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THE DEVELOPMENT OF A
COMMERCIALLY VIABLE REMOTE SENSING INDUSTRY

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ABSTRACT

Satellite remote sensing has been the victim, as well as the beneficiary, of U.S. government sponsored programs. The technology owes its existence to NASA and Department of Defense R & D projects. But after proving its practical benefits to society, the government has lacked a commitment to the commercial development of remote sensing, even though there are successful examples of other high technology products and services that have been commercialized. A primary missing element in this situation is the application of proven marketing techniques and strategies.

Remote sensing has reached a critical point in its development cycle. The technology has proven to be viable in various earth resources applications, and overseas interests are rapidly siezing the momentum in its commercial implementation. U.S. government agencies and private companies must cooperate to prevent the loss of U.S. leadership in this information technology.

INTRODUCTION

Remote sensing has been described as a technology for which few commercial customers exist. A more accurate evaluation, however, is that the customers exist but their markets have yet to be identified or properly developed. This situation will change in one of two ways: slowly, as young technicians and executives who have trained in remote sensing techniques are gradually promoted into positions of power and responsibility; or, rapidly, by applying proven marketing techniques. The obstacles faced in marketing remote sensing technology are not unique. Many of the same problem areas have been successfully overcome by executives in other industries. In particular, many electronics and computer companies have effectively marketed complex technology to relatively unsophisticated customers. The

strategies and techniques used by these industries are equally applicable to marketing commercial remote sensing services.

EVALUATING THE MARKET

Although a market for remote sensing services does exist, under present circumstances, it remains poorly defined. This lack of market definition and segmentation can only be remedied by a proper investment in market development. There is a means, however, of quantifying market potential. A baseline or minimum market may be defined by determining the dollar value of the services which remote sensing could productively replace. Using this figure, an initial "break even" commitment to capital investment can be established. For example, the computer and office products companies such as IBM and Xerox evaluated the sales potential for word processing and electronic mail by analyzing the dollars spent on specific office equipment, secretarial labor, postage, and business phone communications. Realizing that they had a superior approach to office and communication functions, IBM and Xerox were able to determine a low risk financial commitment to these technologies.

Superior technology tends to stimulate new applications once it is established, and thus the baseline market figure represents a conservative estimate of market potential. A parallel evaluation of earth resources data markets indicates a market potential significantly greater than what current sales of Landsat would portend.

Terra-Mar Associates has researched and evaluated the baseline figure for commercial remote sensing services. Developing a twenty year market scenario from this baseline figure and assuming an aggressive marketing environment, Terra-Mar has projected that the annual market for remote sensing data, computer hardware and software, and value-added services could conservatively exceed \$10 billion in constant 1980 dollars by the year 2000.

this evaluation and market projection is based on the fact that several important industries are currently dependent on sources of resource and environmental information which can be partially replaced or augmented by reliably and timely processed and delivered remote sensing information. Such an opportunity is particularly evident in the oil and mineral industries and within the agribusiness sector of the economy. This market potential can be achieved by developing sensor technology and data products which specifically address the needs of the resource and environmental based industries and government services.

MARKET PENETRATION AND DEVELOPMENT

Market penetration in the case of satellite remote sensing data services becomes a case of reaching key decision makers with a brief but convincing presentation of facts, figures, and case study analysis. However, remote sensing must not be oversold as a replacement for all other data gathering functions. On the contrary, it should be sold on the basis of the integrative role which it plays in pulling together other types of data into a logical and useful format. This effect can be achieved through:

- Development of case study situations where Landsat data has been effectively utilized in problem solving analysis.
- Cost benefit and statistical evaluation of various data collection techniques as compared to a remote sensing supplemented data base.
- Computer simulation and demonstrations of interactive computer graphics using an earth resources data base.

A marketing presentation should be based upon a previous understanding of the information requirements of each individual customer. Although needs within an industry may be similar, the level of technical sophistication may vary and a single approach may alienate those who are least receptive to new technology and any operational change within their organization. Therefore, in designing a marketing strategy, it is essential to realize that the middle manager or technician, who may have the best understanding and knowledge of remote sensing data and computer capabilities, may have only minor influence in determining large capital commitments to new technology. For this reason, the bias as well as the technical sophistication of top management must be taken into consideration in developing a long term customer relationship. The commitment to a remote sensing data system must come from the top down to middle management -- thus corporate heads must be convinced by cogent arguments, relevant to their operating situation.

EVALUATING THE TECHNOLOGY

Remote sensing is not only a satellite sensor/aerospace technology. Born of aerial photography, military surveillance, and NASA research, remote sensing is entering an era when its capabilities are defined by computer hardware and software and not by variations in satellite and aircraft platforms. Remote sensing is primarily a computer technology and its markets should be defined accordingly. The growth of remote sensing data markets can be related to future computer industry sales; more specifically, the ease of access to remote sensing data becomes an integral part of the market development of distributed processing and related communication technologies. Remote sensing/earth resources data services will become another component of one of the major growth industries of the future -- the business of accumulating and distributing knowledge.

Although satellite broadband communications may represent an important means of distributing data within a remote sensing industry, the commercialization of satellite communications does not represent a relevant example of marketing strategies which should be applied in developing a remote sensing industry. The communications industry was established and mature before satellites were an available option. Satellites provided an alternative to land lines and microwave for voice and data communications in an exploding marketplace. Basically, there was little new and creative marketing to be accomplished. On the other hand, remote sensing commercialization will require aggressive market development to broaden the current base of users sufficiently to justify further capital investment. Again, this market development is not unusual and has been accomplished by many other embryonic technologies in order to establish commercial self-sufficiency.

This does not mean, however, that the Landsat experience should be used as a model for a future commercial remote sensing operation. Landsat is a R & D system and is encumbered with many costs and inefficiencies which should be eliminated from an operational program design. Landsat represents a proof of concept. With that experience as its foundation, a satellite remote sensing industry should be based on user needs and the most appropriate and cost-effective technology to satisfy those requirements. The Landsat approach is overpriced by a factor of ten, and the market will be served eventually by a commercial system designed from the ground up to operate productively and efficiently. In the near term, this strategy will require the optimization of technology and assets which are currently available, while long term growth will justify the commitment to a dedicated system.

This system redesign should include not only satellites but also the rocket boosters which place satellite payloads in orbit. The current rocket booster and satellite combination represent engineering striving for perfection, providing an extra 10% of reliability and performance at the expense of commercial feasibility. Pushing the limits of a particular technology is common under current programs -- even when other less costly technology may be more appropriate. Such a strategy is satisfactory for R & D experimentation but is a completely inappropriate method for achieving commercial objectives. Simplicity and cost-efficiency should ultimately drive a successful operational program of space commercialization. Concepts for rocket propulsion and satellite imaging have been rejected for reasons unrelated to cost efficiency and performance characteristics.

The Shuttle is a Space Limousine in an era requiring a Space Truck. Landsat D is a data system created by a multidirectional committee with the result that, at a premium price, it will serve no single user group well. Political and government budget decisions are inhibiting the development of space commercialization at a time when the United States' overseas industrial competitors are aggressively developing their own commercial initiatives in space related ventures.

POLICIES AND POLITICS

Market projections for the future development of a remote sensing industry are highly dependent upon an expeditious transition of remote sensing from government to private sector control. Government has no experience in marketing high technology products and services. A rapid transition is necessary now in the face of stiff overseas competition. A strong U.S. industry will effectively compete with foreign remote sensing programs. A strong U.S. industry will efficiently coordinate complementary satellite sensing systems with European and Japanese projects in order to minimize duplication of effort. A strong U.S. industry will provide valuable data at a reasonable price to a wide range of users. From a marketing perspective, such a strategy will represent the best method to stimulate the acceptance of new software applications and the associated value-added consulting which represent the greatest opportunity for profit generation.

In this regard, the best government policy should stimulate this transition process. There should be no regulation and no subsidies allowing the marketplace to determine the best distribution of dollars and resources. The government can provide tax incentives to expedite this process, thus providing equal opportunity to all companies venturing into this new industry. Thus, the markets and advanced technology exist to create a healthy and pros-

perous U.S. remote sensing industry. The government's role is to hand over the business to the private sector without creating regulatory obstacles to overcome, allowing those who best apply and market the technology to prosper in a competitive environment where the real winner will be the customer for remote sensing data and services.

THE ROLE OF THE PRIVATE SECTOR

The companies which have developed the greatest technical knowhow in remote sensing technology through DOD and NASA contracts are also unlikely to assume a pioneering role in establishing a broad based commercial industry. Primarily, these are large aerospace companies who believe that marketing is equivalent to engineering liaison and who have had limited experience in selling an advanced technology based product or service to relatively unsophisticated, widely dispersed customers.

Remote sensing (and related data base services) is an information business which will be developed by the entrepreneurs in our society. Information products and services are recognized as major growth markets in the world economy; however, market oriented ventures will be required to maximize the benefits as well as the revenues which this industry will provide. Remote sensing is a result of aerospace research and development addressing the needs of information markets. In a sense, remote sensing bridges two established industries which are in a state of transition. The information revolution will be stimulated by concurrent development of distributed processing strategies in the computer industry. The aerospace industry is faced with the challenge of commercializing space but is inhibited in this initiative by an overdependence on government contracting and associated limited marketing capability.

Whereas the entrepreneur and small business will take advantage of the inevitable growth in distributed processing, computer services, and other knowledge and information services in establishing a remote sensing business, the aerospace executive and engineer is faced with the challenge of changing his way of business in order to reap the benefits of space commercialization. This effort will certainly require a higher level of risk as well as a basic change in the manner which an aerospace company conducts its activities. However, the potential rewards are obvious to those who understand the implications of space industrialization. The failure of U.S. companies to assume an aggressive strategy and continue their leadership will only concede these lucrative markets to those more aggressive companies beyond our borders.