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REMOTE SENSING - THE ROLE OF THE SUPPLIER

SYMPOSIUM ON "MACHINE PROCESSING OF REMOTELY SENSED DATA, "

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I have been asked to address the question of what is the responsibility of the business community, those providing hardware, software and services, to assist in the transfer of remote sensing technology.

By exclusion, let me suggest that the development of sensors, instruments, data processing systems or application programs for NASA or EROS not be part of the topic for consideration. This segment of the market, possibly the largest in dollar volume at this time, does not to my mind represent a transfer of remote sensing technology. However, other government agencies, including other segments of the Department of Interior do in fact represent potential users of the technology and must be included.

The business community should be addressing the basic philosophy of how to best support the development and exploitation of our remote sensing technology in the management of natural resources. In this they must work hand in glove with NASA and USGS and other government agencies. Equipment and services offered should include data processing, analysis and interpretation; information data base system design and management; consultation on data utilization; ancillary data acquisition, processing and interpretation equipment; and operations support. This is for the most part the domain of private industry - not the government.

These equipment and services will provide information on how land and resources are being used; where resources are located; the distribution and inventory of vegetation, soil, crops, minerals, etc.; where to locate development projects; location of pollution; and many other areas associated with engineering, land use, resource management and environmental problems.

At the present state of technology understanding, the business community is faced with the problem of attempting to provide an ill-defined product to an uninformed consumer to satisfy some real and some yet to be determined needs and requirements. Would you say that we have before us a classical example of a "solution looking for a problem," or perhaps 'a developed technology

looking for an application.' Yet we have had years to consider this application and in fact have determined that the potential of the technology is limited only by the imagination of the users. Hence it becomes important that the business community not only look to sales of its products - hardware, software or services - but take an active part in developing applications and alerting the customer to the utility of the technology, the method of application and the benefits to be derived.

One of the means for accomplishing this is to address the data problem. What is the data, what does it represent, how is it obtained, how can it be handled, how can it be related to a specific objective. The business community can support the utilization by providing management expertise based on an awareness of the data and its utility. Assisting in helping the customer to relate the data specifically to his problem, not just encouraging him to acquire equipment and services to process the data, but in fact how it can be used beneficially. We are frequently caught up in our enthusiasm of presenting a product to a potential user, and overwhelm him with the facade associated with its operation. Quickly we can demonstrate false color renditions of selected data segments, glibly defining data categories, illustrating data classification, drawing pretty pictures. Hidden is the fact that the classification accuracy is marginal; the relationship to a specific farmer's field is at best loose and besides he's looking for oil, not wheat. We may in fact initiate our first sale, but the customer soon tires of circumferential answers to his questions and we had best have something more to offer or don't return; and mark up one dissatisfied potential remote sensing user.

System management in remote sensing provides a means for assisting the user in a direct fashion. If he is interested in providing sewage treatment facilities for a developing community, one must show the limitation of remote sensing as well as its benefits. Maps can be generated, supported by aircraft and/or Landsat imagery showing urban buildup, access routes, possible effluent basins,

potential problems with thermal or other pollutants. In operation, continual monitoring can update population projections to determine when maximum capacity is anticipated, monitor potential pollution effects and suggest future developments or refinements. All with little investment in capital equipment for remote sensing, but a better understanding of its real worth.

Services in acquisition, processing and interpretation of remotely sensed data must likewise be problem directed. It may not be sufficient that one can nicely show the delineation of conifers vs. deciduous forests when the concern is seedling survival, control of watershed, prevention of infestation or over production of a specific species. The user must again be made aware of the limitations of the available data and means identified to augment the data to achieve a problem solution.

Equipment for the data acquisition, processing and analysis may satisfy a number of functions simultaneously. We can not be over zealous in our concern for promoting remote sensing when what is required is a good data base management system, one that organizes the users' existing information and may negate the requirement for additional data sources and data interpretation equipment. Then get on with the job of finding the right potential user.

In brief I would suggest that the business community must, in supporting the utilization of remote sensing, be honest in its evaluation and quick to help a potential user identify where it can be useful - and to be just as forceful in pointing up its shortcomings. We have too often seen our technologies lie unused and wasting because an over enthusiastic proponent promised more than it could deliver. We must also accurately identify the capabilities of our systems and overcome our zeal when faced with a receptive, enthusiastic, but naive client and user. This issue is often clouded by the honest appraisal, desire or even intention of its proponent in selling a projected product, and not the product on hand. Projections are just that and all too frequently one falls short. To the user who has been shown one capability and convinced that the other is certainly possible; the failure of meeting a projected milestone, in his eyes, is merely a case of falsifying the product. And in this case another blow against the potential usefulness of remote sensing. It doesn't require many of these to dampen the enthusiasm and curtail the technology utilization.

Nonetheless the exploitation of the data, by management, scientific, engineering and lay persons is the main objective we must strive for. To provide this capability we must design equipment that readily handles the data in the format it is provided; and makes available the results in a format suitable for the user. The ease with which the user, no matter what his level of sophistication, can handle the data and derive its benefits is directly related to the future sale of the

products and the promotion of the technology. At this point several comments related specifically to the Landsat data and its suppliers are warranted. As a user I have been frustrated repeatedly by the delay in acquiring the data, particularly the tapes. NASA and EROS must pay heed to the user community and speed up the turn-around time to do its part in convincing the users that remote sensing is something more than a research adventure. Along this same line, a ready means must be provided for addressing a specific geographic location, and not just that it lies somewhere within this 100-mile area. When the data is identified by certain latitude and longitude (or other reference) boundaries, that's the data that should be provided, or at least an easy method for accessing that data from the digital tapes. Information for making the necessary radio-metric and geometric corrections must also be provided, again in a ready, usable form. Let's bear in mind we are trying to provide a service to a community not necessarily versed in digital data processing and all its attendant disciplines in mathematics, programming and machine operation. We may be able to provide the necessary expertise in the initial familiarization and installation but when we leave, it has to stand on its own, and the next user may not have the benefit of your expert, benevolent guidance.