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TWO-WAY COMMUNICATION AND ANALYSIS PROGRAM ON LANDSAT

Prepared By

New England Innovation Group, Inc.

For

NASA HEADQUARTERS

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Project Summary

In November of 1980, the New England Innovation Group contracted with NASA to:

A. Determine the level of awareness of Landsat among various substate users.

B. Document the requirements for increasing the utilization of Landsat by substate users.

C. Develop potential demonstration projects from these research activities.

A. Through a combination of user community workshops, field visits, research and telephone survey, NEIG determined substate user awareness to be significantly high at the upper management levels of both local, regional and state planning and resource management agencies. Awareness at mid and entry levels of these same organizations dropped from the planning director or agency head. Interest in substate applications of Landsat, however, was demonstrated at all levels of the profession during our three regional workshops. Professionals at the substate level are interested in and open to consideration of Landsat as a planning and resource management tool, but are at the same time skeptical about some of the inherent problems with Landsat data such as cost, resolution, frequency of coverage and data continuity. Despite this skepticism, the response from a largely uninitiated audience to the project's workshops, especially in the populated areas of the region (over 40 at each of two sessions in southern New England) would have to be considered an impressive and significant expression of interest. A further significant project finding relating to the level

of awareness among substate users in New England was the identification of existing though dissimilar substate networks of diverse professional backgrounds and with a wide range of interests in Landsat applications.

B. After determining the level of awareness of and interest in Landsat's substate potential, the project staff defined and documented the principal requirements for increasing the utilization of Landsat by potential substate users. Two premier issues which emerged from this effort were the need for an extension and intensification of technology transfer activities by resource organizations with responsibility for increasing use of Landsat (NASA, NOAA in particular) and the need to develop a larger pool of technically trained personnel to educate and train substate users in Landsat substate applications. Without a committment from the Federal Government for increased substate utilization of Landsat and the availability of trained professionals to meet the needs of a largely new user community, substate activity is likely to remain at a minimum. The existing technical and institutional barriers to widespread use of Landsat described in detail in the project findings, appear too great to overcome by the substate user community acting on its own. The future costs, reliability and relevance of the data are all so largely undefined at present as to effectively deter all but the most innovative and wealthy substate users who are not at all representative of the community-at-large.

C. Well-conceived and well-executed demonstration projects could play a critical role in both shaping the technology's ability to be more sensitive to substate user needs and interests as well as validating the effectiveness of this data to a skeptical audience.

2. Procedure

Several different techniques were used to achieve the goals of this study, including a literature review, telephone survey, three workshops, the establishment of an advisory committee, visits throughout New England and in Washington, DC, and participation in the annual meeting of the Eastern Regional Remote Sensing Application Conference in Danvers, Massachusetts. Each is briefly described below.

a. Literature Review

The literature review was a search of periodicals and books using key words such as Landsat, remote sensing, resolution and applications in order to identify reports of actual and potential substate applications of Landsat. The results of this search are presented in Appendix C. The principal sources used to compile this list were NASA reports (microfiche and SP-), Scientific Technical and Aerospace Reports, the annual remote sensing symposia of ERIM and LARS, NASA's Eastern Regional Remote Sensing Applications Center and the National Association of Counties. In general, this search located remarkably few reports specifically concerned with substate applications of Landsat, and those that have been published are primarily concerned with technical rather than institutional issues. An individual who relied solely on these sources only would have considerable difficulty determining the benefits and costs of potential substate applications of this technology.

b. Telephone Survey

The second procedure used in this study was a telephone survey in New England of 51 regional planning agencies (or councils of government), a regional transit authority, and three more specialized regional agencies (Massport, the Metropolitan District Commission, and the New England River Basins Commission). The survey was conducted from the University of Massachusetts by two research assistants who were graduate students in planning, and therefore had some familiarity with the organization and operation of regional planning agencies. The procedure on contacting an agency was to identify the caller as a researcher from the University of Massachusetts conducting a "planning study about remote sensing" and then to ask to speak to a "planning professional in the office who was involved in land use decisions". This person was asked some preliminary questions about the agency (size and jurisdiction), and then about this data uses and needs. Finally, the professional was asked about his or her familiarity with Landsat. The results of this survey are presented later in this report in the discussion of the user community.

c. Workshops

A major component of the study was the organization and presentation of three workshops on substate applications of Landsat. These were held in Amherst, Massachusetts, on January 22, 1981, Framingham, Massachusetts, on February 19, 1981, and South Portland, Maine, on April 3, 1981. Announcements of these workshops were mailed to substate agencies and municipal governments throughout New England. The list of attendees at these workshops is presented in Appendix B.

The format for the first two of the workshops was similar. In the morning, participants were briefed by experts on Landsat applications, and in the afternoon, were formed into smaller groups to discuss potential substate applications. The reports of these discussions was the final part of each workshop. (The third workshop did not form into smaller groups because of the smaller number of participants.)

d. Advisory Committee

Twelve individuals agreed to meet as an advisory committee on the study. They included representatives of substate users throughout New England, state officials, university faculty, and representatives from other groups working on substate applications: the National Association of Counites, the Pacific Northwest Innovation Group and the Upper Plains States Innovation Group. (The list of members is presented in Appendix C.) This group met in Northampton, Massachusetts, with the study staff on February 28, 1981. At this meeting, the findings from the site visits, literature review and workshops were presented and the committee requested to review, comment and suggest modifications.

e. Site Visits

Study staff from the New England Innovation Group and the University of Massachusetts visited a number of individuals and institutions concerned with substate applications of Landsat in the course of this study. A list of these is presented in Appendix D. Most of the places visited were in New England with a smaller number in Washington, DC. One trip was made to Los Angeles to participate in a similar applications study carried out by another Innovation Group.

f. ERRSAC Conference

On March 9-11, members of the study staff participated in the Second Eastern Regional Remote Sensing Applications Conference at Danvers, Massachusetts. This conference provided an opportunity to review several formal reports on substate applications, participate in a workshop session specifically concerned with substate applications, and meet informally with persons interested in substate applications.

3. Technical Issues

There is a substantial agreement among experienced and potential users of Landsat products about two major technical deficiencies for substate applications -- resolution and frequency of coverage.

Most users of satellite imagery want finer resolution, but substate users are particularly concered because their information needs are not adequately met by a 1.1 acre (80 m) resolution. Workshop participants indicated that, next to cost, this was the biggest obstacle to further utilization of Landsat data. Aerial photographs and maps are much more useful for their needs. In fact, one can make the case that the coarser resolution of Landsat effectively eliminates much information of value such as land uses which occupy small areas (transportation, steam networks) for substate applications. It is probably also valid to generalize that the payoff from increased resolution will be at least proportional to the increased processing cost. Thus doubling the resolution will make the data at least four times more useful, or applicable to four times as many problems.

There is, of course, a threshold or a point of diminishing returns to gains to substate users from finer resolution, processings, time and clarity, but it appears to be well beyond the values which are considered to be technically feasible. (Land use variations in urban areas or in phenomena such as flood extent are still imperfectly seen at 10 meters.)

The second technical issue of considerable importance to users in the humid climates of the United States is the effective frequency of coverage. The experience in New England (particularly noticed by Vermont users) with Landsat is that it is extremely difficult to obtain more than two relatively cloud-free images a year, and the dates on which they occur is largely random. There have also been problems with the satellites not being in operation on cloud-free days (also a Vermont experience). Ground truth data has been collected during a satellite pass on a cloud-free day to use to verify Landsat data, only to discover later that the satellite system was not functioning that day. Increasing the probability of cloud-free images by additional satellites and fully operational satellites is probably more important to substate users than investment in capabilities such as reduced delivery time. (Finer resolution, however, is considerably more important than increased frequency of coverage.)

Other technical issues such as the suitability of the sensors and the time of day of the pass are generally considered of little importance, although this may be due to an imperfect understanding of their importance.

4. The User Community

It is difficult to make an exact estimate of the size of the potential substate user community, but it is clear that it is quite large, much larger than the existing substate user community, because it includes not only professional land use and resource planners involved in substate decisions, but also elected and appointed officials at the local, county, and regional levels in municipal government, regional planning associations, councils of government, watershed associations, and conservation commissions. It also includes state and federal employees in agencies with clear substate responsibilities such as Cooperative Extension and the Soil Conservation Service, and state-supported "circuit riders" who provide services to a number of smaller jurisdictions. The total number of individuals involved in such activities in the United States is in the order of tens of thousands. (There are over 3,000 counties and 600 regional planning agencies in the U.S.) It is unlikely that many of these would ever become active day-to-day users of Landsat products, However, if technical, institutional, and pricing policies are adjusted accordingly, then it is probable that the substate user community would become the largest served by the Landsat series and its successors and quite likely one of the largest serviced by any of the NOAA/NASA satellites.

The telephone survey and the workshops carried out as part of this project indicate that in New England, the group most familiar with Landsat capabilities are the Directors of Regional Planning Agencies and their liaison staff in the office of state planning or its equivalent.

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The spectrum of substate officials described above, however, could become regular users of the information generated by Landsat for policy and planning decisions. Major institutional problems were identified through this project in the absence of a functioning infrastructure to deliver this into the entire range of potential users on a regular basis. Infrastructure including field processing equipment, education and training and outreach/awareness programs, and skilled professionals.

TABLE I

RESULTS OF TELEPHONE SURVEY OF PLANNING STAFF
IN
NEW ENGLAND REGIONAL PLANNING AGENCIES

Position in Agency	Landsat Awareness		
	None or Very Little	Some	Good
Director	3	7	2
Planner	21	7	2
Planning Asst.	1	2	0
TOTAL	25	16	4

In recent years, there have been a number of presentations, demonstrations and short courses in which many of these individuals have participated, and their level of understanding has grown correspondingly. Professional staff in junior positions have significantly less understanding of Landsat capabilities. This is illustrated by the results of the telephone survey of New England regional planning agencies (Table I). The overwhelming majority of planners and planning assistants indicated little or no knowledge, but the majority of planning directors indicated some or good knowledge. (This pattern also provides significant information about planning education.)

Other principals in substate planning, such as local planners, elected officials, and members of public interest groups appear to have even less familiarity and contact with Landsat technology.

However, though they may know little of the technical capabilities of Landsat, the substate user community is generally very interested and often enthusiastic about its potential, particularly when future possibilities such as Landsat D are described. This enthusiasm is somewhat lessened with increasing knowledge of technical problems such as resolution and frequency of coverage, and, most important, cost. (The issue of cost was a universal and special concern, particularly by workshop participants, and is treated separately in the next section.)

One of the major purposes of this study was to determine how Landsat could be usefully incorporated into future activities of this potential substate user community. If we assume that technical and cost issues are resolved, and that Landsat products are found to be useful, then the primary concern in the institutional and organizational framework for its processing, delivery, interpretation and use.

The substate user community is very different from those who normally use satellite imagery such as those involved in research or oil exploration because the typical substate user is engaged in a wide variety of tasks at once, and many of these may have very little to do with land cover information. As a result, they cannot justify the time required for training and study on highly technical material, and must rely on other agencies for technical assistance.

The incorporation of technical information and procedures into substate planning and management decisions has been recognized as a significant problem for many decades, and a variety of networks and organizations have been established to simplify and facilitate the process. Perhaps the best examples are the Cooperative Extension Service and the Soil Conservation Service. A principal function of both agencies is to insure that highly technical information is made available to individuals and groups with planning responsibilities in rural and urbanizing areas. The Soil Conservation Service has been so successful at this that their maps and tables are routinely considered by planners to be the major source of information about the natural environment.

In theory, either agency could add to its technical assistance functions some information about Landsat capabilities. In practice, however, both are primarily concerned with food and fiber production on single holdings, and only secondarily with rural development or other problems which are large in geographical extent. As a result, there has been little interest in Landsat in either agency, with the notable exception in New Hampshire at the Cooperative Extension Service in New Hampshire.

There are other technical assistance networks which vary in importance from state-to-state. One that appears potentially significant is the regional planning agencies (RPAs) in a state, together with the office of state planning or its equivalent. Regional planning agencies primarily function to coordinate planning activities on regional matters, such as transportation an waste disposal. They also function as a centralized location for information and expertise which are available on request from local and county governments, and from the private sector. The relationship of RPA's to state agencies is usually quite good; typically, the directors of all the RPA's meet monthly with representatives of the office of state planning.

This hierarchical relationship of state, region and municipality appears to be ideal for the distribution of Landsat products and expertise for substate applications. At the state level, the office of state planning, its equivalent, or the state land grant university could function as the principal source of Landsat products, expertise and training. Professionals in regional planning agencies would acquire the appropriate training and

products for their particular areas of responsibility and would act as intermediaries between local planners and officials and Landsat experts.

Unfortunately, the state-region-municipal hierarchy is not as effective as it may first appear. In many cases, this organization, though nominally present, is regarded with indifference and disinterest at any or all levels. In New England, for example, local governments often regard regional planning agencies as unnecessary, and choose not to participate. Another problem is that larger municipalities quite understandably prefer to continue dealing directly with state agencies, without a regional entity as an intermediary.

In addition to these two quite visible networks, there are often many other less apparent but quite effective institutional arrangements which deal with technical issues in planning. The principal participants in these are educational institutions (not only the land grant university, but also community colleges and private institutions), consultants, citizen groups, and professional organizations.

In New England, there are a variety of networks in which Landsat is a major concern, and thier diversity indicates how difficult it is to generalize about desirable or possible institutional arrangements. There are two multi-state groups. In the northern three states there is a largely informal association of professionals concerned with air photo interpretation, remote sensing and satellite imagery. This organization has no formal elections, officers, or membership fees, but still manages to hold annual meetings

which are well-attended. In the southern states, most remote sensing activities have been focused on marine and coastal problems, and these common interests led to the establishment of an organization which the acronym NEARS, New England Remote Sensing. This newer organization is more structured than the northern group, and has viewed all persons interested in remote sensing in New England as its constituency, an attitude which some first viewed as presumptuous.

The principal function of both these groups is information exchange and mutual professional support. It is also possible that one or both could serve as the basis for a larger regional Landsat facility. In the course of this study, we heard this suggestion several times, but in discussion it became apparent that the principal benefits of such an arrangement would be to the research community and federal and state agencies. Interested substate users would likely find it more difficult to obtain products, training and expertise.

In addition to these two multi-state organizations, there are several networks involving the substate community within states in New England. The most ephemeral and poorly developed are those in the southern three states. They consist primarily of several individuals in universities, and a small number of planners in regional and state agencies. There are no formal organizations, and many persons interested in Landsat do not communicate with others with similar interests in their own state.

In the three northern states, the networks are much more strongly developed, although each is quite different. In Vermont, the network consists of a group at the University of Vermont, several individuals in state agencies, and a scattering of professionals in regional planning agencies. It is a well-developed, although largely informal organization. People involved in it talk to one another regularly and engage in joint projects. New Hampshire also has a strong network, but it is quite differently organized because it includes Dartmouth College, the Cooperative Extension Service, the Office of State Planning, and the University of New Hampshire. It is successful even with this many participants primarily because of the interest and commitment of several individuals, some for almost a decade. In Maine, employees of state agencies have a more important role, and university faculty a less important role than in Vermont and New Hampshire.

The principal conclusions that can be drawn from these observations is that there are already established technical assistance networks in place which serve substate users in New England, and that there are a smaller number of networks which are primarily concerned with Landsat, but they are not uniform in organization.

We believe not only that similar patterns exist elsewhere in the United States, but also that they are much more developed than in New England. For example, county planning agencies, which are non-existent in New England, are common elsewhere, have an important role in land use

planning, and rely on technical assistance from state and federal agencies, and from other organizations such as the National Association of Counties.

There also appears to be somewhat more activity in regional planning agencies in areas outside New England. It is interesting to note, however, that the National Association of Regional Councils, which has as members approximately half the 600 regional planning agencies in the U.S., provides most of its technical assistance in the area of econonomic development, and is almost never requested for assistance on land cover or other geographic data.

A final comment on potential users concerns the perceptions of their needs by Landsat advocates. In the early days of Landsat, there was a tendency to be very optimistic about its potential applications and, as a result, there was considerable disappointment when the products turned out to be much less useful than anticipated. Because of these early experiences, current Landsat experts are very careful to be modest in their claim about its capabilities, and perhaps even "undersell" it.

In spite of this conservative approach, there remains a tendency to over estimate the potential importance of Landsat compared to older information sources at the substate level, or, more precisely, there is a tendency to underestimate the importance of information such as the Census, natural resource inventories and maps. The typical substate

professional land use or resource planner has more diverse responsibilities and must incorporate more varied information sources into routine decisions than typical professionals at the state or federal levels. This point was made by several workshop participants, and even the most optimistic viewed Landsat products as a very minor part of the total information package. Even with the major technical problem resolved (frequency of coverage and resolution), and with very low or token costs, Landsat will still be less useful than existing conventional information sources for the substate user.

5. Cost

The cost of applying Landsat technology to substate problems was a central concern of most participants in this study. Currently, most data used by substate agencies is obtained at little or no cost. Terrain and natural resource data are available in topographic, soils, and other low cost maps. Even land use maps, once a significant expense, are available for most of New England at little cost in the Map Down series, and are now becoming available in digital format from the U.S. Geological Survey. Census data is now available in many states from a State Data Center for a nominal charge. (In Massachusetts, staff from public agencies can obtain the full 75 tables of the 1980 Census for one geographic unit, such as a town or Census tract for $1.)

By comparison, costs for Landsat data, although uncertain, appear to be substantial. Part of this cost is charged directly for the Landsat product. This has been a relatively minor amount, but new pricing policies will apparently result in a significant increase. The second part of this cost is for processing the raw Landsat data into a land cover map. Costs for this operation appear to be several times the cost of the product itself.

Direct costs were a universal concern of participation in this study. A few individuals, usually those with more experience in this area, were even more concerned with indirect and hidden costs. The most significant of these is apparently staff training. As presently distributed, Landsat materials require an expertise possessed by few planners at the substate level. (This is clearly in the results of the telephone survey described earlier.) Further, this user of Landsat technology is expected (and often required) to become familiar with a considerable body of technical information, far more than required for other data sources. The training cost, therefore, is significant. But even more of a problem is the mobility of junior planning staff. Because of career opportunities elsewhere or funding cutbacks, persons trained in the use of Landsat tend to be very mobile, and take with them the expertise of the agency.

6. Potential Demonstration Projects

Suggestions for projects which would demonstrate the values of Landsat at the substate level were solicited from all participants in this study, and a number of ideas were put forward. They fell into three general categories. The first are projects which would update existing land use maps, or prepare new ones with somewhat different categories. The second are projects which would monitor unexpected events such as floods, gypsy moth defoliation, or environmental contamination due to an accident. The third are projects which would combine Landsat data with other planning data available in digital form into an integrated geographic information system for planning.

Land use patterns in New England are generally well known and mapped in considerable detail. Land use maps at 1:24000 have been prepared under the direction of Professor William McConnell at the University of Massachusetts for much of the region, and many areas are covered by large scale photomasaics. The principal problem with these materials is their scale (too coarse) and that they are often several years out of date. Landsat products can contribute little to the scale problem, but may be useful in revising existing maps, particularly in areas of significant urban and suburban expansion. (A related and interesting idea proposed by one participant was to use Landsat products to assist in revising land use maps to show their energy requirements, losses and conservation potential.)

The general conclusion of study participants is that the revision (as opposed to creation) of regional land use maps could be done well with present Landsat products, and certainly very well with future products. It will probably become a routine and useful application of Landsat technology to substate problems, particularly in areas of rapid urbanization or rural change.

A demonstration project which would monitor unexpected events was particularly attractive to many participants in this study because most had recent and direct experience with extensive gypsy moth defoliation. The planning staff in many New England communities were put under considerable pressure during this defoliation to advise citizens and elected officials on its severity and control, but had little information on its extent. A Landsat image delivered within a day or two would have been most useful.

The difficulty in establishing a demonstration project concerned with monitoring unexpected events is obvious. However, the potential benefits to substate users are so significant that it would be useful to at least develop a prototype for the mechanism which would respond to these unexpected events. It would consist primarily of a capability to locate and process recent images on an emergency basis, and deliver them (with interpretation) to the affected communities. The costs of such a project could be relatively low, and the benefits substantial.

The third type of demonstration project would interpret Landsat products with other geographic data useful in substate planning such as natural resource information (geological, hydrological, soils, topographic elevation, slope) land use, ownership, tax assessment, the availability of utilities, and census/tabulations and maps. These various sources of data are now integrated in substate agencies only in that they are physically in the same office, or perhaps the same filing cabinet.

Much of these data are now being provided primarily in machine readable format. The census is the best example of this, but other federal agencies such as the U.S. Geological Survey and the Soil Conservation Service have also initiated programs in which they will provide their spatial data in digital form. Because of its format, Landsat data would fit very well into a geographic information system with these other data sets, and could even be used to verify and update them.

However, the development and maintenance of such an integrated geographic information system is not feasible at the substate level. In fact, it is far more appropriate that federal agencies develop standards and procedures for matching these spatial data sets, and that state agencies or universities develop and maintain the data bases. The demonstrations [illegible] at the substate level are how one can access this integrated

data base. A most useful project would show how one could use microcomputers as intelligent terminals which process query requests locally and contact regional centers via telephone lines to obtain the necessary data and processing. (Many, if not most, substate agencies now have a microcomputer, but they are used primarily for word processing and general accounting functions.)

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ERRSAC's newsletter informs the reader of ongoing research, past, present, and future uses of remote sensing, announcements of upcoming events as well as reports on past ones, and recent publications. It also contains a quarterly feature discussing pertinent issues of the day. Focus is upon efforts and activities occuring across the United States.

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classification and area calculations based on comparisons with ground truth data and aerial photographs. Resolution is also briefly discussed.

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Hughes, Travis H. (editor) 1980. Application of Remote Sensing for Planning Purposes. NASA Tech Briefs, Vol. 5, No. 1 MFS-25107.

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Metrics Incorporated. Overview of Conferences with Non-Federal Users on U.S. Operational Land Remote Sensing Program. 290 Interstate North, Atlanta, Georgia 30339:April 24, 1980.

The status in 1980 of NASA/NOAA concerning the future of a Landsat operational program. User needs discussed include data requirements such as resolution, timeliness and repeat coverage cycle.

National Aeromautics and Space Administration. 1979. COSMIC Image Processing. Computer Software Management and Information Center, 112 Barrow Hall, University of Gerogia, Athens, GA 30602.

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software capabilities, language which the package is written in, machine requirements, and price.

National Aeronautics and Space Administration. 1980. "Guide to Publications." Earth Resources Satellite Data Applications Series. Module U-1.

A listing of available NASA publications, classified either as general information (Universal Modules), or specific data use applications (Data Use Modules).

National Aeronautics and Space Administration. 1978. Landsat and Ancillary Data Inputs to an Automated Geographic Information System: Applications for Urbanized Area Delineation. NAS 5-24350. Computer Sciences Corporation.

A discussion of Landsat for the delineation of urban areas using the Washington, D.C. area as a case study. A range of issues dealing with software technology are discussed including a thorough consideration of the integration of Landsat data with various geographic information systems. A glossary and references are included.

National Aeronautics and Space Administration. 1980. "The Landsat Story." Earth Resources Satellite Data Applications Series. Module U-2.

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An excellent overview of the Landsat Program. The publication include the history of Landsat, satellite function, uses and users, available products and costs and a good introductory listing of references for additional sources.

National Aeronautics and Space Administration. 1977. Landsat Urban Area Delineation. Intralab Project 75-3. Goddard Space Flight Center. Greenbelt, Maryland.

A comprehensive discussion of the use of Landsat in urban area delineation. The major focus is on Landsat integration with various geographic information systems. Existing geographic information systems are reviewed and evaluated in terms of their compatability with Landsat data.

National Aeronautics and Space Administration. 19 . Local Governments Landsat Applications Program Final Report. ERRSAC. NASA - 24335. Public Technology, Incorporated. 1140 Connecticut Avenue, N.W., Washington, D.C.

Report of a five city applications study by Public Technology, Incorporated. Issues discussed on technology transfer, technical needs, institutional arrangements and effective applications. Available software/hardware systems and their relative costs are briefly described. This is one of the few documents primarily concerned with institutional

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issues and cost effectiveness, but is aimed primarily at larger urbanized areas.

National Aeronautics and Space Administration. 19 . Resourceful Decisions: Landsat in Michigan. Michigan Energy and Resource Research Association. U.S. Government Printing Office, Washington, D.C.

A general publication discussing the utility of Landsat in various state and substate applications from the perspective of both the state and private user. Landcover analysis, wetlands mapping, and transportation planning are a few of the applications discussed. State, private and institutional contacts are provided.

National Aeronautics and Space Administration. 1980. "Satellite Earth Resources Data." Earth Resources Satellite Data Applications Series. Module U-3.

Specifications and characteristics of various available forms of satellite data are presented. Major comparisons are made between remotely sensed aircraft data and satellite data. References give additional information concerning satellite data and user publications.

National Aeronautics and Space Administration. 1980. "Sources for Landsat Assistance and Services." Earth Resources

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Satellite Data Applicat on Series, Module U-5.

Directory of current academic and commercial users of Landsat technology, specifying the various application being utilized by each, and the names and addresses of contaact personnel. Federal and State Agencies utilizing Landsat are also listed.

National Aeronautics and Space Administration. 1979. Western Regional Remote Sensing Conference Proceedings - 1979. Publication 2148, Scientific and Technical Information Branch.

Contains several papers addressing the applicability of Landsat for state and local government use. Several issues concerning the redundancy of Landsat use are presented. Successful Landsat applications, user needs, and the role of the private sector are a few of the topics discussed relevant to the substate use community.

The National Conference of State Legislators. 19 . A Legislator's Guide to Landsat. The National Conference of State Legislators Remote Sensing Project. 444 North Capitol Street, N.W., Washington, D.C.

Excellent overview of Landsat capabilities for state and substate level applications. General information is provided

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concerning costs, available hardware/software systems. institutional arrangements, and related terminology. Several state level contacts are given.

Richason, Benjamin F. 1978. "Landsat Platforms, Systems, and Image Interpretation." Introduction to Remote Sensing of the Environment, pp. 169-196. Edited by Benjamin F. Richason, Jr., Dubuque, Iowa: Kendall Hunt Publishing Co.

This chapter gives a comprehensive view of Landsat systems; past, present, and future. Topics include a description of Landsat spacecraft design and operation, Landsat images, (including photos and computer compatible tapes), and image analysis and interpretation. Emphasis in this chapter is on system design and processing capabilities while later chapters consider Landsat usage Particularly useful is the chapter describing remote sensing technology useful to regional planners.

"Super 'Eyes-In-Sky' Map Land." In State and County Administrator. Volume 2, Number 6. Security World Publishing Company: June, 1977.

A discussion on the success of Landsat applications at the county level. Major topics include software systems used,

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the value of Landsat in urban area studies and its value in the completion of planning mandates such as EPA 208 water quality studies.

Spann, G. William, Nancy J. Hooper and Nicholas Faust. 1980. Technical Support Package-Low-Cost Landsat Processing System. NASA Tech Briefs., Vol. 5, No.2, MFS-25396.

The report documents a low-cost processing system (approximately $20,000) which includes both hardware and software, and can provide agencies with some Landsat processing capability. The system is designed to adapt to the needs of the agency; from needing an entire system to needing only parts of it. A demonstration project is proposed which would utilize the described system.

Swain, Philip H. 1977. "Advancements in Machine Assisted Analysis of Multispectral Data for Land Use Applications." Fourth Annual Symposium on Machine Processing of Remotely Sensed Data.

A study of the feasibility of applying digital analysis of satellite data to land use inventory and mapping. Techniques, data processing products and the education of personnel concerning digital data analysis technology are the three

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major components of the study. The most notable result was the successful technology transfer from the university research team to the potential user agency.

U.S. Department of Commerce. National Oceanic & Atmospheric Administration (NOAA). New England Area Remote Sensing Notes (NEARS). National Marine Fisheries Services, Northeast Fisheries Center, Woods Hole, Mass. 02543: Published periodically.

NEARS notes are published by NOAA to inform New England remote sensors about ongoing and upcoming events. Included are reports on research, past conference and workshops, as well as announcements of upcoming ones, particularly as they relate to coastal zone and ocean management.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1980. Planning for a Civil Operational Land Remote Sensing Satellite System: A Discussion of Issues and Options. Satellite Task Force. Rockville, Md. June 20, 1980.

Issues and options relating to a national civil operational land remote sensing satellite system are discussed, including NOAA's responsibility for its interim management before being transferred to the private sector. Emphasis is on issues

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involved in implementing an operational system, including physical elements of such a system, user requirements, system financing policies, market expansion, international aspects, hardware, personnel and legislative matters.

Vincent, Robert K., Harrow, Ronald A., and Vincent, Dirah K. "Cartography with Combined Landsat and Navigational Satellite Data." Proceeding of the Thirteenth International Symposium on Remote Sensing of the Environment, pp. 983-992.

The report describes how computer compatible tapes can become a base for computerized cartography. Information from computer compatible tapes can be matched with other digitized geobased information such as soil and land use maps. Methods for producing maps on a scale of 1:24,000 which can be placed in a data file integrating Landsat with other geobased information systems are described.

Wherry, David B. 1978. "Cartographic Applications of an Image Based Information System." Auto Carto III: Proceedings of the International Conference on Computer-Assisted Cartography. 148-168.

This paper describes two case studies in which the IBIS software package (Image Based Information System) was applied. The second of these is a report on a procedure to match Landsat data with census tract boundaries in the Orlando SMSA.

Wildesen, Stan E., and Phillips, Edward P. 1981. "Application of Remote Sensing to Land and Water Resource Planning: The Pocomoke River Basin, Maryland." Second Eastern Regional Remote Sensing Applications Conference. NASA Conference Publication 2198, pp. 157-166.

Three different remote sensing techniques were used to collect data for a comprehensive resource management plan for the Pocomoke River basin - high altitude colorinfrared photography, processed Landset imagery, and Airborne Oceanographic Lidar. The study concludes that all three techniques are valuable, particularly when used in combination.

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the last program designed to facilitate local, long term, comprehensive planning will be phased out (Section 701 of the Housing Act of 1954). The net result of these changes is that virtually no community in New England is using a comprehensive plan to guide its actions, nor is any community actively developing a comprehensive master plan.

Because of the inability of planners to develop effective guides, cities and regions have shifted the emphasis of their concern to short-term, issue-oriented, action-planning, interest deals with one key problem at a time and examine it in the context of existing federal, state, regional or local resources.

Reinforcing this shift to short run concerns is a change in the time horizon of planning activities. Planning at all levels of government has become increasingly political. While this means that planning is more response to the electorate, it also means that its effectiveness is often judged by that which is accomplished in a single term. In effect, there is very little support for longer term planning or for the commitment of scarce resources that will not have a community pay-off for years to come. This change can be noted in the fact that virtually none of the federally or state supported local assistance programs require information concerning development that is projected forward for more than five years. As well, it can be noted in the collapse of the use of the Capital Improvements Programs and Capital Budgeting. These tools were used regularly throughout the 1960's and early 1970's to spread the cost of governmentally-sponsored improvements over a five

or six year span. Today, largely as a result of the increased tie-in between planning and the political term of office, these tools are being used less and less.

Finally, it must be realized that planning is being considered being less important in an era of less governmental involvement in the day-to-day living of the American populace. Both President Reagan, at a national level, and local policy makers are increasingly examining the usefulness of planning. These leaders see planning as interventionary, time consuming, costly and of little benefit to society. They feel, in general, that planning is too concerned with process and rarely concerned with implementation. The net results of this evolving change is that planners and planning have an increased need to justify their roles, contributions and results.

We must also consider the role of the federal government in the recent past. Beginning with the Housing Act of 1949, the federal government has played an ever-increasing role in influencing the priorities, approaches, thrusts and results of local planning. The impact of the federal government is such that few communities nationwide undertake any planning at all unless it is part and parcel of a federal program or mandate. For example, virtually every community over 50,000 people in America has made use of the Urban Renewal, Model Cities, Community Development, Urban Development Action Grants and Economic Development Art Funds. Each of these was "action" oriented in one form or another and forced communities to react to what federal agencies required rather than what

the local communities needed. In effect, the increased involvement of the federal government in regional and local planning has resulted in the "shelving" of local needs and the meeting of national needs at the local level.

Thus, in summary, it is the effectiveness of planning itself, not merely the elements within it, that is being questioned. To become effective, planners must be able to react to these problems in a manner that is analytical, that is democratic and that leads to solutions that meet local approval.

As substate requirements shift to these unforeseen problems, we also see an increased reliance on data originally collected for other purposes. With little revenue for increased analysis, and, perhaps more importantly, with little training in resolving the unforeseen problems noted above, the planner has little choice but to rely on previously collected data. At the same time, there are significant problems in borrowing data. First, the data is often dated. For example, Soil Conservation Service maps and the "Map Down Series" both used extensively in New England, often reflect building patterns that are more than ten years old. Second, it is rare when the boundaries covered by "borrowed" data match the boundaries of the study area in question. For example, in a recent study of a problem in the Lowell area, the authors used borrowed data that focused on "Greater Lowell"; there were as many as five different geographic descriptions of what constituted this area. Third, there is a problem of interpretation. Data collected for another purpose usually gives priority to that purpose. In effect, its accuracy will be high for the specific topic in question, but for the information outside of the topic area, it is likely that the data will not be accurate or, at the least, not as closely checked. Thus, there is significant danger of misinterpretation.

The future of planning as a program designed to help decision makers has come under increased scrutiny as of late at all levels of government. In an era of fiscal austerity and "cutback" management, there is a significant need to do more with less. It is clear that quick, clear, accurate, inexpensive information is absolutely critical. More specifically, data that can relate to energy problems, environmental questions, solid waste disposal and changes in land use at a large scale will be invaluable. For this reason, we conclude that a periodic record of the condition of the earth's surface will be of major benefit in the future.

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STATEMENT OF WORK

1.0 INTRODUCTION

Landsat remotely sensed data has potential for use by substate units of government unique from those identified for states. State natural resource data needs are different from those of the local units due to the areawide nature of state programs; this generates requirements for a broader perspective for statewide land use planning/resource allocation decisions then for substate governments. Frequently substate requirements for land and water resource data is generated by national legislation geared to specific site resource use, impact(s) and monitoring activities. Substate requirements are more detailed than state requirements. State resources are being increasingly strained to meet statewide needs. Programs to provide natural resources data more effectively and economically through remote sensing techniques have expanded rapidly at the state level, but not at the substate level for lack of documented experience in applying Landsat data to unique substate data needs and also the inability of government at this level to make large resource committments to develop capability, to understand and/or to utilize an unfamilair technology.

2.0 OBJECTIVE

The New England Innovation Group (NEIG) will determine the level of awareness of Landsat among various units of substate users, document the requirements for increasing the utilization of Landsat by these potential users and develop potential demonstration projects from these activities.

This effort will be geographically focused on New England local units of government but the applications will be evaluated for nationwide use by similar local entities and will address requirements faced by all local units of government. Areawide governments rather than individual county governments will be the primary concern. This will enhance interaction of this project with NASA's consideration of federally mandated program requirements on areawide government which Landsat remotely sensed data can meet.

3.0 PROJECT TASKS

3.1 Develop process for identifying substate uses of Landsat.
- A. Review of available literature on Landsat substate applications in coordination with the Regional Applications Centers.
- B. Formation of substate unit applications advisory committee to include participation of representative innovation groups.
- C. Identification and documentation of representative potential sites for a range of levels of substate users.

3.2 Conduct three Landsat substate user community requirements and awareness workshops.
- A. Identify demonstration criteria and requirements for validation of remotely sensed data utility and cost effectiveness.
- B. Identify appropriate state and federal agencies involvement.
- C. Identify existing and needed capabilities for effective substate applications.
- D. Identify existing and needed sources for Landsat remotely sensed data and user training needs.
- E. Develop planning and training requirements for substate applications to determine appropriateness and level of support required for utilization of Landsat data.

3.3 Provide national dissemination of requirements, capabilities, planning, and training needs for substate Landsat utilization in coordination with the National Association of Counties (NACO).

3.4 Prepare Project Summary Report

4.0 SCHEDULE

The contract activities will be completed within a period of six months.

5.0 FUNDING

The funding for this contract shall not exceed $50,000.

6.0 CONTRACT DELIVERABLES

The following constitute contract end items originals to be delivered to NASA except as otherwise agreed by the NASA project manager.

- Workshop Reports (three)
- Project Summary Report

The format and contents of each of these products and items shall require approval of the NASA Project Monitor prior to finalization.

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HIGHLIGHTS OF THE NEIG/UMASS LANDSAT SUBSTATE USER REQUIREMENTS AND AWARENESS PROJECT

November 1	Project starts - NEIG and UMass staff begin reviewing previous demonstrations of Landsat's substate applications.
Dec. 15 - Jan. 8	UMass conducts survey of New England regional planning agency's data sources and analyzes Landsat's role as a data source to this user community.
January 8	Visit by NEIG/UMass staff to Vermont State Planning Office and University officials to discuss substate activities in Vermont.
January 22	ERRSAC hosts one-day training session on substate applications for NEIG and UMass staff.
February 5,6	Visit by NEIG/UMass staff to New Hampshire and Maine State Planning and University officials.
January 28	First Substate User Workshop on Landsat, UMass-Amherst, MA, for Vermont, Western Massachusetts and Connecticut - attended by 44 state, substate, and resource personnel.
February 19	Second Substate User Workshop on Landsat at Framingham for Eastern Massachusetts and Rhode Island - attended by 36 substate users and resource people.
February 28	Substate Advisory Committee meets for the first time at Northampton, Massachusetts. Progress report given on NEIG/UMass, Pacific Northwest Innovation Group, Upper Plains States Innovation Group, and National Association of Counties Landsat substate projects.
March 11	NEIG/UMass describe Landsat Substate Project at NASA/NOAA Regional Conference, Danvers, Massachusetts.
April 3	Third Substate User Workshop for Maine and New Hampshire users, to be held at the Sheraton-Dunphy, South Portland, Maine.
May	Meeting of Advisory Committee to review draft final report.
June	Submit final report to NASA

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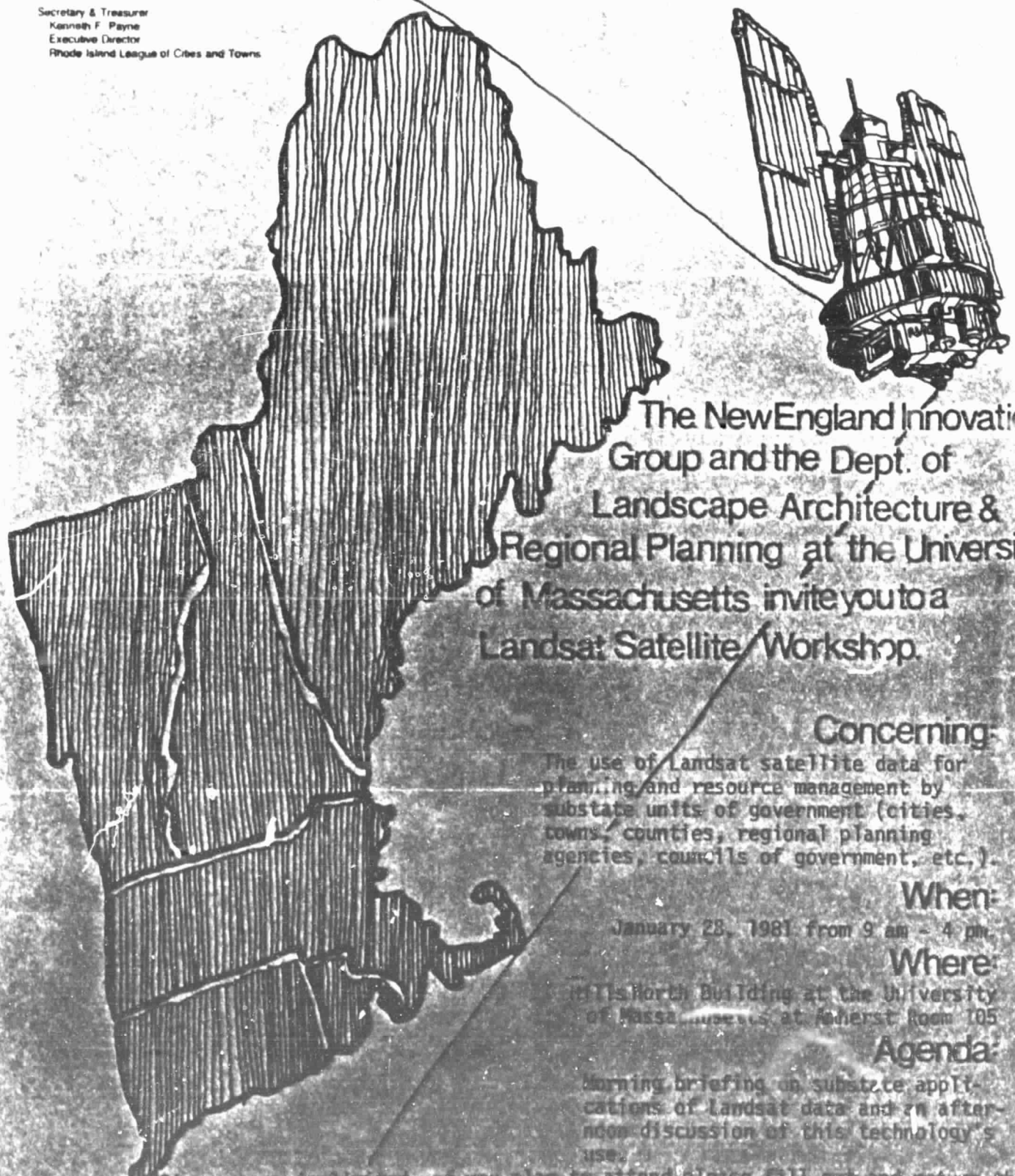

The New England Innovation Group and the Dept. of Landscape Architecture & Regional Planning at the University of Massachusetts invite you to a Landsat Satellite Workshop.

Concerning:

The use of Landsat satellite data for planning and resource management by substate units of government (cities, towns, counties, regional planning agencies, councils of government, etc.).

When:

January 28, 1981 from 9 am - 4 pm.

Where:

Hills North Building at the University of Massachusetts at Amherst Room 105

Agenda:

Morning briefing on substate applications of Landsat data and an afternoon discussion of this technology's use.

Since space is limited, if you plan to attend please fill out and return the enclosed self-addressed postage paid registration card ASAP.

For further information contact Nick Kepple at (401) 272-3437 or Dr. Bruce MacDougall (413) 545-2255.

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NEIG/UMASS Landsat Substate User Community Requirements and Awareness Workshop

AGENDA

January 28, 1981 UMass-Amherst

8:30 - 9:15	Registration and Coffee
9:15 - 9:45	Substate Information Needs: Dr. Bruce MacDougall, UMass Department of Landscape Architecture and Regional Planning
9:45 -10:30	Overview of Landsat as a Planning & Resource Management Tool: Dr. Philip Cressy, Head, NASA Eastern Regional Remote Sensing Applications Center, Goddard Space Flight Center, Greenbelt, Maryland
10:30 -10:45	Coffee
10:45 -12:00	Substate Applications of Landsat: Gary Smith, University of Vermont; Robert Mills, New Jersey Department of Environmental Protection
12:00 - 1:00	Lunch
1:00 - 2:45	Work Group Discussions re:

A. Defining the requirements for increasing the substate utilization of Landsat.

B. Determining the most worthwhile applications/ demonstrations of Landsat at the substate level.

2:45 - 3:00	Coffee
3:00 - 3:45	Work Group Reports and Discussion
3:45 - 4:00	Concluding Remarks: Nick Kepple, Project Manager, New England Innovation Group
4:00	Adjourn

NEIG/UMASS LANDSAT RESEARCH PROJECT

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SUBJECT: AMHERST WORKSHOP; DISCUSSION GROUP I.

Julius Fabos, Jonathan Henney

The following is an overview of participants in this discussion group. Four Planners, Three University personnel, One resource person, and Three NEIG/ UMASS staff members.

The majoretopics of discussion centered around applications for sub-state users and the requirements for implementation. There was no time allocated in this particular session for the discussion of demonstration projects.

A summary of the major applications sited is as follows:

1. Water

   a. Aquifer recharge studies
   b. Non-point pollution studies
   c. National resource information

2. Change Monitoring

   a. Urban areas
   b. costal zones

3. Energy Supply

   a. I.D, large forest areas suitable for harvest for burning
   b. Thermal energy sources

4.

4. Agriculture

   a. Crop production and inventory
   b. Health of crops

5. Air quality and Movement

6. Regional Level Applicability; Some Town

A summary of the major requirements for implementation are as follows:

1. More frequent coverage for more frequent cloud-free images.
2. Trained personnel would be required.
3. The need for an accessable data base location.
4. Data manipulation from the Federal to Sub-State level; the interpretation must take place at/close to the local level.
5. Additional hardware required would be relatively minimal.
6. Institutional arrangement/information to bridge the gaps would be essential.

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NEIG/UMASS LANDSAT RESEARCH PROJECT

SUBJECT: Framingham Workshop: Discussion Group 3

NEIG/UMASS Staff Present: Julius Fabos, Bryant Fake, Jon Henney

Discussion concerning requirements produced the following:

Resolution of Landsat made the technology useful only to some aggregated planning studies or supplying preliminary data for planning needs. The delivery time did not seem to be a critical problem as long as the data could be guaranteed in a specific time frame. There appeared to be little problem with personnel willing to be trained, as long as the technology was such that you could go back to it easily after exended periods of time.

Discussion concerning the topic of potential application/demonstration projects produced the following:

1. The use of Landsat technology to monitor both the primary and secondary impacts of growth on Route 9. Specific construction projects mentioned were an electronics complex and fun park to be sited near the 495/ Rt. 9 intersection.
2. The use of Landsat technology as an educational gaming tool for public use.
3. The use of Landsat technology as a tool to correlate monitored change data with revenue information.

4. The design of a demonstration project to examine in detail the cost effectiveness of Landsat data to compatable data obtained by other means.
5. The design of a demonstration project to compare the utility of centralized data centers to decentralized data collection with regard to such issues as control, availability of storage, and ease of access.
6. The potential use of Landsat technology in the detection of heavy metals/hazardous waste and identification of its movement over time.
7. The potential use of Landsat technology as a rapid assessment tool to deal with environmental concerns.
8. The use of Landsat technology as a inservice tool for training/educating geographers and cartographers.

The largest areas of discussion in which little or no resolvement occured were the topics of cost and resolution.

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NEIC UMASS Substate User Community Requirements and Awareness Workshop - Work group discussion session - 1:00-2:45

Participants: Meir Gross, Peter Nelson, Sean Hayes, Alan Lamson Bob Mills, Brenda Loew, Donald Bissex. Susan Lawrence

Issues Discussed:

1) Cost

-can municipality afford
-image processing must be provided or most municipalities would be incapable of using digital data
-equipment is becoming cheaper
-municipality has limited budget
-have problems getting money for remote sensing
-bureaucratic reasons for not getting technology which is demonstrable now
-must educate public officials to remote sensing utility
-official spends money on things he understands
Landsat vs. garbage collection

-ERDAS-Atlanta-sells low cost Landsat system
-can integrate various systems
-can do modelling
-can tell topography if difference is severe enough-different signatures
-preferable to aspect map
-not profitable compared to USGS digital data or soils data
-may integrate Landsat data with USGS data

-Landsat does not give unique products over other data-only cost-effective if used in virgin territory
-may be used as a legal base in such areas
-effectiveness marginal in local areas

-satellite is cheapest part of the system
-ground portion is the most expensive part

2) Training in use of equipment and data

3) Use of imagery vs. digital data

-complex issue
-area larger than several thousand square miles use imagery
-area smaller than few thousand square miles use digital data
-capability of getting a larger amount of data

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-Problems: 1) cost to process data (equipment)
2) cost of time involved
-digital-3 hours to 3 weeks - depends on detail you wish to extract

4) Confusion determining utility of Landsat

-consult experts as to whether or not it would be useful for your specific application
-NASA - University of Vermont

5) Regionwide data base

-need central facility and expertise and local personnel with knowledge of area

6) Critical delivery time with emergency data

7) Use of present data - one to two years old if changes are not significant

-can easily get Landsat data every one to two years - air photos are more difficult to get
-good for time series computerized data

8) Resolution

-not good enough for urbanized areas

9) Thermal IR

-would have been useful for urban areas - was on Landsat 3
-used for determining energy level usage in towns
-determine heat loss in area

Hayes: Economics is overriding reason for not using
-air photos more applicable for his needs - imagery is sufficient
-need greater resolution
-function is limited for a small area
-would contact University personnel for special projects
-would use Landsat for growth inventories

Lamson: Manchester - 16,000 pixels
-did combination land use land cover survey
-took someone 4 months at a cost of $4000
-satellite use for imagery over periods of time - monitor changes taking place
-30% of Manchester in area of watershed for water supply
-equal amount of watershed in outside areas - concerned about cost of land cover study of watershed

Landsat D is designed more for planners than previous satellites

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Recommendations:

1) Regional rather than local level because of cost

   -U. Mass. could be one regional center
   -regional centers give technological information

2) Resolution

   -depends on what is available and what needs are
   -need for greater resolution

3) Must convince people of what projects Landsat can be used for

   -need program for substate users

4) Seems to be useful as a problem resolution tool rather than as a planning tool

   -ex. gypsy moth problem
   -air pollution monitoring

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LANDSAT SUBSTATE USER COMMUNITY REQUIREMENTS AND AWARENESS WORKSHOP I
28 Jan 81

Compilation of information obtained from the first workshop parallels in form the objectives of work undertaken by UM/NEIC.

I. Awareness among units of substate users

Discussions centered around four basic themes:
- accuracy
- speed
- price
- frequency

A. Utility - Landsat useful as a problem resolution tool rather than as a planning tool; recognized as one tool out of a variety which could be used for planning decisions

B. Site Selection - best when integrated with other geographic information systems

C. Land Use - to determine existing conditions and monitor change (i.e., urban, coastal)

D. Disaster Monitoring

E. Environmental Monitoring (i.e., hazardous wastes, water and air quality)

F. Cost

1. compared with USGS soils and/or aerial data
2. processing and training costs

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II. Requirements for increasing Landsat utilization by those potential users

A. More information needed about cost

B. More frequent coverage for clearer, more accurate images

C. Need for greater resolution for local use; especially for urban areas

D. Data to be supplied by federal level to substate: assurance of interpretation at local level

E. Personnel trained in interpretation; accessible data base location

III. Demonstration project potential

A. A regional processing facility at university site most frequently suggested

B. Responsible for technical data

C. Responsible for introductory-level training

D. Responsible for education of public

E. State to interface between federal and local

F. Specific projects suggested:

1. matching flood statistics with Landsat
2. monitoring pest defoliation
3. regional land-use map by Landsat to compare with McConnell's

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MEMORANDUM

April 6, 1981

TO: NEIG Staff

FROM: Bryant Pake

SUBJECT: Landsat Workshop III - S. Portland, ME

The morning session proceeded as in previous workshops. In attendance were fourteen people, including one NEIG staffer, one UMASS staffer, one NASA staffer, two local planners, one regional planner, six university representatives, and three state agency representatives (see attached attendance list).

The afternoon session planned to tap the needs and evaluate the barriers to Landsat usage by the two local and one regional planners. However, those three people were unable to attend the afternoon session. Consequently, Dr. MacDougall opened the floor to discussion of factors required to facilitate substate Landsat applications. A comment from New Hampshire stated that universities may be a more stable source of technical assistance to substate users, particularly in northern New England. Turnover of staff in RPA's, along with the prospect of reduced federal funding to RPA's, were argued as key negative factors.

Gary Smith noted that towns, acting alone, are marginal potential users of Landsat. A total state approach, providing assistance to locals, is his recommendation. He mentioned the Rutland, VT RPA's interest in water shed applications of Landsat.

Kevin Doran advocated provision of education and training programs for substate users. Gibb Dodge added the following comments:

1. Need to increase awareness and motivation of substate end-users.

2. Need to train end-users (substate and state).

3. Many potential users fear that Landsat will displace jobs. In reality, Dodge said Landsat should increase the number of jobs.

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Dodge admitted that, at the National Extenstion Service level, there is a need for change in emphasis to get more involvement with Landsat (by extension, a need to stimulate increased use of our technology in general). Dodge concluded with the need to develop more middle-level people (e.g., more Gary Smiths) who have regional identity and can get back to listen. But, it is better to have a Gary Smith in every state working with the extension service to have the greater impact.

Woddman and Tidd of Maine DOT said they have looked at Landsat's potential, but feel its only value to them is in planning large highway networks, such as the Maine Turnpike.

Jim Connors concluded the session by recommending against use of RPA's. In Maine, Connors says RPA's are dying out and suffer high turnover. But, the River and Lake Districts are more stable there and would be a better model to pursue. The RC&D (USDA program) organization in Maine is another example of a long-term vehicle. Connors added that there is a need for commitment from substate users in terms of money and personnel time. In addition, Landsat use requires an efficiency of scale to be available at the local level. He concluded that an active communications network is essential to the success of Landsat at any level.

Dodge added that he has a $500,000 proposal in to NASA on using the extension service model, but has not received a response on it. I requested that he send NEIG a copy for consideration in follow-on demonstration projects.

February 9, 1981

You are cordially invited to participate in the first meeting of the New England Innovation Group's Landsat Substate User Advisory Committee which will take place at the Northampton (Mass.) Hilton on Friday, February 27, 1981 from 10 a.m. to 3 p.m.

The purpose of this meeting is to inform the Advisory Committee of progress to date on NEIG's Substate User Requirements and Awareness Project (work statement attached) and to solicit both reaction to these activities and guidance about the potential of this technology for use at the substate level (regional planning agencies, regional councils of governments and municipalities). NEIG and the University of Massachusetts Landscape Architecture and Regional Planning Department recently (January 28, 1981) co-sponsored a Landsat Substate user workshop at UMass. Nearly fifty participants from Vermont, Western Massachusetts and Connecticut attended. We are planning a similar session Thursday, February 19, 1981 at the Sheraton Tara in Framingham, Massachusetts, for Eastern Massachusetts and Rhode Island substate users.

A report on these and many other research activities we have been conducting as part of this project will be presented. We hope you or your representative will be able to join us since the recommendations of the Advisory Committee will be an integral part of our report to NASA. I will be circulating a detailed agenda shortly. I have enclosed for your information copies of our workshop invitation and agenda as well as a copy of the Executive Summary of a report on Landsat by the White House Science Office's Intergovernmental Science, Engineering and Technology Advisory Panel (ISETAP). Thank you in advance for your time and consideration.

Sincerely,

Nick Kepple

Nick Kepple

NEW ENGLAND INNOVATION GROUP, INC.

128 N. MAIN STREET
PROVIDENCE, RHODE ISLAND 02903
401-272-3437
ROBERT A COX DIRECTOR

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LANDSAT ADVISORY COMMITTEE

Northampton Hilton
Northampton, MA
Friday, February 27, 1981

AGENDA

10:00 a.m. - 10:30 a.m.	Introduction and Overview of NEIG Landsat Substate User Requirements and Awareness Project A. Activities to Date B. Role of Advisory Committee: To Assist NEIG and UMass Identify Issues for inclusion in a report to NASA about Landsat's Substate Potential
10:30 a.m. - 11:00 a.m.	Perspectives of other Regions on Landsat's Substate Potential: The Experiences of the Upper Plains States Innovation Group and the Pacific Northwest Innovation Group.
11:00 a.m. - 11:30 a.m.	The ISETAP Review of Landsat's Potential: Leonard Slosky, Office of Governor Lamm, Denver, Colorado.
11:30 a.m. - 12:00 p.m	Questions and Comments
12:00 p.m. - 1:00 p.m.	Lunch at Hilton
1:00 p.m. - 2:30 p.m.	Roundtable Discussion of Landsat's Application to Substate Planning and Resource Management Needs: Technical and Institutional Issues.
2:30 p.m. - 3:00 p.m.	Summary Recommendations by Advisory Committee
3:00 p.m.	Adjourn

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MAJOR POINTS OF DISCUSSION FROM THE LANDSAT ADVISORY COMMITTEE MEETING 2.27.81

1. The institutional framework must be determined - how Landsat data is best delivered to substate units.

2. The responsibility of Landsat is best served at the state level.

3. Information must be in a package that is readily usable.

4. The resolution, frequency, and cost uncertainties warrant further discussion.

5. Landsat data is most frequently used with other information systems.

6. It must be clear what the market for Landsat data is.

NEIG UMASS Landsat Substate User Community Requirements and Awareness Workshop I-Workgroup discussion session- 1-2:45

Problems and concerns of the workshop participants were brought up, some of which were discussed in more detail than others Three major issues continued to surface throughout the afternoon and are bridfly outlined below:

COST: Municipalities, with their limited budgets, usually cannot afford the processing costs or the manpower costs associated with Landsat usage. The cost of processing digital data would have to be provided for, or most municipalities would be unable to afford it.

UTILITY & RESOLUTION: Landsat appears to be more useful as a problem resolution tool than as a planning tool. Effectiveness is marginal in local areas because of its large resolution. Air photos are more applicable for most user needs. A program should be developed to convince substate users of its utility.

REGIONWIDE DATA BASE & TECHNOLOGY TRANSFER: A central facility with the necessary technological expertise, knowledge of the area, and the capabilities for techology transfer is needed for any major usage of Landsat data to take place.

S.L.L.

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PLEASE NOTE: There is no registration fee for the workshop. However, there will be a $4.00 charge for the Yankee Pot Roast luncheon payable when you register.

NEIG/UMASS Landsat Substate User Community
Requirements and Awareness Workshop

AGENDA

February 19, 1981
Sheraton Tara, Framingham, Massachusetts

8:30 - 9:10	Registration and Coffee
9:10 - 9:15	Opening and Welcome, Nick Kepple, Project Manager, NEIG
9:15 - 9:45	Overview of Substate Information Needs: Dr. Bruce MacDougall, Head, UMass Department of Landscape Architecture and Regional Planning
9:45 -10:30	Overview of Landsat as a Planning & Resource Management Tool: Arlene G. Kerber, State Program Manager, NASA Eastern Regional Remote Sensing Applications Center (ERRSAC), Goddard Space Flight Center, Greenbelt, Maryland
10:30 -10:45	Coffee
10:45 -12:00	Substate Applications of Landsat: Gary Smith, University of Vermont
12:00 - 1:00	Lunch
1:00 - 2:45	Work Group Discussions re: A. Defining the requirements for increasing the substate utilization of Landsat B. Determining the most appropriate applications/demonstrations of Landsat at the substate level
2:45 - 3:00	Coffee
3:00 - 3:45	Work Group Reports and Discussion
3:45 - 4:00	Summary Remarks: Bryant Pake, Resource Applications Manager, NEIG
4:00	Adjourn

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Gary A. Kane
23 Feb 81

SUMMARY
GROUP IV AFTERNOON DISCUSSION
FIRST WORKSHOP

It was rapidly discerned that, although all the participants in this group knew of LANDSAT, virtually none understood its capabilities. More accurately, they misunderstood them. That no one was aware that LANDSAT's resolution was already refined to 1.1 acres, yet complained about poor resolution, serves as an example. It was agreed that more introductory level training was needed and that this training should be carried out by regional agencies.

Most of the time spent in this workshop was allocated to discussing LANDSAT's applicability to planning tasks. LANDSAT uses were rated by the participants as follows:

1. Land use determination (existing, changing)
2. Site selection (intergrated with other GIS)
3. Energy analysis (determination of "energy islands" or areas of common use patterns or needs)
4. Environmental monitoring (all aspects)
5. Forest defoliation/stress
6. Disaster research (primarily flooding)

note: items 3 through 6 are transient events and, as such, were considered by the participants to be least likely funded, unless in an emergency.

It was generally agreed that small New England towns (less than 20 square miles) would have little use for LANDSAT as long as the resolution was no better than 1.1 acres. Nevertheless, demonstration projects designed to educate users and verify the potential of LANDSAT were suggested as follows:

1. Matching known flood statistics with LANDSAT data.
2. Monitoring pest defoliation in order to predict the severity of damage and determine suitable controls.
3. Development of a regional land use map.

The Commonwealth of Massachusetts
University of Massachusetts
Amherst 01003

DEPARTMENT OF
LANDSCAPE ARCHITECTURE
AND REGIONAL PLANNING
HILLS NORTH

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WORKSHOP TWO 19 FEBRUARY 81 ATTENDANTS

Joel Brown Priv. Consultant
Jim Coppola Principal Planner, City of Warwick R.I.
Dennis Vinhateiro "
Russ Burke MAPC
Wendy Beckhart Camp Dresser, McKee
Laurie Suda, Essex Agric. & Technical School
George Jepson, DEQE
Peter Wells, Chas. Downs Assoc.
John Furlong, Brookline Png Dept.
William Scanlon, Framingham Plng Dept
John Lukens, Priv. Consultant
Charles Boston, WCH Industries
Alan McLennan, Waltham Plng Dept.
Mr Oates Eng Town of Weston
Mark Hutchins, E. Greenwich R.I. Public Works Dept.
Lia Vasconcelos Student URI
Joanne Cassulo Student URI
Alan Peterson Environmental Consultant
Maria Caine Framingham Plng Dept.
Michael Bernard Lincoln Industries, Cambridge
George Caldow Chief Plnr E. Providence R.I.
Donald Tart Mass Natl Guard
Ellen Johnson Westwood Water Quality
Chris Mossman Student WPI
Tom Abdulla Student WPI
Tim Pac Student WPI
Mark Stewart

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NEIG/UMASS LANDSAT SUBSTATE USER COMMUNITY REQUIREMENT AND AWARENESS WORKSHOP

Agenda

April 3, 1981

Sheraton Dunphy, S. Portland, Maine

8:30 - 9:00	Registration and Coffee
9:00 - 9:15	Overview of Substate Information Needs Nick Kepple, Project Manager, New England Innovation Group
9:15 - 9:30	Preliminary Findings From Previous User Workshops: Dr. Bruce MacDougall, Head, UMass, Department of Landscape Architecture and Regional Planning
9:30 -10:30	Overview of Landsat as a Planning and Resource Management Tool: Arlene G. Kerber, State Program Manager, NASA Eastern Regional Remote Sensing Applications Center (ERRSAC), Goddard Space Flight Center, Greenbelt, Maryland
10:30 -10:45	Coffee
10:45 -11:30	Substate Applications of Landsat: Gary Smith, University of Vermont
11:30 -12:00	Questions and Comments
12:00 - 1:00	Lunch
1:00 - 2:45	Work Group Discussions A) Defining the requirements for increasing the substate utilization of Landsat. B) Determining the most appropriate applications/demonstrations of Landsat at the substate level.
2:45 - 3:00	Coffee
3:00 - 3:45	Work Group Reports and Discussion
3:45 - 4:00	Summary Remarks: Bryant Pake, Resource Applications Manager, New England Innovation Group
4:00	Adjourn

PLEASE NOTE: There will be no registration fee for this workshop, but there will be a $3.00 fee for the luncheon.

Group 1 - Room 304

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Project staff: Dr. Julius Fabos and Mr. Jonathon Henney

Resource person : Dr. Philip Cressey, NASA

Mr. Dennis Mallory, Montpelier, VT
Ms. Joanne Haracz, Sunderland, MA
Mr. Jeff George, Amherst, MA
Mr. Hiram Peck, Waterbury, CT
Ms. Lisa Carnwell, Chappaqua, NY
Mr. Robert Hust, Groton, CT
Ms. Ann Miller Maley, Holyoke, MA
Mr. Bryant Pake, B erlin, NH

Group 2 - Room 305

Project Staff: Dr. John Mullin and Mrs. Joan McCallion

Resource person: Ms. Arlene Kerber

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Mr. Edward Goldstein, Northampton, MA
Ms. Helen Armstrong, Amherst, MA
Ms. Kathryn Proko, Amherst, MA
Mr. Fred Muehl, Greenfield, MA
Mr. D. Melchert, Amherst, MA
Mr. Richard Gladstone, Newburyport, MA
Mr. Dave Russell, Amherst, MA
Ms. Natalie George, Simsbury, CT

Group 3 - Room 404

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Project Staff: Dr. Meir Gross and Ms. Susan Lawrence

Resource person: Mr. Robert Mills

Dr. Carl Carlozzi, Amherst, MA
Mr. Donald Bissex, Amherst, MA
Mr. Donald Jacobson, Amherst, MA
Mr. Alan Lamson, Manchester, CT
Ms. Brenda Loew, Amherst, MA
Mr. Peter Nelson, Leverett, MA
Mr. Shain Hayes, Springfield, MA
Mr. Glen Rowland, Montachusetts, MA

Thanks to Attendees

Group 4 - Room 405

Project Staff: Dr. Bruce MacDougall and Mr. Gary Kane

Resource person: Mr. Gary Smith

Mr. Dan Sheehan, Westfield
Mr. Tony Jackman
Mr. Ross Moldoff
Mr. James Cope, Amherst, MA
Mr. Larry Dennison, Framingham, MA
Ms. Karen Unsworth, Rutland, VT
Mr. Michael Weinberg, Amherst, MA
Mr. Nick Kepple, Providence, RI
Mr. Paul Sebestyen, Vernon, CT

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LANDSAT ADVISORY COMMITTEE

February 27, 1981

Substate Data Needs - Points

1. 20X cost increase

   - its's already expansive
   - computer based system is a barrier

2. Not enough information on 115 x 115 plats

3. Beneficial in natural resource area

4. Universities must be involved

5. Prefer at <u>least</u> 2 centers, urban/rural, not north/south (in N.E.)

6. 100% subsidy necessary

1. Ditto preceding comments

2. National perspective does not indicate good expenditure of funds

3. Chance for use at state level

4. Chance if cost is not a factor

5. Resolution

6. Service delivery by state (census in MA)

1. Long term data cost downturn w/increased use

2. Cost increase is in long-term future?

1. Cost

2. 5 year time frame

3. Information must be in a utilizable package

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4. Resolution of 1 acre would be better than present 10 acre square
5. Frequency of fly-over
6. No buying for LG's in ear future
7. Regulation as affects Landsat use
8. State sensitivity to LG needs an obstacle
9. Location of key node for data (grad-students as a resource) at state level

1. Use potential: assessment (twice yearly) housing starts, incl. swimming pools
2. Illegal hazardous waste dump monitoring

Counties - Needs

1. Major use - landuse change
2. Hazardous waste
3. Coastal zone
4. Resolution problem
5. Forest inventory use
6. Resolution problem as it affects cities
7. Intergovernmental relations

1. Awareness (state demo program)
2. Institutional question - project appls. across agency boundaries
3. Resource inventorying
4. Fire, prests, stress

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5. Packaging issues
6. Use not at LG level in NH (RPA's, state)
7. Forest land taxation
8. State outreach to towns
9. Landsat limited usefulness

1. Resolution = biggest problem
   - plan info can be provided
2. Small LG use is not indicated
3. 30 M and 15-10 m. data this decade

oject
eds to
with

4. Best institutional arrangement for T^2 awareness
5. Service delivery to substate units (federal gov't probably won't do this)
   - team composition
6. Landsat production is not routinized (interagency workings)
7. Project (unique) specificity
8. Private sector brokerings should be explored (university or private as consultant)
9. Firms have not been quick to pick up Landsat technology
10. LG's needs to know how to make correct specs demands of Landsat data (PTI project)

1. NOAA - abilities in operational area (problems)
2. Cost to market

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1. Problems of use documentation (awareness)

1. Marketability potential

1. Resolution not a major problem (state-county change detection)
2. Ground-truthing
3. Appl. for transmission line planning
   - roads
4. Better resolution will increase substate use
5. Coverate not frequent enought
6. Institutional arrangements
   - team effort indicated, not consultants from outside
7. Institutional support and training activities
8. Flyover coordination for infor
   - overlay activity (VT)
9. Technical assistance needed in greater measure

1. Agency posture/responsiveness
2. Market availability

1. Skills/training at state level

1. Non-awareness of related professional groups

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1. Short term market potential

1. Agency relations with states
   - inability to deal with area of past non-involvement
2. Presidential directives
   - cost recovery
   - turn tech over to private sector marketing rather than T^2

1. Macro vs micro perspective

1. Repitition of data sets is attractive

1. Change detection mask

1. Other technologies for planning need (aircraft/vidicon)
   - private sector use - why?
   - St. Regis, oil, geology

1. Best applications of Landsat

1. Foreign use

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Topographical Surveys

1. Meeting LG needs

1. Use of data
2. Data continuity
3. Data format
4. Brokering of data to LG's by states/RPA's
5. Betther throughput of data at higher level before dissemination

1. LG officials must have hands-on experience with data use

1. Comparison of census data use vs landsat increase in statistical awareness generally

State/LG Interface (VT)

1. Middleground should be explored

1. Most state projects are substate in nature
2. NEARSS (area remotse sensing system) as an alternative
3. Geometric increace in data with increased resolution
4. Better coverage needed

5. "Smart" users needed (education for team effort)

6. Team approach

   - quality control

1. Applications better than information (scale)

1. Usefulness of Landsat is uncertain, but potential is evident

   - 2-3 existing user networks should be utilized (training needed)

   - resolution, GIS compatability, and coverage are major technical considerations

   - cost/effect is unresolved

   - useability by non-technically (landsat) trained persons

   - Team Composition

     - Landsat awareness computer person (university or RPA?)

     - Study area person

   - NASA/NOAA "should attend to" _____

Committee Membership: Bob, Fred, Marie, Curt, Jim, Dennis

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NEIG/UMASS LANDSAT PROJECT

May 30, 1980 Organizational Meeting

AGENDA

1. Distribution of material from Nick Kepple to UMASS faculty

2. Project status report from Nick Kepple

   A. Expected start-up date - late June
   B. Collaboration with other projects
      1. West Coast Innovation Groups
      2. NACO
   C. Contacts with potential Advisory Committee members
   D. Contact with ERRSAC - remote terminal available through NASA van
   E. Budget reduction: recommended distribution of cuts - Nick Kepple

3. Discussion of Project Components

   A. Literature Review and Cursory Analysis
   B. User Workshops
      1. Two full-day independent workshops, one at UMASS, other at northern New England site
      2. Three or four workshops in conjunction with other user meetings
   C. Advisory Committee Meetings
      1. Four or five over six-month project period
      2. Held coincident with workshops
         a. Size, composition and responsibilities of Advisory Committee (percentage of "floating" members to increase participant quality)
   D. Personal Contact with User Community
      1. In New England - site visits and participation in state and regional meetings
      2. Nationally - staff participation in national meetings and symposia, e.g., NACO, ISETAP
   E. Development, Distribution and Analysis of User Community Survey
   F. Development of Project Report
      1. Use 1978 ISETAP report as jumping-off point?
   G. Development (if feasible) of Substate User Guide to Landsat
      1. Develop in draft form for use at workshops to be improved upon and amended as deemed necessary by workshop participants and Advisory Committee

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NEIG/UMASS LANDSAT PROJECT
May 30, 1980 Organizational Meeting
AGENDA

4. Establish Timetables

   A. Workshops
   B. Advisory Committee Meetings
   C. Interim and Final Report Deadlines
   D. NEIG/UMASS Staff Meetings

5. Best Strategy for Notifying Interested Parties of Project

   E.G., state agencies, professional associations, universities, private sector

   If a mailing is in order - how handled? Joint NEIG/UMASS letter?

✓ 6. Advisability of Seeking No-Cost Extension to enhance ASVT Prospects

✓ 7. Update on Status of UMASS' Landsat Data Analysis Capability

8. Other Business

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UMASS LANDSAT PROJECT

Nov. 7, 1980 NEIG/UMASS STAFF MEETING

MINUTES

1. Introduction of project to research assistants.

2. Delegation of research for UMass staff.

   A. Bruce MacDougall/Gary Kane-Identification of user community coordination.

   B. Julius Fabos/Jonathan Nenney-passed planned and future applications of landsat data at the sub-state level(what where, why, how).

   C. Meir Gross/Susan Lawrence-technical investigation of landsat capabilities at the sub-state level.

   D. John Mullin/Joan McCallion-liason between user community and project; recruiters for workshops.

3. Establish Timetable.

November:	28th -	deadline for identification of the Advisor Committee.
December:	15th -	deadline for comfirmation from Advisory Committee members.
	18th -	2nd. NEIG/UMass. staff meeting (9:30 am).
January:	16th -	Briefing document leaves UMass to go to Nick Keppel
	19th -	Briefing document to be distributed
	28th -	1st workshop (to be held in Amherst) and Advisory Committee training session.
	30th -	deadline for 1st. Quarterly Report.
February:	19th -	2nd. workshop (to be held tentatively in Framingham).
March:	12th -	3rd. workshop (to be held tentatively in Durham).
May:	1st -	deadline for 2nd. Quarterly Report, report on the three workshops, and a draft summary report.
	8th or 11th -	meeting to discuss 1st. draft of summary report.
June:	1st -	deadline for final drafts report (independent of production).
July:	31st -	deadline for NEIG to complete summary report.

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4. Discussion of Project Components

A. Workshops

1. Arrangements for Durham and Framingham. To be investigated by Nick Keppel.

2. Arrangements for Amherst to be made by UMass. staff.

3. Decide on goals of workshops.

4. Determination of effective size and range of represen

a. Max. of 50 participants/workshop.

5. Determine how to draw community users to workshops.

6. Determination of workshop format.

a. Short course based on the four research divisions (UMass. staff).

b. Landsat representative (NASA slide presentation).

c. Sub-state representative (Bob Mills slide presentation).

d. Structured for max. feedback.

B. Advisory Committee

1. Determination of size (15-30 persons)

2. Representatives from all categories of the user community (60-70% users, 30-40% resource personnel)

a. University representatives are to be recommended by UMass.staff.

3. Definition of sub-state user community

C. Briefing Paper

1. Outlined to be an appendaged package.

5. December 18 meeting agenda

1. Workshop format.

2. Briefing paper.

3. Recruiting workshop participants.

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NEIG/UMASS LANDSAT RESEARCH PROJECT

MINUTES of December 18, 1980 MEETING, 9:30 AM

PRESENT: NEIG: Nicholas Kepple, Bryant Pake

UMASS: Bruce MacDougall, Julius Fabos, John Mullin, Mair Gross, Gary Kane, John Jenney, Joan McCallion, Susan Lawrence

PRIVATE: John Lukens

AGENDA

I. Schedule Confirmation
II. Advisory Committee Selection
III. Workshop Participants
IV. Workshop Format and Substance

MINUTES

BRUCE: Bruce reported on the trip he and [illegible] had earlier this week to Washington, D.C. They visited EPRSAC (Eastern Regional Remote Sensing Applications Center) and NACO (National Association of Counties). They found that 1) our policy should be to gain reliance from other Landsat investigators and 2) our strength lies in our perception of user needs (not in understanding Landsat capabilities, as is true of ISETAP, etc.)

BRUCE: The purpose of the trip were 1) establish a dialogue between NEIG, UMASS and ERRSAP and 2) gain Landsat information. A Landsat demo van is being prepared and we may be able to use it, although it won't be ready until Spring.

I. SCHEDULE CONFIRMATION

January 12,	9:30 am.	Pre-ERRSAP trip meeting with NEIG & UMASS.
January 22,	9:00 am. -4:00 pm.	ERRSAP session in Greenbelt, MY. Outsiders are welcome, but there is a 30 person limit.
January 26	9:30 am.	Pre-workshop #1 meeting with NEIG & UMASS
January 28	6:00 am. -6:00 pm.	Workshop #1 at UMASS, Hills North, Room 105
January 30		Quarterly Report due.
February 4	10:30 am.	Post #1/Pre #2 Workshop meeting with NEIG & UMASS.
February19		Workshop #2 at Framingham Towers (Advisory Committee present).

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March 10 — Annual Landsat Forum. NEIG/UMASS presentation expected.

March 31 — Workshop #3 at Durham, NH (Univ. of N.H.).

II. ADVISORY COMMITTEE SELECTION. 25 representatives of a cross-section of potential users (i.e. COGs & RPAs, Metros., Munis. DTAs, water, coastal, marine, forestry, a.g., conserv., etc.)

A. Non-New England (approx. 14) reps may vary at each workshop.

1. Public Interest Groups

NACO - Lee Epstein

NLC - Ken Payne

USC - Dave Gatton

2. Professional Orgs.

APA

Water (civil engineers; environmental engineers)

Resources (forester)

3. Experts

Mills

Slosky

Rado

B. Sub-state Agencies.

1. Rhode Island

Ken Payne

Barbara Sokoloff (city planner)

2. Connecticut

Dave Russell - Hart. COG

Dick Ericson - S.E.C.T. RPA

3. Massachusetts

MDC

MAPC-McLellan - (John M.)

Hamp. Co. - Fred Muehl (John M.)

4. New Hampshire

Coastal - Jack Mettee (EEM)

Forester (BP)

5. Maine

Marine (BP)

?Nature? (BP)

6. Vermont

U. of VT (EEM)

Off. of State Plan. (EEM)

Burlington (BP)

C. Private

CDC

EQUIFAX

High-Tech. Council

SOM

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III. WORKSHOP PARTICIPANTS

UMASS to be determined later by UMass team Workshop #2 & #3 from Advisory Committee (per NFIG)

IV. WORKSHOP FORMAT AND SUBSTANCE

John . . and Nick to attend RT. 128 High-Tech. conference to attract free demos.

- different rooms for several small demos.
- programs & letters are to be prepared.
- follow-up calls will be made to "most wanted" participants.
- 20-25 people desired at each workshop.
- USGS/NASA conference at UCONN brought together 200 people with interests in Landsat
- over-invite for workshops is necessary, but risky. A statement is needed to cover our limited facilities and possible exclusions (John M.)

- Continuing Ed. credit available for $10 fee for those attending workshops. A two week notice is required (Joan).
- debated whether to send all states an announcement covering all three workshops or a letter to CT, W.MA, VT only announcing Workshop #1. Nick suggested the later.

ASSIGNMENTS (some already mentioned in minutes)

1. UMASS (Gary) is responsible for Workshop #1 arrangements.
2. NEIG (NICK) is responsible for final two workshops.
3. List of foresters (Mair) - contact extension services in Philly & UMASS.
4. Municipal List (Nick).
5. Professional List (John M.)
6. State Agency List (Nick)
7. Flyer/Announcement Design (Julius & John H.)
8. Letter for "User Awareness & Requirements" (John M.)
9. Copies of Exec. Report are needed for each NEIG/UMASS team member (9). Gary will make them (but call Nick Mon. to see if he can get additional copies first.)
10. UMASS team to review "The Landsat Story" for possible dissemination to potential Landsat users.

IMPORTANT NOTICE TO ALL NEIG/UMASS RESEARCH PROJECT PERSONNEL

NICK: (paraphrased) Documentation of every step is very important. Telephone contacts, trip reports, data sources, etc. must be recorded and filed.

BRUCE: I have used "memos to file" successfully in the past for this purpose.

MEETING ADJOURNED AT 12:15 pm

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Sent to Nick Kepple

WHOI/UMASS LANDSAT RESEARCH PROJECT

Minutes of January 12, 1981 Meeting, 9:30 AM Meeting

Present: WHOI: Nicholas Kepple
UMASS: Bruce MacDougall, Julius Fabos, John Mullin, Mair Gross, John Henry, Joan McCallion, Susan Lawrence

AGENDA

I. REPORTS

II. BRIEFING DOCUMENTS

III. WORKSHOP FORMAT

I REPORTS

Joan and Gary's telephone report. Bruce suggested that we read and comment upon it in order to determine what our next step is going to be.

Bruce and Bryant Fake's trip to UVM: Bruce handed out notes from the meeting to all who were present. While there they met with Dennis Malloy, Roy Whitmore and Gary Smith.

Nick's report: Nick discussed his conversations with other Innovation Groups as well as a conversation he had with a representative from NOAA.

Nick discovered that there is only one person working at NOAA with Landsat, indicating that things are in somewhat of a disarray there. They will therefore, not be able to help us during the workshop. NOAA will need the information from us on how to meet the needs of the user community and on what an operational program for substate needs is.

The Western Innovation Groups (Pacific Northwest, Pacific Southwest, Colorado and Upper Plains States) Ames project is in various stages of completion. The Upper Plains States' program was given as an example. They have completed four workshops, all of which have been taped. Each has come as close to a demonstration project as possible. They have identified six steps in the process of becoming a LANDSAT user. We may consider these six steps for our January 28th workshop. Nick will attend a January 30 workshop in Los Angeles and compare their content and format to ours.

II Briefing document to be given workshop participants for the Jan. 28 workshop

(1) ISATAP report
(2) Earth Resources Satellite Data Application Series

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III January 28 Workshop Format

In general, we will have experienced resource personnel present during the morning session and then a reaction to the presentations in the afternoon. At present we're not sure who will be presenting in the morning. Nick will be confirming this with Bruce next week. If worse comes to worse we may have to give the morning presentations.

During the afternoon there will be questions, comments and answers on the morning's session as well as on four major topic areas (to be decided at the Jan. 26 meeting with Nick). Three topic areas, outlined in the statement of work , must be addressed:

(1) level of awareness
(2) document requirements for increasing the utilization of LANDSAT
(3) develop potential demonstration projects

WORKSHOP

9:00-9:30	Registration
9:30-10:45	What is Landsat - NASA
10:45-11:00	Coffee
11:00-12:00	Landsat substate applications - Mills Smith
12:00- 1:30	Lunch
1:30- 3:00	four small groups -have fairly structured at outset -put people with common interests together -zero in on documentation of the requirements for increasing utilizati -Joan suggests we downplay awareness discussion
3:00- 3:15	Coffee
3:15- 4:00	Group synthesis session Workshop evaluation

- Topics to be discussed at Jan. 26 meeting
  - Quarterly Report
  - Modifications to mailing list
  - Advisory Committee
    - 2 day session Feg. 19th
    - determine their role
    - meet again with them in Mid-April and give them a draft final report
    - synthesize their comments and evaluations into our final report
    - will be able to discuss results of our finding with them at this point
    - some advisory committee members will attend Feb. 19 workshop

- Contacts at Goddard for Jan. 22 trip. Nick Short
  Bill Campbell

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NOTES OF MEETING [illegible] 4 February 81

PRESENT: Nick Kepple, E.B. MacDougall, John Mullin, Meir Gross, Julius Fabos, Gary Kane, Sue Lawrence, Jon Henney, J. McCallion

---

N.H. & Me. Trip

Bruce and Bryant Duke will visit state officials in Augusta and Concord this week; purpose of trip is to solicit their support for upcoming workshops; Bruce expects there has been a turnover of personnel working on Landsat in Maine.

Review of Workshop I

Bruce noted some disappointment in presentations made by reporters: it was felt that workshop groupings for the afternoon ought to be made more carefully and that the subject of demonstration projects ought to be more fully addressed; it was felt that if the participants had rec'd briefing materials prior to the workshop, there would have been a better response.
Meir observed that tighter demands ought to be made of both experts and participants.
Bruce will make an outline for the next workshop which will be available for discussion.
Nick expressed concern that the workshop formats be worked out, as the key data to be presented to NASA is the level of awareness; he reported that A. Kerber will be available for the next workshop - she will expand on the Detroit info and also supply a list of substate users to date; suggested that we give Arlene Parameters to address
There was a discussion of Gary Smith's presentation; it was decided that protocol was important in dealing with the Vermont people and that Gary's presentation would be more effective if it addressed applicability.
General agreement that workshops could be more structured.
Nick stated that the next invitation will be more inclusive; he will mail us responses as he receives them.

Nick's Report on 30 Jan 81 Trip to L.A.

General impression was rather poor; ~~[illegible]~~ Sherry Wall, UC @ Berkeley gave most impressive presentation; Nick may invite her to present at our workshop
Larger scale examined by this group made substate applications more relevant
Workshop included little feedback
A questionnaire was distributed which will be evaluated by Nick

Additional meeting scheduled for 12 Feb 81 at 7:30 Hills 301.

Advisory Group Briefing

Documents to be mailed to Advisory Comm. will include "Landsat Story, ISETAP Report, and the Summary Document.

There will be two aspects to the meeting with the Adv. Comm:
1 - Nick will report on our work to date
2 - UM will present technical aspects
Nick sees approximate schedule for meeting of 27 Feb.:
10:00 - 12:00 overview of our activities
LUNCH
1:00 - 3:00 hear their views
Outline of briefing paper to be ready for meeting on 12 Feb; John will write first draft using telephone survey, workshop evaluations, and ISETAP report as sources.

- Nick suggested that assistants evaluate first workshop and write a short summary of the Goddard trip; workshop tapes are to be written up by assistants.

- There was a discussion of the 10-11 March ERRSAC forums at which it is expected that UM will present.

- Nick will have Quarterly Report for the next meeting.

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UNIVERSITY OF MASSACHUSETTS
AMHERST

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MEMORANDUM

FROM E. Bruce MacDougall DATE March 18, 1981

TO Landsat Project Staff, cc. Kepple, Pake

SUBJECT Future project activities

(1) As the third and final workshop is now confirmed for South Portland, Maine, on Friday, April 3. Because of the distance, (requiring an overnight stay the evening before) and the likelihood of a lower interest level in that area, I would like to see if we could staff it with something less than the entire contingent of eight. If anyone is particularly interested in going or particularly interested in not going, please let me know.

(2) I suggest we have a short (1 hour) meeting sometime early in the morning or at noon early in the week of March 30.

(3) As I see it, there are two principal tasks remaining for the research assistants. One, the responsibility of Joan McCallion and Gary Kane, is to work on a questionnaire to be distributed to workshop participants, and to follow up on the telephone survey. I ask that Joan and Gary hold off on both these activities until after April 3rd. The second task, the responsibility of Sue Lawrence and Jonathan Henney, is to complete the review of sub-state applications, published and unpublished, demonstrated or prepared. I understand that this is pretty well completed for published material, but we still do not know much about activities outside New England. We should address this problem in the week of March 30.

(4) I have taken the draft brief document prepared by John Mullin, and am making some revisions and enlargements (including our "findings") I will circulate this for comment, and then we will use it as the statement to be reviewed, amended, endorsed, or whatever, by the Advisory Committee.

(5) Nick Kepple, Bryant Pake, and I finally appear to have made a viable connection in Massachusetts stats government. We met Bob Yaro at the ERRSAC conference, and were able to talk to him at length. (He was relatively uninformed about our project.) We are attempting now to set up an appointment, probably during the week of March 30. Yaro also mentioned a GIS proposal that had originated elsewhere in the bureaucracy; I will find out more about it.

E. Bruce MacDougall, Head
Dept. of Landscape Architecture
and Regional Planning

10 April 81 UM/NEIG meeting re the final report

The following outline was suggested and discussed:

I. Introduction
   A. similar to the statement of work with additional comments
   B. to include summary of the remainder of report

II. Procedures - how we have collected evidence
   A. workshops
   B. Advisory committee meeting
   C. trips
   D. literature review
   E. undocumented work
   F. telephone survey
   G. another survey of workshop participants
   H. ERSAC/NOAA conference
   I. vendor survey

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III. Findings - conclusions with some recommendations built in
   A. user community - stress that it is numerous, based on workshop attendance; they are unaware, interested, and skeptical; therefore, we should talk about education from grad school level to that of elected officials
   B. Technical assistance network
      1. state/RPA/local hierarchy is not as universal a distribution system as we thought
      2. alternative networks (SCS, cooperative extensions) are more significant than first thought
      3. private consultants are more utilized than first thought
   C. LANDSAT data is small part (maybe 5%) of much larger data flow - Census and IGIS form larger chunk
   D. technical issues are real (freq. of coverage, resolution)
   E. cost effectiveness is perceived as marginal at best; LANDSAT is being compared with other 95% of data which is usually free
   F. trend is toward "action" planning and away from "comprehensive" planning; coping with unforseen problems makes an in-place info system more valuable

each point in report must be presented with documentation of evidence from workshops, Adv. Comm. mtgs and tested through our own procedures

IV. Demonstrations (potential) - suggested 3 to deal with 3 different institutional arrangements
   A. RPA arrangement (i.e. Franklin County, MA.) - look for strong local component in the state/RPA/local hierarchy
   B. Cooperative Ext. or SCS/local (i.e. N.H.) - a technical advisory framework
   C. other jurisdictions (i.e. watershed groups in ME.)

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V. Appendix - all evidence, bibliography, abstracts, survey results, all info listed in procedures

Responsibilities:

N. Kepple - Procedures
B. McDougall - 1st crack at Findings & Demonstrations
R.A.'s - literature review, workshop notes, appendix
UM - work statement for Intro
NEIG - summary for Intro

Time Schedule:

DRAFT by end April
FINAL by end May

Advisory Committee Mtg - 15 May at Brattleboro
UM/NEIG Mtg - 11 May 7:00 P.M. at Hills North

Misc:

J. Mullin, M. Gross, N. Kepple to arrange meeting with Carol Thomas, APA Conference
J. Mullin to check on "hi-tech" connection

C-2

Minutes of meeting 15 May 81 UM/NEIG re LANDSAT

Agenda: to put together final report
to evaluate its condition
to assess what's left to do

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Objective: a completed report by the end of May

B. MacDougall stressed that differences in writing styles should not be noticeable.
Bruce and N. Kepple will meet with NACO and NASA late May.

According to the revised report outline, the following responsibilities were discussed:

I. Introduction (N. Kepple)

II. Procedures (stress how done)

A. Workshops - students must assemble VI-A, workshop summaries
B. Advisory Committee - Joan will supply membership listing and summary
C. Field Visits - Nick has compiled
D. Telephone Survey - Gary - should include procedure only; results will go elsewhere; for VI-C, include addresses, use consistent format
E. Lit Review - Sue and Meir Gross will go over
F. Review of Unpublished works - Jon Henney and J. Fabos will go over
G. EROSAC/NOAA notes
H. Vendor Survey - Nick - will ask - what hardware, software do you have, what is your corporate policy re substate users?

III. Findings - UM's primary contribution to report

- Bruce's "findings" section should have evidence added to it, not simply style changes; incorporate procedures to document findings
- assume readers of this report to already know about LANDSAT

IV. Requirements for increased substate LANDSAT utilization - Nick and Bruce will work on after Section III completed

V. Useful Demonstration Projects

A. Fed/Municipal delivery system; Gibb Dodge example to be used
B. State/RPA/Municipal; as in Franklin County
C. Private Sector - Bryant Peke has contacted Jim Conners

NEXT MEETING - Thursday, 28 May at 10:00A.M.

- all copies should be compiled, read, commented on
- review of position

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May 5, 1980

Mr. E. Bruce MacDougall, Chairman
Landscape Architecture & Regional Planning
Hills North
University of Massachusetts
Amherst, MA 01002

Dear Bruce:

Sorry it has taken so long to send this on to you, but its been hectic and as you can understand I am obliged to place priority on active, funded projects.

As I see it right now, the contributions from UMASS faculty and staff to our Landsat Substate User Requirements and Awareness will fall into several categories:

A. Analysis of the key issues surrounding utilization of this technology by substate users.

B. Assistance in the documentation of these issues (which might include development and analysis of a project survey to the selected members of the New England substate user community).

C. Assistance in the planning and execution of several effective Landsat workshops.

D. Regular outreach and liaison to the New England substate planning community.

E. Participation in Project Advisory Committee meetings and provision of technical information to Advisory Committee.

F. Assistance in the development, editing and review of the project report to NASA.

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Obviously you and your colleagues at UMASS will be working very closely in these activities with NEIG project staff, whom I expect at this time will be Bryant Pake and I. We can discuss these and any other tasks you deem necessary or appropriate at our meeting later this month, at which time we can execute a more formal, contractual agreement.

I will be in touch with you in the meantime in case you have any questions.

Sincerely,

Nick Kepple

Nick Kepple
Assistant Director for
Program Development

NK:kl

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October 17, 1980

Dr. E. Bruce MacDougall, Head
Landscape Architecture and Regional
Planning Department
Hills North
University of Massachusetts
Amherst, MA 01003

Dear Bruce:

I regret having missed you on Wednesday while I was at U Mass, but my meeting at the School of Engineering went longer than expected. As I explained to you on the phone on Tuesday, we should be receiving the official word from NASA about our Landsat Project in the next two weeks and I believe the starting date will be November 1, 1980. Both the Program and Contract Offices at NASA have preliminarily approved the no-cost extension to nine months, so the project will last until July 31, 1981.

I believe it is extremely important for us to meet as soon as possible in order to establish our project timetable and begin assigning tasks to U Mass and NEIG staff. We can discuss this at greater length at our meeting, but I would be inclined to use November and December to gather and analyze some substate user community data then convene our first advisory committee meeting and workshop in January. The holiday season may preclude convening these much sooner anyway. I will talk with you next week after you've had an opportunity to discuss a convenient meeting date in the first week of November with the appropriate U Mass faculty and graduate assistants.

The New England Innovation Group is looking forward to working with you and your colleagues at U Mass on this technology utilization project, especially in light of our NSF-funded mission to increase the use of New England's academic resources by state and local governments.

Sincerely,

Nick Kepple
Assistant Director for
Program Development

cc: R. Cox

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December 4, 1980

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Mr. James R. Johnson
Associate Director
Office of Grant and Contract
Administration
University of Massachusetts
Amherst, MA 01003

Dear Mr. Johnson:

Enclosed please find two copies of the proposed contractual agreement between the New England Innovation Group and the University of Massachusetts.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Nick Kepple
Assistant Director
for Program Development

NK:kl

Enclosures

A. WORK STATEMENT

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The Department of Landscape Architecture and Regional Planning and the Remote Sensing Center of the University of Massachusetts propose the following activities as part of the Landsat Substate User Requirements and Awareness Project of the New England Innovation Group:

A. Analysis of the key issues surrounding utilization of this technology by substate users.

B. Assistance in the documentation of these issues (which might include development and analysis of a project survey to the selected members of the New England substate user community).

C. Assistance in the planning and execution and documentation of three Landsat workshops.

D. Outreach and liaison to the New England substate planning community.

E. Participation in Project Advisory Committee meetings and provision of technical information to Advisory Committee.

F. Assistance in the development, editing and review of three quarterly and on summary project report to NASA.

The University faculty involved in the project would be as follows:

Principal Investigator: E. Bruce MacDougall

Investigators: Julius Gy. Fabos
Meir Gross
John Mullin

The duration of the project will be from November 1, 1980 to July 31, 1981.

B. Budget

Faculty salaries (extra compensation)	$6,200
Graduate Assistants ($1,200 per student)	4,800
Travel	950
Overhead (75% of salaries)	8,250
Total	$20,200

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The New England Innovation Group (NEIG) hereby contracts with the University of Massachusetts for the activities, services and documents described in the attached Scope of Work Statement (A), for the amount of twenty thousand two hundred dollars ($20,200) as delineated in the attached budget statement (B).

The University will serve as a subcontractor to NEIG's fixed price contract with the National Aeronautics and Space Administration for a "Two-Way Communication and Analysis Program on Landsat", a copy of which is enclosed for your records.

Accepted By:

Nicholas F. Kepple Assistant Director NEIG Representative	James Johnson Associate Director University of Massachusetts Representative

CITY OF WORCESTER, MASSACHUSETTS

FRANCIS J. McGRATH
CITY MANAGER

WILLIAM J. MULFORD
DIRECTOR

TELEPHONE
(617) 798-8151
EXTS. 224, 225, 253

CITY MANAGER'S OFFICE OF
PLANNING AND COMMUNITY DEVELOPMENT
531 MAIN STREET, RM. 203
WORCESTER, MA 01608

February 11, 1980

Mr. Nick Kepple
Assistant Director for
Program Development
New England Innovation
Group, Incorporated
138 North Main Street
Providence, Rhode Island 02903

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Dear Nick:

My apologies for not being in for our meeting regarding Landstat Technology.

I have reviewed your information with Mr. Latka and Mr. Brennan of this office as well as Mr. Charles Hill of the City Manager's Office and presently we foresee no practical application of this particular technology for the City of Worcester.

Thank you for your interest in the City of Worcester.

Sincerely,

Charles T. O'Connor
Deputy Director

/sme

cc: Mr. Charles Hill

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April 1, 1980

Ms. Linda Jadwin HQS-11B
Control Data Corporation
8100 34th Avenue, South
Minneapolis, Minnesota 55440

Dear Linda:

Pursuant to our recent conversation, enclosed you will find a package which could be entitled "All You Ever Wanted to Know About Landsat..." I hope its not too much all at once, but I thought I would send you a significant amount of background material now in order to allow you to peruse it at your leisure.

As I mentioned on the phone, our proposal is presently being reviewed by NASA Headquarters and we are advised that funding prospects look very good at this point. A key part of the proposed Landsat Substate User Requirements and Awareness effort will be the formation of a Project Advisory Committee. The Innovation Group is hoping to be able to secure the participation of representatives from a variety of sectors including municipal, county, state and federal government, the professional planning community, academia and business, all of whom have interest in Landsat's applications to substate unit needs.

I would be most grateful if you would review the proposal and some of the supporting literature (especially the ISETAP Report and the PTI Local Government Project Summary) in order to determine whether it appears Control Data Corporation would like to participate in this project. This participation could take several forms, such as providing a representative to serve on the Advisory Committee or providing expert speakers at our workshops or merely to provide overall comment and guidance about the prospects for commercialization of this technology.

Control Data Corporation's commitment to the effective utilization of available technology by state and local officials closely parallels NEIG's mandate from the National Science Foundation to facilitate these utilization activities.

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In light of the above as well as CDC's well-known corporate strategy of addressing societal problems as business opportunities, the Innovation Group believes it would be both appropriate and beneficial for CDC to participate in this effort to provide substate officials with an effective planning and resource management tool. NEIG's involvement with CDC's LOGIN project is evidence of a cooperative effort between our two organizations which we hope will lead us to other efforts aimed at assisting state and local governments in better utilizing science and technology.

I look forward to discussing this with you in great detail in the coming weeks. Thank you for your time and consideration.

Sincerely,

Nick Kepple

Nick Kepple
Assistant Director for
Program Development

NK:kl

Enclosures

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December 12, 1980

Ms. Linda Jadwin, HQS-11B
Control Data Corporation
8100 34th Avenue, South
Minneapolis, MN 55440

Dear Linda:

Earlier this year I contacted you regarding a proposal the New England Innovation Group submitted to the National Aeronautics and Space Administration (NASA) for a Landsat substate user requirements and awareness project. I am pleased to advise you this project has been funded and we are beginning to organize our Landsat Substate Unit Applications Advisory Committee and to plan for our three User Community Workshops.

The staff of the Innovation Group and the University of Massachusetts Department of Regional Planning and Landscape Architecture would be pleased if you would consider participating in this project as a member of our Advisory Committee. I anticipate we will be meeting four times between January and May of 1981, though participation in every meeting will not be required. We are trying to secure representation on the Advisory Committee of several groups interested in Landsat including potential substate users (representatives of local and regional planners, chief executive officers, and other functional substate unit officials) and Landsat resources (NASA and NOAA representatives, state agencies officials, university personnel, private sector representatives). A copy of our work statement is attached for your review.

We are planning our first Advisory Committee meeting and workshop for January 28, 1981 at the University of Massachusetts Amherst Campus. I will be contacting you shortly to discuss this matter further. If in the meantime you have any questions, please do not hesitate to contact me.

Sincerely,

Nick Kepple

Nick Kepple
Project Manager

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[illegible]an J. Kennedy, Alderman of New Britain
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Associate Director — Kathryn Feldstein

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December 31, 1980

Mr. Nick Kepple
Assistant Director for
Program Development
New England Innovation Group, Inc.
128 N. Main Street
Providence, Rhode Island 02903

Dear Nick:

We received your letter concerning the LANDSAT Substate User Requirements and Awareness Project.

I would appreciate discussing this project with you if possible, on the telephone.

From the materials you sent, I can't understand what municipalities can really gain out of either the project, attending the workshops, or serving on the advisory committee.

I'm sure the project is very worthwhile. I would, however, like to understand it better.

Hope to hear from you soon.

Sincerely,

Michelle

Michelle Riba
Director of Technical Services

ENVIRONMENTAL LAW CLINIC

Carolyn W. Baldwin

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January 21, 1981

Mr. Nick Kepple
Assistant Director of Program Development
New England Innovation Group, Inc.
128 West Main Street
Providence, RI 02903

In Re: Landsat Substate User Project

Dear Mr. Kepple:

John Andrews of the New Hampshire Municipal Association has referred your letter of December 17 to me. I am very pleased to see that efforts are being made to use data derived from landsat to assist local and regional governmental bodies. However, it is my experience that most New England towns, at least those in New Hampshire, do not have the capability to use such information on their own. In this state the regional planning commissions provide much of the planning capability required by smaller towns. Only a few municipalities in New Hampshire have professional planning staff. The rest turn to their regional planning agency to assist with comprehensive planning and implementation measures. Therefore, I would suggest that at least in this state you focus your information distribution and demonstration projects on the regional planning agencies, together with the larger cities and towns, for the greatest potential benefit.

One of the current concerns in New Hampshire is aquifer protection. There is increasing recognition of the importance of groundwater as a permanent essential resource. The hydrological studies necessary for carrying out a successful aquifer protection program are beyond the means of most small towns. Is it possible that landsat data might have a place in this effort?

I enclose for your information a copy of a flier describing the Environmental Law Council of New Hampshire and the Clinic. I look forward to hearing more about your landsat project.

Respectfully,

Carolyn W. Baldwin
Director

CWB:jae
Enclosure

FRANKLIN PIERCE LAW CENTER
2 WHITE STREET CONCORD, NEW HAMPSHIRE 03301 603/228-1541

STATE OF MAINE
DEPARTMENT OF CONSERVATION
STATE HOUSE STATION 22
AUGUSTA, MAINE 04333

JOSEPH E. BRENNAN
GOVERNOR

RICHARD E. BARRINGER
COMMISSIONER

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February 18, 1981

Nick Kepple
New England Innovation Group, Inc.
128 North Main Street
Providence, Rhode Island 02903

Dear Nick:

I want to respond to your letter of February 9, 1981 inviting me to participate on your advisory committee for the Landsat Substate User Study. I am honored to be asked, and certainly willing to offer what ever help I can.

I must, unfortunately advise you that I will not be able to attend the advisory committee meeting. I am unable to spare the time from my usual duties.

We all enjoyed meeting Bryant and Bruce and discussing landsat usage in Maine. I think we gave them a good deal of insight into what would work in Maine and what would not.

I'll look forward to future meetings and your third wo "shop.

Sincerely,

Jim Connors

James F. Connors
Supervisor
Resource Analysis Division

JFC/rmw

JEFFREY R. PIDOT, DIRECTOR
LAND USE REGULATION COMMISSION/TEL. 207-289-2631
IN STATE TOLL FREE NUMBER 1-800-452-8711

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State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF CANCER AND
TOXIC SUBSTANCES RESEARCH
P.O. BOX 1390, TRENTON, N.J. 08625

THOMAS BURKE, M.P.H.
DIRECTOR

February 17, 1981

Nick Kepple
New England Innovation Group
128 North Main St.
Providence, Rhode Island 02903

Dear Mr. Kepple:

Enclosed are the expense receipts related to my presentation at the Landsat conference at Amherst on January 28. As you can see, the total comes to $202.29.

I greatly enjoyed doing the presentation, and want to take this opportunity to thank you for sponsoring an event which was, I think, most useful to the local government representatives present. I'm sorry that, as we discussed on the phone, I won't be able to make the second conference.

It was a pleasure working with you, I hope we'll have more time to talk at the ERRSAC Conference in Danvers.

Sincerely,

Bob

Bob Mills

BM:pj

ENCLOSURE

Joe Wolf
CHAIRMAN OF THE BOARD

Jack Howley
DIRECTOR

UPSIG

Upper Plains States Innovation Group

1839 EAST CAPITOL AVENUE
BISMARCK, NORTH DAKOTA 58501
(701) 222-0171

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February 18, 1981

Mr. Nick Kepple
New England Innovation Group, Inc.
128 N. Main Street
Providence, RI 02903

Dear Nick:

I've received the flight information from your office and will be arriving on the 26th at the Hartford Airport at 10:30 p.m. I'm looking forward to serving as a member of the Landsat Substate User Advisory Committee and hope that our experience here in the Upper Plains States with Landsat will be of benefit to your efforts in New England.

See you on the 26th.

Yours,

Chris

Chris Wohlers
Asst. Director

CW:je

Cooperative Extension Service

Durham, N.H. 03824
Tel. 603 862-1029

University of New Hampshire

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February 19, 1981

Mr. Nick Kepple
New England Innovation Group, Inc.
128 N. Main Street
Providence, R. I. 02903

Dear Mr. Kepple:

Thanks for your invitation to meet with the rest of the NEIG Advisory Committee at Northampton on February 27. Due to the fact that neither Emily Bryant, Kevin Doran or I can attend, we are sending the attached list of suggestions. We believe that work toward implementing these suggestions will encourage sub-state users to apply Landsat and other remote sensing data to meet their individual needs.

Is it possible that our next meeting date can be set during the Northampton meeting? That would allow you to notify us soon and we could plan accordingly.

Thanks for your consideration.

Sincerely,

Arthur G. Dodge, Jr.

Arthur G. Dodge, Jr.
Extension Program Leader
Forestry/CFM Supervisor

lsm
Enclosures

CC: Bryant Pake
Bruce McDougall
Gary Smith
K. Doran
E. Bryant

The New Hampshire Cooperative Extension Service's programs and policies are consistent with pertinent Federal and State laws and regulations on non-discrimination regarding race, color, national origin, religion, sex, age, and handicap.

College of Life Sciences and Agriculture; New Hampshire Department of Resources; County Governments; United States Department of Agriculture cooperating.

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SUGGESTIONS FOR REGIONAL AND LOCAL USERS OF LANDSAT DATA

1. Include an investigation of Landsat applications by private substate users; they often have more freedom to innovate than public users.

2. Bear in mind that Landsat data must be integrated with other forms of information such as aerial photos, maps, and census data to create information with the detail necessary for regional and local applications.

3. Design an information center which can tell substate users how to obtain the combinations of data that they need. This center could include:

   - an index of all aerial photography and Landsat imagery in New England

   - a directory of existing remote sensing services in New England, such as Landsat processing facilities and people who can help substate users solve specific problems.

4. Provide several practical alternative designs for the information mentioned in 3. Possibilities:

   1. One center for all of New England.

   2. Two centers - one for northern and one for southern New England.

   3. State centers.

   For all alternatives, explain how the centers could be used and estimate user costs.

Joe Wolf
CHAIRMAN OF THE BOARD

Jack Howley
DIRECTOR

UPSIG

Upper Plains States Innovation Group

1839 EAST CAPITOL AVENUE
BISMARCK, NORTH DAKOTA 58501
(701) 222-0171

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March 2, 1981

Nick Kepple
New England Innovation Group
128 N. Main St.
Providence, RI 02903

Dear Nick:

Thanks again for the opportunity to attend the NEIG Advisory Committee meeting. It appears that the innovation groups must address common needs associated with local use of landsat data and that we can share experience and knowledge to our mutual advantage. Let's just hope that NASA will make funds available for a series of demonstration projects of landsat use at the local level.

I've enclosed a travel voucher and receipts.

Yours

Chris

Chris Wohlers
Asst. Director

CW:je

Enclosures

NACoR
National Association of Counties Research, Inc.
Offices • 1735 New York Avenue N.W., Washington, D.C. 20006 • Telephone 202/785-9577

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March 4, 1981

Nick Kepple
New England Innovation Group, Inc.
128 N. Main Street
Providence, RI 02903

Dear Nick:

Thank you for including me in your Landsat Substate User Advisory Committee meeting on Friday. I found the people, the interaction, and discussion about Landsat helpful and interesting. I look forward to staying in contact to continue exchanging information.

I do have some doubts about the usefulness of Landsat to counties after being at the Advisory Committee meeting; however, I realize that the reactions to and experiences with Landsat which we heard are not necessarily representive of the entire country. The issues of expense, computer capability, and resolution do appear to be common problems as well as the general lack of information about Landsat. (All of these issues and more are mentioned on the surveys which I am receiving from County Planning Directors -- enclosed you will find a copy). I am anxious to meet county representatives at NACo's Legislative Conference this weekend to see what their exposure is to Landsat and its potential for meeting their county needs.

Thank you for covering my travel and hotel expenses and for making all the arrangements. I did make it to Hartford in time to catch the 5:45 p.m. train!

Sincerely,

Marie

Marie Cummings
Research Associate

P.S. Do you have a list of those who attended, with phone numbers? Would you send me such a list, if you have it?

Nick

Cooperative Extension Service

Durham, N.H. 03824
Tel. 603 862-1029

University of New Hampshire

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May 13, 1981

Bryant Pake
New England Innovation Group, Inc.
Resource Apps. Office
251 Main St.
Berlin, NH 03570

Dear Bryant:

Sorry for the long delay. I am enclosing a draft copy of a field training program entitled "Remote Sensibility". With tongue and cheek I can honestly say that I expect this to meet the same degree of acceptance with the New England Innovation Group that I have had with NASA and other professional colleagues. My only hope is that somewhere along the line we in New Hampshire Cooperative Extension Service will be offered the opportunity to become involved somewhere down the road. I have purposely blanked out the items under Personnel and Budget because if someone else decides that this is their idea, I would be very happy to see their proposals of cost and results.

On a more constructive vein, I want you to know that I sincerely enjoyed the discussions that we had at Portland on April 3rd. It is probably the most down-to-earth work session on Landsat in New England that I have attended. This is to the credit of you and your colleagues. Please keep in touch. At this point in time I have not yet received a draft of your report, but hope it will arrive in the future.

Sincerely,

Arthur G. Dodge, Jr.
Extension Program Leader
Forestry/CFM Supervisor

lsm

Enc.

P.S. I realize some of the statistics under Situation may have changed slightly. Please keep in mind that this draft was prepared in the Spring of 1980.

CC: Kevin Doran
Emily Bryant

The New Hampshire Cooperative Extension Service's programs and policies are consistent with pertinent Federal and State laws and regulations on non-discrimination regarding race, color, national origin, religion, sex, age, and handicap.

College of Life Sciences and Agriculture; New Hampshire Department of Resources; County Governments; United States Department of Agriculture cooperating.

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REMOTE SENSIBILITY

A Pilot Program to train Field Users of Remote Sensing Data

SITUATION

Remote sensing is a valuable tool for all Natural Resource Managers, Land Use Planners, and those involved with Land Cover Information Gathering activities.

Many researchers are spending large amounts of time and money developing Remote Sensing techniques that can be applied in the above activity areas.

At least 540 Photogrammetry or Remote Sensing courses are being taught at American and Canadian Universities. They are teaching Remote Sensing to a wide variety of students. The bulk of these courses originate from Civil Engineering, Geography and Forestry Depts., Photo Eng. Mar. 1977). Most of these courses, however, are not aimed at field applications but rather at research techniques or merely familiarization.

Most regional applications labs (?) are currently transferring technology to, and teaching, researchers, Remote Sensing professors and large area users. This is a legitimate endeavor but, at the same time, not reaching an important group of potential users - the field users.

Potential field users such as Management Foresters, Town Managers, Tax Assessors, City or Town Planners, and Agriculturists do not use Remote Sensing techniques and tools to the extent that they should. This is true in most all resource areas. Estes et. al. (Geography Dept., University of California at Santa Barbara) stated at ERIM Symposium, April 1977 "Remote Sensing impact on geography, at best, is slight". This statement is only one of many stating the same general theme.

There are many constraints to the use of Remote Sensing by people in the field. These are well documented in "State and Local Government Perspectives on a Landsat Information System" (ISETAP, June 1978). Most constraints listed there apply to all Remote Sensing.

Among the most prominent constraints is the lack of technology interpretation into a format which is easily transferred to field level personnel. The increase in highly technical Remote Sensing research has widened the gap between Remote Sensing teaching and practical application.

Cooperative Extension Service has historically interpreted technological research into useable information for practical field application and developed unique teaching skills for this type of technology transfer. This has been accomplished because Cooperative Extension Service is a land grant University based on organization which has close ties, both physical and financial, to local and state clientele. Cooperative Extension personnel deal directly with Natural Resource, Forestry, Agricultural, Land-Use Planning, and Community Development people in both the private and public sector at these localized levels.

Potential field users of Remote Sensing data in the above professional fields are working under stress to gather current data in less time with less financial resource than ever before. In general, they have not had an opportunity to receive recent Remote Sensing technology in a format that is understandable and useable for their purposes. These users must have multi-stage remote sensing data taylored to their use to meet ever increasing demands for current information.

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The University of New Hampshire Cooperative Extension Service is in a position to evelop a pilot field user Remote Sensing Technology Transfer Program if granted a NASA echnology Grant through the Cooperation of Regional Application Lab (?), Goddard Space Flight Center, Greenbelt, Maryland.

ROPOSAL

The University of New Hampshire, Cooperative Extension Service, proposes to develop pilot field oriented Remote Sensing Technology Transfer Instruction Program (FORSTTIP) entitled "REMOTE SENSIBILITY". The program will be developed with the assistance of _____ at Goddard Space Flight Center and be ssigned for potential field users such as Management Foresters, Town Assessors, Town nd City Planners, Wildlife Managers, Recreation Planners, and Agriculturists.

UNH COOPERATIVE EXTENSION QUALIFICATIONS

We are centrally located in relation to the six New England capital cities with easy ccess to two jet airports and all major New England interstate highways, plus easy riving distance to major motels.

Cooperative Extension main office is located on the UNH Campus and has access to raditional and special classroom facilities and varying field conditions ranging from ea level to 6000'+ elevation within two hours drive.

UNH includes the New England Center for Continuing Education, a facility which caters o New England wide conferences and workshops similar to our proposed Remote Sensibility rogram.

UNH Cooperative Extension Service has been active in the applications end of LANDSAT lapping Research with Goddard Institute for Space Studies, New York, New York, and artmouth College in joint Forestry Mapping Projects since 1974. During that time we ave been involved with potential users in state, USFS White Mountain National Forest, nvironmental Impact Study Teams and nationally known Forest Industries. We have generated cooperative Remote Sensing atmosphere between the two major educational institutions ithin the state and potential users.

UNH Cooperative Extension Service has access to potential users of Remote Sensing echnology in most applicable professional fields within the state of New Hampshire and any others throughout New England through traditional interagency and interdisiplinary ontacts.

We have staff with expertise in Remote Sensing and access to other professionals who ould provide instruction in a Remote Sensibility Program. There are _____ Remote ensing courses offered at UNH, Dartmouth College, Plymouth State & Keene State by _____ Remote Sensing instructors. Cooperative Extension Service has _____ staff well versed in some phases of Remote Sensing.

PILOT PROGRAM CONTENT

A two week Remote Sensibility Program will be designed to be applied in the New igland and related Northeastern states. It will be composed of down to earth Remote ensing techniques but will teach data collection ranging from use of a 35 MM camera to he Landsat sattelite CCT's. Instruction will include:

Elementary Remote Sensing techniques

Field applications of Remote Sensing - a range of Remote Sensing tools; sources of Remote Sensing data; obtaining and using sattelite data.

Program will be designed to teach Remote Sensibilit to 20 or less people

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Emphasis will be placed on practical applications of all remote sensing technology and will present alternative costs as part of the course.

Pilot program duration

It is proposed that the Remote Sensibility Program have a duration of four years eginning FY 1980 and be scheduled in four phases:

PHASE I - PROGRAM DEVELOPMENT

September 1980 - September 1982 (two summer seasons)

PHASE II - TRIAL PROGRAM WORKSHOPS AND WORKSHOP REFINEMENT

July 1981 - September 1982

PHASE III - PRODUCTION PROGRAM WORKSHOPS & CONTINUED REFINEMENT

August 1982 - September 1983

PHASE IV - PROGRAM WORKSHOPS WITH LANDSAT 4 APPLICATIONS

October 1983 - September 1984

Total pilot program would train 260 field workers. 20 would be used to teach in he workshops after their training at a workshop

10 - 15 graduate students trained in technology t[illegible] hniques

\ remote sensing technology transfer program tha[illegible] to train field users of remote sensing space program can be adapted [illegible]

\pproximately 260 field professionals trained in latest remote sensing techniques.

Approximately 20 field professionals trained to work on future technology transfer programs.

Submitted by:

To Brian Pake — 5/12/81

Arthur G. Do[illegible]e, Jr., Program Leader
Cooperative [illegible]astry Programs

Pacific Northwest Innovation Group
211 East Eleventh Street, Suite 103
Vancouver, Washington 98660
Phone: 206-693-2956

June 9, 1981

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Nick Kepple
New England Innovation Group
128 N. Main Street
Providence, RI 02903

Dear Mr. Kepple:

In December, 1980, Pacific Northwest Innovation Group (PNIG) and Southwest Innovation Group (SIG) initiated a joint project to assess local government utilization of LANDSAT technology. The investigation was completed in May, and PNIG is now distributing the final project report.

Project participants identified applications of LANDSAT technology to local governments, and several demonstration projects could be forthcoming. If you have questions or comments regarding LANDSAT technology or the PNIG/SIG project, please feel free to contact us.

Sincerely,

R. L. Richards

Robert L. Richards
Acting Director

RLR:lf

Enc.

Funded by a grant from the
National Science Foundation,

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SUBSTATE GOVERNMENT TECHNOLOGY TRANSFER STUDY

Authored by Lawrence Shadbolt, Jr.
May 29, 1981

Distribution of this report is provided in the interest of information exchange. Responsibility for the contents resides with the author.

Prepared under Contract No. NAS 2-10737 by

PACIFIC NORTHWEST INNOVATION GROUP
Vancouver, Washington

and

SOUTHWEST INNOVATION GROUP
Anaheim, California

for

AMES RESEARCH CENTER
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Moffett Field, California

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I. INTRODUCTION

This report concludes a preliminary investigation of local government information needs and an assessment of the potential for substate utilization of LANDSAT data and information processing technology. The study looks at city, county and regional government (substate) needs in the six Pacific Northwest and Southwest states of Washington, Idaho, Oregon, California, Nevada and Arizona. The primary vehicle for the study was two one-day workshops attended by interested local government officials and staff held in Portland for the Pacific Northwest states and Los Angeles for the Southwest states.

The workshop format was adopted for the study since it would provide the participants with an opportunity to learn about the potential applications of the technology; and, then, to assess the potential use of LANDSAT applications to meet local needs. The format was to encourage sharing of information and mutual learning. Due to the selection process for the workshop, it would be risky to generalize beyond the participant group. Yet, the results from the two workshops confirm each other and the findings of similar research conducted in other regions of the country.

II. SUMMARY

To assist PNIG and SIG conduct an assessment of local government needs for land resource information and to evaluate the potential for LANDSAT application, a task force of potential users was convened for one-day workshops in Portland and Los Angeles. Participants at the Portland workshop included elected officials, planning directors and information specialists representing urban and rural counties from Idaho, Washington and Oregon. The Los Angeles workshop was attended by planning directors, resource managers and information specialists from California, Nevada and Arizona.

Information needs were first identified and prioritized by the participants at the workshop. Specific responses to the survey reflected differences in state-mandated programs and in the needs of predominantly urban versus predominantly rural areas; and, between city and county. Yet, many types of information needs cut across these boundaries. This was reflected in the need for land use classifications, environmental impact monitoring and urban change detection. Presentations were made on various types of applications and then, potential applications were discussed and evaluated. Several specific projects, such as detailed classification of croplands, the estimation of water runoff resulting from development and the assessment of alternative energy potentials were identified as having both high utility and high potential feasibility.

Factors which were identified that constrain the use of LANDSAT data are of three types - technical limits, resource availability and institutional barriers. Information needs should be viewed against these factors to determine whether a LANDSAT application is an appropriate solution to the problem. Technical limits which were identified include the following: (a) the coarse-grain resolution of 1.1 acres, (b) the statistical nature of the data, (c) frequent cloud cover in some areas, (d) the need to integrate with other types of data, and (e) problems with interpreting the data. Some of these technical constraints make LANDSAT inappropriate to the scale and complexity of urbanized areas. Yet large, urbanizing areas provide situations where the need for comprehensive information regarding the location, rate and nature of development or land use inventories may outweigh the need for finer resolution of data.

Resource availability is a serious obstacle to the development of geographic information systems, especially as state and local governments struggle to maintain their existing programs. A new system must demonstrate that it is cost effective compared with current methodologies or that it generates new and valuable information that is worth the investment.

The scarcity of resources and a trained staff will affect the ability of all jurisdictions to use LANDSAT data. It especially limits LANDSAT application in rural counties. Yet, potential use exists in rural counties where a local project can be linked to a state or federal project or where several rural counties can develop a multi-county project.

Since state and federal programs have created a tremendous need for information in the states surveyed, there do not appear to be significant political or conceptual barriers to the utilization of LANDSAT. Problems such as the lack of trained staff, absence of data processing facilities and, to some extent, the use and integration of data, may be considered institutional problems. At this stage of technology transfer, facilities for technical assistance and resource availability are tied together. Although each state facility has trained staff and data processing capability, the absence of information about substate demonstration projects makes the cost of using the facilities a barrier to utilization of the technology by local government.

Therefore, utilization of LANDSAT at the substate level requires resources and institutional support until demonstration projects are developed and information regarding the costs, benefits and most appropriate use of the data in substate contexts is available. Following an evaluation of the demonstration projects, the potential market and appropriate cost sharing for LANDSAT data can then be determined.

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III. STUDY PROCESS AND FINDINGS

A. Background

The question underlying this study is whether there is sufficient experience with LANDSAT to evaluate its potential application or whether there is a need for additional demonstration projects to evaluate substate applications. A number of LANDSAT remote sensing applications have been developed over the past eight years. At first in the Pacific Northwest and later in the Southwest, state level demonstration projects have been developed and evaluated. Facilities for technical assistance and data processing have been established in all of the states within the study area. Yet, the focus of this activity has been primarily at the state and federal level for single-function natural resource management, i.e., forestry, water resources, agriculture, wildlife. Demonstration projects have frequently been statewide and oriented the needs of state agencies for resource identification and/or inventories. A few projects have been oriented to local government - urban classifications at the county or regional level. These projects were usually for the purpose of demonstrating the technology (the ability to do a classification) rather than to meeting the information priorities of local government. In other cases the demonstration project was developed independently of the jurisdictions' decision-makers so that the results were either poorly understood or not utilized.

Local government, with jurisdiction over private land development, has been subject to state and federal mandates for environmental review, land and natural resource planning and coastal zone management. Each of these mandates creates a need for a different type of information covering the natural and human environment integrated into a data system. The data should be capable of monitoring changes or integrated into a process for periodic updating. It should also be relatively inexpensive since resources are increasingly scarce. LANDSAT's ability to cover large areas and for periodic updating has significant potential for application to the data needs of local government. It was appropriate then to have local government officals involved in an assessment of whether LANDSAT data systems have application to the information needs of local government.

B. Selection of Workshop Participants

Project travel budget constraints and the objective of having a group small enough to facilitate discussion limited the number of participants at the workshops to 12-15 each. For the Portland workshop we sought three counties from each state represented by a rural, suburban and urban county. A list of counties was generated

by the Association of Counties in each state and from a list generated by PNIG. We contacted several county commissioners in each state before arriving at a representive mix who were able to attend. We also sought to balance counties which had some direct experience with LANDSAT with those without previous experience. A balance of elected officials and professional staff was another criterion for participant selection, the rationale being that it would be important that the workshop not overly provide a "technological fix" for particpants and that the workshop involve "decision-makers." As it worked out, most jurisdictions chose to send their planning director or information specialist. Thirteen representatives from urban, suburban and rural counties participated in the workshop.

For the Los Angeles workshop, SIG generated a list of jurisdictions experiencing rapid rates of urban growth. It was decided to invite cities and counties from these urbanizing areas to find out whether there are mutual needs for information on development of the urban fringe. Since the Portland conference had limited success in attracting elected officals from the urbanized areas, we invited planning directors, resource managers and information specialists. In larger jurisdictions these personnel are influential in making decisions regarding the implementation of information systems. Sixteen representatives from eleven urbanizing cities and counties participated in the workshop.

C. Workshop Format

The purpose of the workshop was to provide participants with an opportunity to learn about LANDSAT - how it works and an understanding about appropriate applications and technical constraints. Participants were to consider whether LANDSAT remote sensing data would meet local jurisdictions' needs for information.

In order to create the appropriate context for the workshop, a survey of participants' general data information needs was conducted before getting into the presentations about LANDSAT. Participants at the Portland workshop were handed a questionnaire and they filled out the survey at the start of the workshop. Los Angeles workshop participants were asked to fill out the survey and return it prior to the workshop. This provided participants with an opportunity to consider and prioritize their information needs before discussing the possibilities of LANDSAT. The premise was that it would assist in considering the technology in relation to the problem rather than encourage fitting the problem to the technology. The workshop proceeded with a presentation on how LANDSAT works and the nature of the data. A discussion followed to clarify data needs and identify problems. The second part of the workshop

was to orient participants as to some of the applications which have been developed. Presentations on urban growth monitoring, natural resource inventories and the integration of LANDSAT data into geographic information systems were made at each workshop using local examples and projects from the participants' states. Following these presentations, a final survey and discussion was conducted to identify potential applications.

After the workshops, the responses to the surveys were tabulated. A table of data needs was constructed and the potential applications were given a preliminary feasibility review. This information was sent out to workshop participants with a follow-up questionnaire to identify potential demonstration projects.

D. Survey Findings

Due to the different mix of workshop participants and the emphasis upon urban growth monitoring or "change detection" at the Los Angeles workshop, the two workshops will be discussed separately. (Refer to Appendix 4, Survey Tabulations.)

1. The Pacific Northwest Workshop. A tabulation of information needs by rural/urban counties (SMSA's) and by states reveals some interesting differences. There was an equal need indicated for water resource and land resource data. Rural counties showed a slightly greater interest in water resource information, particularly in terms of surface water supply. Urban areas showed interest in surface water runoff and both were interested in identifying floodplain/wetlands boundaries. The tabulation of data needs by states shows that there were twice as many responses from Oregon as Washington. This reflects the broad local planning requirements in Oregon.

   The tabulation for the land resource data category includes soil productivity, forest cover and crop types information. Significantly, the urban counties showed a strong need for these types of information. This may reflect the growing concern with the conversion of forest land and agricultural resources in urban areas.

   The largest information category is "urbanization" which includes general land use classification, growth monitoring and data to identify planning and resource management needs. Both land use classifications and growth monitoring were needs expressed equally by rural and urban counties and the representatives from all three states. The need for energy resource information was indicated by the Oregon counties, reflecting the state planning mandate for energy resource inventories.

The primary problem identified with the utilization of LANDSAT data is the coarse-grain resolution at 1.1 acre. Image resolution is an important issue where the jurisdiction is already urbanized or where development activity takes place on a small scale. Thus, highly urbanized counties and sparsely populated rural counties appear to have limited uses for LANDSAT data.

The second major issue is that of cost. Related to cost is lack of trained and/or available staff and lack of data processing facilities.

Costs associated with using LANDSAT include data acquisition, data processing and staff training. Presently, data acquisition is not a major cost and is a small part of the total cost of a LANDSAT project. Data processing can be done in either a manual mode (using images) or in a computer mode (using digital data). The cost of processing the former is minimal while the latter can be significant since it requires hardware (computers) and software (programs). Yet many software programs are available while there are computer processing facilities in all the states. Computer time is not cheap but a project run can be done in little time. Data preparation and data interpretation are labor-intensive tasks. Consequently, the lack of skilled employees to prepare and analyze the data can result in significant costs if contracted out; and, training, if the costs are borne locally, may be lost if the employee relocates.

2. The Southwest Workshop. The responses were tabulated by cities and counties since all jurisdictions represented are dominantly urban or urbanizing. There was an indication of a greater need for land resource than water resource data. Yet, approximately one-half of the participants indicated a need for better information on floodplains, wetlands, and riparian areas. There was also a need for information about surface and groundwater resources. The needs for water resource information is evenly divided between the cities and counties.

The predominant need for land resource data is for croptypes/ground cover, soils productivity and topographic features and slope. The counties showed a slightly greater need than cities for these types of information. There were no indications of a need for energy resource data.

The urbanization category follows the pattern of counties in the Pacific Northwest with a predominant need for general land

use classifications. All of the cities expressed this as a need while only one-half of the counties did so. Growth monitoring was the second most frequently cited information need. Five of the six counties indicated a need for this type of information while only one city indicated a need for this information. These responses are probably reflections of the larger areas covered by the counties, the differing concerns of the jurisdictions and the fact that cities already have data systems to monitor growth. The different needs of cities and counties is also reflected in a survey identifying problems using LANDSAT data in which one-half of the cities indicated that the coarse-grained resolution made the data unsuitable to the data needs of cities.

Again the city/county difference is reflected in a survey to identify potential applications. All seven of the counties indicated monitoring urban development as the most significant potential application. Only one city indicated growth monitoring as a potential application. A review of the tabulation totals shows that the counties identified 38 potential applications while the cities identified 5 potential applications.

E. Possible Demonstration Projects

A primary purpose of this study was to determine whether LANDSAT has potential application to the data needs of local government. A secondary purpose, if appropriate, was to identify and plan for demonstration projects. Workshop participants were asked in a follow-up survey to identify demonstration projects that were technically feasible and appropriate to their information needs. The following list of possible projects was generated by project participants. This is neither an exhaustive nor an exclusive list; however, it would provide a suitable starting place for developing demonstration projects.

1. King County, Washington. Proposed development of a surface water runoff model utilizing LANDSAT digital data. Applicable to urbanizing areas in the Pacific Northwest that must make land development decisions in the absence of a drainage basin plan or detailed runoff analyses.

2. Whitman County, Washington. Proposed development of an integrated data system as basis for Agricultural Land Preservation Project. System would integrate LANDSAT crop cover data with soils, topography and other building constraints. Develop information to determine relative suitability of land for development.

3. Clark County, Washington. Identified several types of data that would meet local needs for land resource information - crop types, forest cover, topography, urban land use, vacant land, building suitability and growth monitoring.

4. Ada County, Idaho. Proposed a project to identify vacant land and to monitor changing land use. LANDSAT ground cover data would be supplemented with low level aerial photographs and 1980 census data to establish a baseline. Identification of changes in land use and monitoring growth areas would be used to review operation of local comprehensive plans.

5. Yamhill County, Oregon. Identified solar energy potential and growth monitoring as possible applications in this predominantly rural county.

6. Metropolitan Service District (METRO), Oregon. METRO serves the four Portland Metropolitan counties and identified several possible LANDSAT data applications, including water quality, water runoff, floodplain boundaries, soils productivity and erosion. The need for urbanization information includes a land use classification, vacant lands and buildable lands inventory, and growth monitoring.

7. San Diego County, California. Proposed that LANDSAT data be used to monitor the conversion of land in northern part of county. This would assist the county and five cities located there to coordinate growth management plans.

8. Los Angeles County, California. Identified the three most important applications for regional planning as floodplains/ wetlands boundaries, topographic features and slope, growth monitoring.

9. Sacramento County, California. Proposed a project to assist county update comprehensive plan and to aid land use decisions. Project would inventory agricultural lands and monitor changes in irrigation and in land use conversions. Data could be used to predict location and amount of future growth.

10. Fresno County, California. Identified three demonstration projects: (1) Define areas of riparian vegetation along Kings River; (2) Monitor development in Sierra Foothills over past 10 years ±; and, (3) Identify most productive grazing lands in Sierra Foothills during same time period.

11. Nevada MX Local Oversight Committee (includes Lincoln, Nye Esmeralda, Lander, White Pine, Eureka and Clark Counties).

Proposed a demonstration project that would include the following elements:

(a) Quantify land cover data on the amount and location of grazing lands, farmlands, surface water and forest cover;

(b) Monitoring of area during MX construction phase to identify environmental resources impacted such as water supply and conversion of land for urban growth;

(c) Integration of LANDSAT cover data with Clark County Geographic Information System.

IV. CONCLUSIONS AND RECOMMENDATIONS

The results of this preliminary study indicate that there is a need to test the application of LANDSAT in specific substate contexts in order to answer questions about LANDSAT applications in a range of local government situations. There are a sufficient number of projects suggested by workshop participants from which prototypical projects could be developed that would provide information that is transferable to other situations. The following recommendations are provided as a basis for developing a substate applications program. It is suggested that user involvement in the planning and design of the demonstration projects is essential for project success. Also necessary is the development of adequate institutional support to provide training and technical assistance. Resources for travel and staff for training should be considered all but non-existent at the local level, although there may be some cases where staff are available for travel and training. However, in spite of these obstacles, there is a high level of interest in the potential uses of the technology to meet local needs.

1. Identify generic projects that have a high potential for transferability to substate governments and for assessing the costs, benefits and accuracy of LANDSAT data applications. Select a range of projects by diverse urban/rural characteristics and states to provide comparative information.

2. Provide assistance for institutions in each state that are capable of carrying out technical assistance to local government including training, data classification and processing.

3. Develop training modules for local staff to determine appropriate levels of technical training and to explore roles for local staff in developing, processing and using LANDSAT data.

4. Provide information and assistance to local governments regarding the use of LANDSAT and other remote sensing imagery in

manual operations and in the integration of remote sensing data with other available data.

5. Inventory and disseminate information regarding available LANDSAT and other remote sensing data as well as ongoing state/federal projects that may either spin off information or be adapted to provide information to local government.

6. Monitor and evaluate demonstration projects to develop comparative information to be available to substate governments and to policy makers at state and federal levels.

APPENDIX 1

List of Workshop Participants

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LIST OF WORKSHOP PARTICIPANTS

PACIFIC NORTHWEST WORKSHOP

Mark Fredricksen, Planner	Whitman County (Washington) Regional Planning
Colin Armstrong, Commissioner	Yamhill County (Oregon) County Commissioner
Dave Bishop, Planning Director	Yamhill County Planning Department
Dale Himes, Planner	Clark County (Washington) Regional Planning
Gerald Jensen, Commissioner	Canyon County (Idaho) County Commissioner
Robert Hilgenberg, Planning Director	Ada Planning Association (Idaho)
Joe Garlitz, Commissioner	Union County (Oregon) Commissioner
Harley Jenkins, Planning Director	Union County Planning Department
Walter Monash, Planner	METRO (Oregon)
Neal F. Van Horn, Planner	METRO (Oregon)
Sharron Shinbo, Planner	King County (Washington) Planning Division
Tracy Donovan, Planner	King County (Washington) Planning Division
Mark Jaffray, Planner	Spokane County (Washington) Planning Department

SOUTHWEST WORKSHOP

Don Brown, Planner	City of Las Vegas (Nevada) Planning Department
Matthew Beckstedt, Planner	Clark County (Nevada) Planning Department
Larry Charness, Planner	Los Angeles (California) Regional Planning
Gary Washburn, Planning Commissioner	Lake Elsinore, California Planning Commission
Lance Bailey, Planning Director	Sacramento County (California) Planning Department
Al Solis, Planner	City of Fresno (California) Planning Department
M. David Smith, Planner	City of San Diego (California) Planning Department
Don McDaniel, Planning Director	Maricopa County (Arizona) Planning Department
Warner Leipprandt, Assistant Director	Phoenix Planning Department
Lee P. Vance, Planner	San Diego County Planning Department
Kerry McCants, Planner	Fresno County Planning Department
Susan Metz, Planner	Sacramento County Environmental Department

APPENDIX 2

Workshop Agendas

AGENDA

LANDSAT/REMOTE SENSING CONFERENCE
SUBSTATE AREAS NEED ASSESSMENT

Fireside Room
Westminister Presbyterian Church
1624 N.E. Hancock
Portland, Oregon

December 11, 1980

Morning Session		INFORMATION NEEDS
	9:00	Registration
	9:15	Introduction - Pacific Northwest Innovation Group
	9:30	Overview of Program - NASA Representative
	10:00	Remote Sensing, LANDSAT, and Information Needs - Barry Schrumpf, Oregon State University Environmental Remote Sensing Lab
	11:30	Discussion groups - Information needs
	12:15	Buffet lunch
Afternoon Session		POTENTIAL APPLICATIONS
	1:00	LANDSAT and Geographic Information Systems for Urbanizing Areas - Duane Shinn, University of Washington Department of Urban Planning
	2:00	Remote Sensing Applications for Rural and Natural Resource Areas - NASA representatives
	3:00	Potential applications at the county level - discussion groups
	4:00	Summary and/or Project Identification
	5:00	Adjourn

AGENDA

LANDSAT/REMOTE SENSING CONFERENCE
SUBSTATE AREAS NEED ASSESSMENT

Holiday Inn at LAX
Navegators' Room

Los Angeles, California
January 30, 1981

Morning Session		INFORMATION NEEDS
	9:00	Registration
	9:10	Welcome from Southwest Innovation Group - Les White
	9:15	Overview of Conference - Lawrence Shadbolt, Project Coordinator
	9:30	The NASA Role - NASA/Ames Staff
	9:45	LANDSAT and Remote Sensing - Robin Welch, Airview Specialists
	10:30	Break
	10:45	Integration with Geographic Information Systems - NASA/Ames Staff
	11:15	Group Discussion - Information Needs and LANDSAT Utilization
	12:00	Buffet lunch
Afternoon Session		POTENTIAL APPLICATIONS
	1:00	Change Detection for Urbanizing Areas - Jerry Christenson, ESRI
	2:00	Agriculture and Water Resource Applications - Sherry Wall, Space Sciences Laboratory, U.C. Berkeley
	3:00	Break
	3:15	Group discussion - Identifying Potential Applications at the Substate Level
	4:30	Adjourn

APPENDIX 3

Needs Survey

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REGISTRATION/NEEDS SURVEY

Information Needs/LANDSAT Assessment Conference

NAME:

ORGANIZATION:

POSITION:

1. In general, what are the major informational needs of your city or county? After you list them, rank them in order of importance (1 for highest priority, 2 for next highest and so on).

2. Are you currently using remote sensing data?

   a. Large scale aerial photograhy _____yes _____no
   b. High altitude aerial photograh(U2)_____yes _____no
   c. LANDSAT images _____yes _____no
   d. LANDSAT digital information _____yes _____no
   e. Other _____yes _____no

3. How familiar are you with LANDSAT?

4. Do you have any questions or problems regarding the schedule or agenda for this conference?

Mail to: Larry Shadbolt, Project Coordinator
Pacific Northwest Innovation Group
211 E. 11th Street, Suite 103

APPENDIX 4

Survey Tabulations

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I. INFORMATION NEEDS - PACIFIC NORTHWEST COUNTIES

	Totals	Urban	Rural	Oregon	Wash.	Idaho
A. WATER RESOURCES						
1. Surface water runoff	4	3	1	2	2	0
2. Floodplain/wetland boundary	4	2	2	2	1	1
3. Water quality studies	3	1	2	1	1	1
4. Hydroelectric & irrigation supply	3	0	3	3	0	0
5. Groundwater supply	3	2	1	2	1	0
SUBTOTALS	17	8	9	10	5	2
B. LAND RESOURCES						
1. Soil productivity/types	5	2	3	3	2	0
2. Forest cover	4	2	2	3	1	0
3. Crop types/ground cover	3	3	0	1	2	0
4. Topographic features & slope	3	3	0	1	2	0
5. Aggregate deposits	2	1	1	1	1	0
6. Erosion	1	0	1	1	0	0
SUBTOTALS	18	11	7	10	8	0
C. ENERGY RESOURCES						
1. Solar potential	2	0	2	1	1	0
2. Geothermal/heat indicator	2	1	1	2	0	0
3. Fault location	1	0	1	1	0	0
4. Wind resources	1	0	1	1	0	0
SUBTOTALS	6	1	5	5	1	0
D. URBANIZATION						
1. General land use classification	7	5	2	2	3	2
2. Growth monitoring (rural land conver)	5	2	3	3	1	1
3. Identify & monitor roads	4	2	2	3	1	0
4. Vacant land inventory	2	2	0	1	0	1
5. Identify & monitor septic tanks	2	2	0	1	1	0
6. Air quality indicator	1	1	0	1	0	0
7. Building suitability	1	0	1	1	0	0
8. Socioeconomic/demographic data	1	1	0	0	0	1
SUBTOTALS	23	15	8	12	6	5
TOTALS	64	35	29	37	20	7

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II. LANDSAT UTILIZATION AT SUBSTATE LEVEL - PACIFIC NORTHWEST COUNTIES

A. IDENTIFICATION OF POTENTIAL PROBLEMS

	Total	Urban	Rural	Oregon	Wash.	Idaho
1. Resolution	9	5	4	5	4	0
2. Cost of data	8	5	3	5	3	0
3. Political/conceptual problems	4	3	1	0	3	1
4. Data system integration	3	3	0	1	2	0
5. Staff committment/skills	3	1	2	2	1	0
6. Land cover vs. land use	3	3	0	1	1	1
7. Access to data and processing	2	2	0	1	1	0
8. Reliability (accuracy)	2	1	1	1	0	1
9. Lack of thermal sensor	1	0	1	1	0	0
10. Cloud cover	1	0	1	1	0	0
TOTALS	36	23	13	18	15	3

B. POTENTIAL APPLICATIONS

	Total	Urban	Rural	Oregon	Wash.	Idaho
1. General land use classification	6	2	4	3	1	2
2. Monitor development	6	3	3	3	1	2
3. Water quality monitoring	3	1	2	1	1	1
4. Surface water runoff analysis	3	3	0	1	2	0
5. Agricultural land use inventory	3	1	2	2	1	0
6. Forest land inventory	3	0	3	3	0	0
7. Forest & Agriculture land productivity	3	1	2	2	1	0
8. Identify growth impacts	2	1	1	1	1	0
TOTALS	29	12	17	16	8	5

I. INFORMATION NEEDS - SOUTHWEST URBAN AREAS

	Totals	Counties	Cities
A. WATER RESOURCES			
1. Floodplain/wetland/riparian areas	6	4	2
2. Surface water supply	3	1	2
3. Groundwater supply	2	1	1
4. Water quality studies	1	0	1
5. Surface water runoff	1	1	0
SUBTOTALS	13	7	6
B. LAND RESOURCES			
1. Crop types/ground cover	6	4	2
2. Soil productivity/types	6	3	3
3. Topographic features & slope	4	2	2
4. Erosion (including sand transport)	2	2	0
5. Land divisions & zoning classification	2	0	2
SUBTOTALS	20	11	9
C. ENERGY RESOURCES			
1. Wind resources	0	0	0
2. Fault location	0	0	0
3. Solar potential	0	0	0
4. Geothermal/heat indicator	0	0	0
SUBTOTALS	0	0	0
D. URBANIZATION			
1. General land use classification	9	3	6
2. Growth monitoring (rural land conversion)	6	5	1
3. Housing, economic, population data	3	1	2
4. Identify & monitor roads (planning)	2	2	0
5. Vacant land inventory	0	0	0
6. Identify & monitor septic tanks	0	0	0
7. Capital improvement needs	0	0	0
8. Building suitability	0	0	0
SUBTOTALS	20	11	9
TOTALS	53	29	24

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II. IDENTIFICATION OF PROBLEMS & POTENTIAL APPLICATIONS - SOUTHWEST URBAN AREAS

	Totals	Cities	Counties
A. APPLICATION NOT SUITABLE (data too coarse)	3	3	0
B. POTENTIAL APPLICATIONS			
1. Monitor urban development (rural & vacant land conversion)	8	1	7
2. Crop productivity	5	2	3
3. Identify & monitor irrigated lands	4	1	3
4. Topography & slope	4	0	4
5. Monitor surface mines/dumping	3	0	3
6. Identify & monitor floodplain	3	0	3
7. Identify vacant lands	3	0	3
8. General land use	3	1	2
9. Identify vegetative cover	2	0	2
10. Water resource inventory	2	0	2
11. Identify sensitive areas/impacts	2	0	2
12. Storm water runoff	1	0	1
13. Air quality monitoring	1	0	1
14. Water Quality studies	1	0	1
15. Rangeland/Habitat management	1	0	1
TOTALS	43	5	38

APPENDIX 5

Technical Review of Information Needs

TECHNICAL REVIEW OF SUBSTATE INFORMATION
NEEDS FOR LANDSAT DATA APPLICATIONS

I. WATER RESOURCES

A. Water Quality Studies (Sec. 208). Generally, LANDSAT sensors are designed to detect land cover reflectance. LANDSAT data can be used to monitor water quality (constituents of water) if pollution source is related to land cover activity i.e. clear cuts or urban development. There is work ongoing to monitor water turbidity. Sources should be larger than one acre.

B. Surface Water Runoff. Surface water runoff can be related to land cover ie. impervious surfaces. Changes in cover can be monitored either through a manual mode (site knowledge or photographs) or through LANDSAT change detection techniques.

C. Floodplains/Wetland Boundary. LANDSAT images can be used to identify the extent of floodplain/wetland areas on specific dates. There are possible problems with day of coverage/day of occurance due to fixed schedule of satellite and cloud cover. Precise legal boundary not possible to determine with LANDSAT.

D. Hydroelectric Potential/Irrigation Supply. LANDSAT data can be used to determine water use, and, hence, water available for alternate uses. Need to work from hydrologic data. Accuracy improves over large areas and with larger bodies of water.

E. Groundwater Supply. It is not possible to look at subsurface resources with remote sensing. Landcover information can be used to infer water use and to estimate aquifer recharge rates, using hydrologic data and modeling.

II. LAND RESOURCES

A. Crop Types. The application of LANDSAT to identify general crop types has been demonstrated. In specific instances complexity and accuracy varies with farming characteristics - size of acreage, number of different crop types, use of irrigation, crop phenology, etc.

B. Forest Cover. LANDSAT data has been used extensively for forest land inventories and related applications. Problems vary with complexity of the forest and size of area.

C. Topographic Features and Slope. Digitized topographic information (elevation, slope, aspect) is available from USGS and the Defense Map Agency that can be integrated with LANDSAT data for computer analysis or image processing. Can interpolate information to 20' contours and be used with land cover data for applications to assist in determining solar energy potential, building suitability, reforestation, etc.

D. Soils Productivity. Primary production or carrying capacity can not be directly inferred from detection of actual land cover. Vegetative land cover data can be integrated with soils and other data to compare actual production with potential production. Can also look at vigor and yield of biomass.

E. Aggregate Deposits. It is impossible to look at subsurface resources or those having sites smaller than one acre.

F. Erosion. Given soils data and topography it is possible to get at soil loss using land cover data. Changes in land cover such as farming practices, urbanization, timber harvest, can be used to estimate loss.

III. ENERGY RESOURCES

A. Wind Resources. No LANDSAT application known.

B. Fault Location for Oil and Gas. LANDSAT data is being applied commercially to identify areas with high geologic potential.

C. Solar Energy Potential. Slope and aspect data (see above) can be integrated with LANDSAT data on cover type to indicate solar intensity.

D. Geothermal. Thermal sensor is not functioning; however, even with the thermal sensor this does not appear to be a promising application. There may be a relationship between indicator plants and geothermal that can be detected through aerial photography.

IV. URBANIZATION

A. General Urban Land Use Classification. This has been done for several areas at different levels of refinement. Complexity of task varies with refinement necessary. LANDSAT data can be integrated with other data sources such as census data, and landownership to gain refinement. Sample field check necessary for accuracy assessment. Appropriate for large areas.

B. Vacant Land Inventory. Land cover information can be used to inventory and monitor supply of "vacant" land. Generally limited to parcels larger than one acre in size although can be supplemented by high altitude and low altitude aerials. Accuracy requires field checking and use of other data sources.

C. Growth Monitoring. LANDSAT can be used to detect changes in land cover for urbanizing areas. This can be done without a General Land Use Classification and limits the analysis and classification to approximately 5% of the land area. Analysis of the changes requires some manual classification of the type and intensity of the land use conversion.

D. Identify and Monitor Septic Tanks. Individual septic tanks and drainfields are too small for LANDSAT detection. Vegetative vigor associated with malfunction may be detected through high altitude/and low altitude aerials.

E. Identify and Monitor Roads. This can be done for major transportation routes using LANDSAT; however, unless problem requires digital data, high altitude aerials are generally more appropriate source of information.

F. Air Quality Indicator. An indicator could theoretically be devised from weather satellite sensors; however, this is or would be a research application.

G. Building Suitability. LANDSAT can be used as one data layer together with soils and topography information to develop a building suitability map. Generally appropriate for large areas where coarse grained analysis (1 + acre) is useful.

APPENDIX 6

Follow-up Survey

IDENTIFICATION OF APPROPRIATE
LANDSAT DEMONSTRATION PROJECTS

NAME OF JURISDICTION:

Please list what you think would be appropriate (feasible and meet substate needs) for LANDSAT demonstration projects:

Comments:

Please return questionaire by April 15th to:

Larry Shadbolt
Pacific Northwest Innovation Group
211 East 11th Street, Suite 103
Vancouver, WA 98660

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Minutes
Final NACoR/Landsat Task Force Meeting
December 7-8, 1981

A. Attendance

1. Task Force Members

	County/State
Jim Altenstadter	Cochise, AZ
Carl Brown	Jefferson, KY
Rena Cusma	Multnomah, OR
Ed Durabb	Lafourche, LA
Don Gragg	Sedgwick, KS
George Schanzenbacher	Erie, NY

2. Visitors

	Affiliation
Alexander Tuyahov	NASA
Richard H. Weinstein	NASA
John Murphy	NACo
Paula Jarvis	NACoR
Marie Baker	NACoR
Bernard Hillenbrand, Executive Director	NACo
Mark Croke	NACo

B. Assignment Discussions:

We began with a discussion of the various areas of concern which each Task Force member had been assigned. The first of these was USER NEEDS, given to Don Gragg, Sedgwick County, Kansas and Carl Brown, Jefferson County, Kentucky):

1. Don Gragg had asked various heads of the departments of the county to respond to the question of how they could use Landsat. The overall response was that they needed better resolution. As individual departments these were the answers:

- County Extension Service could use Landsat for:
    - land use inventory,
    - erosion tracking,

- drainage patterns, and
- crop inventory.

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The currency of Landsat is important. In contrast to Landsat's level of resolution, the county uses low level airplane overflight to detect heat loss of residential units, using infrared photography. The aerial photos pinpoint information which can then be used in requiring homeowners to insulate their dwellings before selling them.

- The Appraiser's Office felt that using Landsat might enable them to locate new properties. With an aggressive annexation program, the use of Landsat might generate increased tax revenues.
- McConnell Air Force Base expressed interest in Landsat.

In concluding, Don Gragg said that Sedgwick County is interested in doing things better and less expensively, and if Landsat can aid particularly in dealing with land use issues associated with rapid urbanization, then the county would be anxious to use it.

2. Carl Brown started by reemphasizing that Jefferson County is an urban county. Given that fact, these are the major issues which the county faces:
   - identifying forestlands, expecially to design transportation for connecting the various park lands in the future,
   - siting landfills, particularly hazardous wastes,
   - monitoring erosion and using riverfront property effectively,
   - monitoring polluting industries,
   - tracking drainage patterns to design sewer systems and identify flood plains.

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with roads, public works, public safety, and health problems. To support the roads and public works budget, the county has a gasoline tax which generates funds. In the area of health, the county has the responsibility but not the funds.

2. George Schanzenbacher described the situation in Erie County where the county has lost 100,000 people in 10 years and the tax base is not growing. The county budget is $600 million of which the split is 1/3 federal, 1/3 state, and 1/3 county. Out of this budget, land use planning has $4 million, or less than 1 percent. The county is responsible for programs in solid waste, parks, capital improvements, environmentally sensitive lands (especially hazardous) and the resources to pay for these programs have to be local, most likely CDBG funds. Increasingly, land use and natural resource planning will have to be more cost-effective, placing greater responsibility on the planner.

Federal revenue sharing funds are not going to land use/natural resources planning. The question is what are the essential government services? Clearly, this is a political question.

What means are there for generating revenue? New York has a long history of special districts, primarily on a city by city basis. The industrial development authority puts emphasis on generating new jobs in Erie County.

(Don Gragg commented that Sedgwick County, Kansas, has an interest in service districts and soon his county will have the authority to create any type of district it desires. There is even the possibility of getting industry to pay a share of the costs when the service district will directly benefit industry.)

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Louisiana State University (LSU) has been training Ed in the interpretation of Landsat data. LSU is, however, more interested in basic research and the use of Landsat is fast becoming applied research. LSU still is virtually the only place Lafourche Parish, and other parishes, can turn to for assistance in using Landsat data.

Private consulting firms do use Landsat data, but they have not been interested up to this point in working with the parish. NASA has been extremely supportive of the efforts begun in Lafourche Parish and has done what it can to finish the project.

Lafourche Parish is committed to Landsat and is even considering the possibility of purchasing an Apple II computer so that the Parish could continue to have access to Landsat data with the cooperation of LSU. In essence, Landsat offers the best and in many ways, the only way to accurately monitor the changes occurring in the wetlands.

Jim Altenstadter explained that there is no one in Cochise County who is trained or is familiar with Landsat data. At this time, there are no funds to train someone, but there is some interest in purchasing an Apple II package. There is no incentive to work with other counties, mainly because Cochise County is itself so large that obtaining Landsat data for its land area would be costly enough without involving other counties.

The Arizona Department of Water Resources does use digital Landsat data, but it never passed on the expertise to the local governments. The University of Arizona has worked with NASA and local governments since 1972 to transfer the technical capability and offer assistance in interpreting Landsat data. Thus, the University is the avenue

2. Alexander Tuyahov, Chief, Space Applications Branch, NASA, discussed the status of the university technical transfer program. This is the only program in the applications area to remain for user outreach.

The remainder of the afternoon, the Task Force members compiled their responses to the various areas of concern which they had discussed earlier in the day.

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Cornwell for the Earth Resources Laboratories, NASA. As Dick Weinstein explained, the purposes are 1) to understand local government needs, and 2) to determine the technology requirements -- i.e., what kinds of models are in use by local governments and which models could make use of Landsat data.

The overall reaction of the Task Force members was that it is all very fine to talk about priorities, but the needs of the large urban counties are so different from those of rural counties that it is difficult to specify one set of user needs. The report seemed to be descriptive rather than analytic; and although there is a large amount of information, it is difficult to see how it necessarily applies.

The Task Force wondered if anyone has ever really used a model? Jim Altenstadter mentioned that the Arizona Department of Water Resources does some mathematical modeling, but that use of modeling at the county level is limited. George Schanzenbacher said there is a model for air quality in Erie County, but he was not sure if the model has actually been used.

B. USER NEEDS

Dick Weinstein asked the Task Force members what information they need and do not have?

The major issue in Erie County is economic development. There is plenty of infrastructure in place and the questions now are where is it most efficient to develop industrial parks, once you take the best sites based on local priorities, then what are the best geographical areas? For Erie County and probably the entire Northeast, the pressure is for jobs. In addition, the county always needs land use information, but on a level of detail not possible with Landsat's current resolution.

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LANDSAT RESOLUTION

WHEREAS, the NACoR/Landsat Task Force has conducted a one-year review of county current and potential uses of remotely sensed information; and

WHEREAS, the Task force has found county activities about which more informed decisions could be made with the systematic availability of remotely sensed data; and

WHEREAS, these activities have included land use inventories, irrigated cropland identification, monitoring land loss, and many others; and

WHEREAS, counties with dwindling budgets are assuming ever-greater responsibilities from state and federal governments; and

WHEREAS, the National Aeronautic and Space Administration's (NASA) Landsat Program has provided data that has contributed to the county ability to meet their continually expanded responsibilities; and

WHEREAS, the University technology transfer program has offered counties often the only, as well as the best, means to access and interpret Landsat data; and

WHEREAS, Landsat has proven useful in offering counties repetitive land cover information otherwise unavailable or prohibitively expensive; and

WHEREAS, Landsat data, although useful at current levels of resolution, will continue to improve its resolution with subsequent satellites, Landsat D (to be launched in September 1982) and D1; and

WHEREAS, NASA now has communication channels established to a network of county officials; THEREFORE,

BE IT RESOLVED, that the NACoR/Landsat Task Force urges NASA to ensure the continuance of the university technology transfer program and to use the network of county officials to inform them of Landsat improvements and uses; and

BE IT FURTHER RESOLVED, that the NACoR/Landsat Task Force encourages counties to consider the possibilities afforded by Landsat to effectively monitor land cover changes.

Submitted by the NACoR/Landsat
Task Force at the Final Task
Force Meeting in Washington, D.C.,
on December 7-8, 1981

SAFE DRINKING WATER ACT

Background

Authorization for the Safe Drinking Water Act expires at the end of this fiscal year. Major issues to be considered will include: maximum contaminant levels, currently set by EPA on the basis of whether a substance "may have an adverse affect" on human health; cost benefit analysis; and treatment technology, currently EPA must prescribe a treatment technique in some cases.

NACo Policy

NACo supports reauthorization of the Act with specific changes which would allow for more local flexibility in designing measures to achieve the Act's goals.

Anticipated Action

Hearings will not be scheduled until late March at the earliest in the Senate with House action anticipated to be slower. The Administration in reviewing the Act but has not yet prepared specific recommendations.

NUCLEAR WASTE MANAGEMENT

Unlike previous years, the second session of the 97th Congress begins with good prospects for final passage of nuclear management legislation. However, if the past is any guide this legislation could become derailed very easily, particularly in an election year. At issue will be; state and local participation, burial vs. storage, how to treat military wastes; and the use of commercial spent fuel for the weapons program.

NACo Policy

NACo supports a nuclear waste management program which has a specified strong state and local government role.

Anticipated Action

A vote in the Senate is expected in mid-to-late March. Mark-up could begin in the House if widespread acceptance materializes for the draft bill put together by Reps. Udall (D-Ariz), Dingell (D-Mich.), and Ottinger (D-NY).

ENERGY CONSERVATION

The prospect for a significant federal role in energy conservation are considerably worse this session than they were last year. Spending for Fiscal 1983 is proposed to be only around $22 million with possible abolition of the conservation and renewable tax credits.

NACo Policy

NACo strongly supports a major federal role in energy conservation.

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