

# Remote Sensing Issues and Policies—Industry's View

Policy must be clarified with regard to research, dissemination, and communication.

(Abstract on next page)

**T**HIS AUDIENCE has had over 10 years' experience with the trials and tribulations of the remote sensing satellite. Reflecting on what I might say to this group, it seemed that a few comments in historical perspective may be relevant regarding what seems to be working right, what seems to be going wrong, and what needs to be done now to make this a better program.

First, the satellite is working right. Milo Cox said it very well a few years ago when he described an "enthusiasm curve" as a function of time. In the first phase scientists and managers ask what they believe are very simple questions (in fact, they are complex) and are encouraged and enthusiastic about the prospect of getting the answers with great regularity, accuracy, and simplicity. Then they get into the inevitable details, and face inevitable problems. They had, of course, oversimplified their questions to begin with, in fact frequently asked the wrong ones and, not surprisingly, when the answers didn't pour out on schedule their enthusiasm went down. Then they begin putting the original question in the real world context (taking smaller bites as a rule), and from that point forward success builds on success and their enthusiasm increases again. A classic example of this would be in agriculture where some people initially hoped they would immediately be able to identify and measure all crops on a world-wide basis, extrapolating from relatively special research conditions. (Note: These were not the same people doing the work!) Not surprisingly, it didn't work out that way. Then they started saying, "All right—let's consider first only the fields of a certain size and type and take into consideration meteorological and other time-dependent and ground information." Once they revised their questions, the true power of the data began to emerge. Now after only two years we can confidently predict that the

impact of these systems on agricultural economics and problems of hunger will be enormous.

*Moral:* When we did something right, in retrospect it was seldom done the way it was first planned. Hindsight is always better than foresight.

The second thing that has worked right is that we have tended to address the application of satellite data from a political viewpoint on a reasonable basis. This success has resulted from the fact that there has been widespread user participation and that policy is being established on a case basis rather than by political theoreticians contriving scenarios and then attempting to set policies to cover all possible cases. Some people are preoccupied that stronger controls and new policies are necessary in order to avoid misuse. It is my contention, however, that at least in the near term, emphasis should be placed on those mechanisms which will broaden the satellite data utilization. Stated otherwise, in a world which is desperately short of food, water power and materials, it is better to err in the direction of finding and managing these resources than obsessing oneself with undocumented abuses and speculative conjecture.

*Moral:* To be forewarned is not necessarily to be foresighted.

Now, what's wrong? Here there's a long list. First, fundamental policy decisions have not been made and/or articulated in many important areas within and between government agencies, foreign governments, and multi-national organizations. For example, when does an application become operational and what does this mean bureaucratically? At first it appears we are fortunate that we have not had any "major misuses" of data to date, noting it is important that this not be left entirely to the caprice of chance too long. On the other hand, crimes of omission may be

just as catastrophic as crimes of commission, and we have had fewer successes than we might had we been less preoccupied with the defense.

Second, in many cases where policy is understood, it is not being implemented systematically and effectively. The result of this indecision is costly. The first cost is that it reduces both government and industrial investment, short-and long-term, and thus retards program benefits and development.

precipitates chaos. In summary, there has been preoccupation with defense and an inadequate attention to the offense.

#### AN INDUSTRIAL VIEW

First, I do not think industry knows which way to go. The marketing representatives from commercial companies very frequently see the "wrong" people, i.e., those they *can* see rather than *should* see, and they collect much misinformation. Further, the "right"

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*ABSTRACT: The appropriate role of the U.S. Government and U.S. industry is indeed a complex one. Modern satellites pass repeatedly and without bias over each part of the earth on a daily basis. Their instruments are insensitive to political or topographic boundaries and they have to date been programmed in a manner designed to evaluate their applicability for many uses rather than to optimize their efficiency for any. The net effect of all this is to leave the question of application in the hands of the interpreter whose interests are as diverse as the territories covered by these systems. What is perhaps most interesting to date is the relative success with which these issues have been addressed, given their complexity and even the extreme emotional views expressed by some of these subjects. It is the opinion of the author that this success has resulted from the fact that there has been widespread participation and that policy is being established on a case basis rather than by theoreticians. Some people are preoccupied that stronger controls and new policies are necessary in order to avoid misuse. It is the author's contention, however, that at least in the near term, emphasis should be placed on those mechanisms which will increase the satellite-data utilization. Stated otherwise, in a world which is desperately short of food, water, power, and materials, it is better to err in the direction of finding and managing these resources than obsessing oneself with undocumented abuses. The purpose of this paper is to discuss the role of the U.S. Government, foreign governments, and state governments with respect to U.S. commercial enterprise. While to date the world has benefited from lack of rigid controls of space-acquired data, its value has been severely limited by government indecision and failure to recognize new sets of demands for formatting, distributing, and integrating the many forms of remotely sensed data into an operationally valuable package very much needed by the world's demands. This paper attempts to address these issues on the context of what we know after more than two years of ERTS satellite data.*

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The second cost is that when objectives are not well understood, research is not effectively focused.

Finally, perhaps the greatest difficulty is the lack of program identity both within and without the government. Ask a different person and you will get a different answer. Is it research or operational? Is the resolution adequate or not? Do the benefits exceed the cost? Go further and try to understand where the future budgets are going to come from— which agencies, for example. This really pre-

people recognize the policy uncertainties and have considerable hesitation in giving guidance sufficient to encourage long-term capital investments. In addition, they are understandably encumbered by procurement laws which make it difficult for them to work with a group that does have a good idea. Net result: Unnecessary suspicion and misunderstanding develops between government and industry.

Second, foreign governments are generally confused regarding industry's role. They

have very little idea of what they are going to have to buy and what the U.S. Government will give them. Further, when and if they talk to "an official representative of a government organization", they frequently get conflicting reports, however well intended. For example, it has been often stated that Sioux Falls will "provide training and technical assistance." What does this mean? Another actual example: "Why does the USGS provide a mapping program for the Saudi Arabian Government and can't be expected to provide one for our government which is just as important and less able to afford it?" While these confusions are explainable, they are nonetheless damaging not just to industry, but to the development of the earth resources program on a world-wide basis because they result in unwarranted delay and misplaced hopes.

Third, there is confusion and competition between government centers and government people running the programs. In fact, to be very candid, there is a conflict of interest between what the role of government will be, as viewed by first-rate professionals in the government who naturally want to pursue their chosen professional interest, and industrial consulting and non-consulting firms. This is further compounded by the fact that support contractors have become interwoven in this morass and it is difficult for someone outside the government center to understand whether there really is an opening for new ideas. (Note: I personally believe the government must do enough internally to maintain professional judgment for management purposes, but the difference between the means and ends must be recognized and managed.)

Fourth, there are major jurisdictional conflicts in, and between, almost every government agency in almost every government that I know of, and the net result of this prolonged conflict has been on balance negative, while not without some benefits (specifically, one

group cannot block progress by doing nothing!).

So, what is the net effect? First, some policy documentation must be prepared which will set a basis for U.S. domestic and foreign policy. Perhaps this should be done within the U.S. Government agencies, perhaps it should be done by a Senate or House committee, or the Executive Offices, but clarification is required. (While I recognize the contribution of the outside groups such as the National Academy of Sciences' Summer Panels and Contractor Reports, what is needed now is an official position. Consequently, the government must take action itself.)

Second, it is my strong opinion that one of the principal policy issues to be resolved within the U.S. is the appropriate balance between in-house and external research within the government centers.

Third, emphasis should be placed on timely and effective dissemination of all data forms from all civilian satellite systems contributing to the management of earth resource problems. Further, to do effective experimentation, delivery services must function in operational mode. I would particularly emphasize the importance of making LANDSAT tapes available on a timely basis. To make less than the highest-quality data openly available will penalize the program in many ways.

Finally, some clearer way should be devised to explain the program and the earth resources community to outsiders (and even insiders). In all fairness, this is a unique program in that it cuts across more technical, bureaucratic, and political boundaries than any other program I know in the government. However, this only makes the job harder and we must realize that historians will judge this effort on its ability to solve real human problems at a crisis point in our history. To do this, communication is critical and, in my opinion, the first problem is policy focus.