses to grow and improve the cost-effectiveness of government research.

COMMERCIAL REMOTE SENSING AND NATIONAL SECURITY

I believe it is in the national security and economic interest of the United States to compete in the field of remote sensing, to lead in the development of technology, and to seek a position of leadership in international markets. The most effective way to do this is to promote the competitiveness of commercial remote sensing and to encourage remote sensing firms to establish themselves in the United States. The surest way to lose to increasing international competition is to adopt a restrictive regulatory environment at home which encourages customers to seek out foreign sources. By being a high-quality, dependable supplier of remote sensing data and related products, the United States can deter others from entering the field and retain influence over the use of remote sensing data in crises and war.

A year ago, the national security community, U.S. industry, and civil government agencies had reached a working consensus on the regulation of commercial remote sensing. The Government would make it easier for firms to operate remote sensing ventures under U.S. jurisdiction and a review of national security and foreign policy concerns was part of the process for getting operating and export licenses. Licensed firms were free to sell data and value-added products around the world. The export licensing process would be streamlined to facilitate international cooperation in low-resolution and older capability remote sensing hardware. At the same time, the Government would maintain restrictions on the export of technical know-how such as the manufacture of space systems.

In short, selling data, services, and related ground equipment are encouraged, selling controlled space technology is not. Firms interested in commercial remote sensing would be encouraged to operate in the United States in preference to exporting complete space systems. The central objective would be to maintain U.S. jurisdiction over the space segments while encouraging U.S. industry competition in international markets. It was assumed that the U.S. Government would not compete with industry in international markets for remote sensing data, hardware, or technology.

Restrictions on operating licenses

Remote sensing technologies were developed to meet national security and scientific needs and they turned out to have commercial value as well - a familiar case of dual-use technology. Commercial uses have not displaced scientific and military applications, but they have enhanced them and created new challenges. For example, high-resolution remote sensing systems may have commercial value to the news media or city planners, but the unchecked proliferation of foreign capabilities could place U.S. military forces at risk.

Part of the purpose of the operating license process is to identify any conditions necessary for the protection of U.S. national security interests. To the maximum extent possible, such protection should be accomplished by conditioning the license - not denying it. The key requirements should be that U.S.-licensed remote sensing satellites remain under the control of a U.S. firm at all times and be subject to service interruptions in times of national crises as declared by the President. In my opinion, it is possible to allow foreign organizations to directly receive data from and task individual sensors as long as the satellite as a whole stays under U.S. control. This is consistent with the requirements of the 1967 Outer Space Treaty in which State parties, such as the United States, remain responsible for the activities of those under their jurisdiction.

In order for commercial firms to compete in rapidly changing markets, they must retain maximum control over their operations. The time scales of commercial competition are inconsistent with government debate and review. Any attempt to require prior government approval of international business arrangements, except those involving controlled technologies, would likely harm U.S. competitiveness and would contribute to driving business offshore. Industry therefore needs a clear and predictable process for addressing national security concerns. If there are countries that U.S. firms should not enter into contracts with, this condition should be stated clearly in either law or regulation.

Government-to-government agreements

Space-based systems play an important role in enhancing stability and security in many parts of the world. In a time of declining defense budgets, it

is natural for the United States to look to other nations to share the burden of regional security needs. The United States needs to be cautious, however, not to compete with private firms who may be seeking international sales to foreign governments. Intergovernmental agreements involving space-based systems should, like many other areas of international cooperation, be based on the principle of no-exchange-of-funds. Particularly in the field of national security, the United States should not act like a business in which it is paid for services. In fact, preference should be given to using U.S. commercial systems in international cooperation to avoid risks of compromising classified systems.

Release of declassified remote sensing data

The press has reported proposals that declassified data from national security systems might be sold openly for commercial and scientific purposes. It has even been suggested that Government agencies might earn substantial sums from such sales to offset budget cuts. If true, such reports are troubling in that this would represent Government going into competition with private industry. As a basic principle, the U.S. government is not a business and should avoid competing with private industry to the maximum extent possible.

The Government may have data of scientific value and whose release would be in the public interest. If declassified remote sensing data is released, it should be subject to certain conditions to prevent harm to industry. For example, data should only come from non-operational systems, data should be not be younger than ten years old, and be released into the public domain on a non-discriminatory basis. The release of data must not become an on-going business for strapped agencies. After a ten year trial period, such releases should be reevaluated and possibly stopped if they are competing with commercial enterprises.

RECOMMENDATIONS

The Commerce Department is currently overdue in responding to several completed remote sensing license applications from U.S. industry. It should act now to issue licenses to these U.S. firms provided the Secretary is

satisfied that the satellites will remain subject at all times to direct U.S. control in the event of crises or war. This is a decision for the Secretary to make as the responsible Cabinet-level official for private remote sensing regulation.

The Congress and the Administration should make clear commitments to ensure that the United States government will not compete with U.S. industry in international markets nor seek to restrict the competitiveness of U.S. industry except for the export of controlled technologies, components, and systems. Business arrangements, including local tasking of remote sensing systems, should not require government approval as long as relations with the participating countries are not otherwise restricted (e.g., economic embargoes). To the greatest extent feasible, the U.S. Government should seek to be a reliable customer for data from private industry.

The field of remote sensing is one of great challenge as well as promise. If successful, commercial remote sensing can provide new, low-cost, sources of data to the national security and scientific communities and contribute to U.S. competitiveness and economic growth. If unsuccessful, our competitors will move in and private firms will create off-shore remote sensing operations beyond U.S. jurisdiction - to the likely detriment of our nation's security and economy.

The delays of the past year have allowed potential competitors to narrow the lead the United States enjoys. Other countries are improving their capabilities and making decisions on whether to develop independent remote sensing systems. These regulatory delays have also increased costs for U.S. firms as they wait for licenses. The time for excuses and reviews is over. It is time to act and enforce the licensing process the Congress approved in 1992.

Thank you for your kind attention and I would be happy to answer any questions that you may have.

