

C. PERSPECTIVE - TECHNOLOGY TRANSFER PROGRAM

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It is a pleasure to be here. What I will try to do today is give you a national perspective of where we stand with the status of the technology transfer program and also to talk about the future as well as some of the things that Sue Norman spoke about.

We have essentially three regional applications centers. They are involved in 91 application projects within 22 states. This is our technology dissemination function. We also have approximately eight application system verification transfer projects. These are technology verification efforts involving those types of organizations.

We have approximately 21 university applications branches to develop capacity in the academic community in space applications. Seventeen branches are involved in remote sensing, and we have some basic discipline centers now being started. For the last four years, we have institutionalized liaison activities with public interest groups, such as the National Congress of State Legislatures, the National Governor's Association and others. We also have user requirements activities that conduct user needs studies through our NASA field centers in cooperation with user panels, and conduct conferences, symposiums and other liaison activities.

There are many ways to talk about technology transfer programs but I thought I would go through it in a chronological sense. That is, how did it evolve? Before I do that, let me give you a breakdown as to where we work primarily in technology transfer.

Many activities concern the area of land use for various purposes, such as development, suitability and planning. Another large area is in forestry, range and wildlife, the whole aspect of forest inventory and other types of vegetation inventories. Then we have two major other areas in agricultural-related and water resources activities. Most of our activities are in these four areas. The remaining activities, the materials processing for our university applications programs, R&D, geology activities, geodynamics and coastal zones.

NASA became involved with technology transfer primarily after Landsat was launched in July 1972. The first efforts were investigation efforts.

We have had 327 Landsat investigations, 119 Landsat II investigations. These primarily were directed at the university community, although other users were involved. We first became involved in technology transfer through the university applications programs, which were formed in 1971. Their purpose was to develop a capacity in the nation for applying space applications technology. That has been going on ever since. We have worked with about 30 universities with an emphasis on remote sensing. Now, we are developing an emphasis of understanding disciplines such as geology - what do you need to measure in geology and what observables do you need to measure from space for future systems?

As to the status of our university applications program, we have worked with 31 universities since 1971. We initiated three programs in 1980. We will not be initiating any in 1981 due to budget problems.

In our branch activities, we have essentially, three major functions. First, we try to develop a capacity in the university for applying space applications. Second, we try to develop an educational process so that a cadre of people will evolve in the future that know remote sensing as it can be applied from civil engineering, geology, etc. The third is technology transfer. These are the subsets of those types of activities. That is what the grants are for.

Each university is normally funded for about five or six years to develop enough momentum to get a center going at that university. They may have 40 to 50 projects at that university. For example, the University of Nebraska started on irrigated lands inventory in 1973. Pivot irrigation was using a lot of fuel and the project was conducted to develop planning data for people who are distributing the fuel positioning storage tanks, etc. In this case, the university developed a map of irrigated lands and became independent. The state started funding this. I have had a growing demand for this type of very simple map for the agri business community, petroleum community, the state agency and so forth. We try to get the university started, develop an area of expertise in space applications and then spin them off independently. In most cases, we have been successful in doing that.

Our first program focused on university applications. The purpose was to develop capacity with work primarily in the academic area. Following that, we realize things were proven out - technology was proven - we had to work more with end users. In 1974, the Applications Systems Verification Transfer program was developed to work with end users, in an attempt to transfer and verify that technology in the users own home setting. We looked at the economics of the applications and what kind of adaptive engineering has to be done to make it work in a real environment.

We have approximately eight or nine ASVT's. Some of these have been completed. We are working with the National Park Service right now completing an ASVT program in identifying such things as fire hazard areas and tailoring information products to that particular customer. They are developing a center in Denver and preparing equipment for a Landsat data analysis facility. We are also working with the State of Alaska in a multi-disciplinary activity involving some federal and state agencies and the State of California, involving vertical data integration, working with counties in this state and private industry. One of our ASVT's is with sub-state government. The Florida Water Management District. This project is primarily aimed at ecological problems in Florida. For example, the withdrawal of fresh water from the Swanee River and what impact does it have on the estuarine. The PNW which you will hear a lot about, in a multi-disciplinary project.

We finished a project with the Corps of Engineers, involving water mapping in support of the Dam Safety Act. We have completed a project with the Appalachian Regional Commission to identify gas deposits. The Appalachian Regional Commission is going to drill so we will know the real result of this ASVT. We do not know the results until something is found or not found. We are going through that process now. In addition, we worked with 13 agencies in the State of Texas, and conducted snow cover mapping with the Corps. We are working through Ames with the public utilities to determine power demand and power line citing.

One example involves the National Park Management project. We have a format here of presenting a problem and solution. The key in using Landsat is geobased information systems. This project is a good example of using Landsat in combination with other data.

Just to illustrate something that is very typical of all our projects, we had a Landsat Project which provided us with nine group land cover classifications. Then, through adding elevation and aspect data, we were able to get 21 land cover categories. This is over Olympic park. Then by adding slope, we produced what the user wanted, a fire hazard map. This is rather typical of all our projects by combining remote sensing with a geobased information system approach.

I am not going to talk too much about the regional program since you are already most familiar with this. The program's purpose was primarily to aid state and local users in a very organized national scale of the dissemination demonstration activity. The 1976 administration policy review affirmed that we needed a program to address state and local needs. There was a study that said NASA is great if you have technology up there orbiting the earth and providing data, but you have to teach

users how to use it. We had a lot of congressional testimony. Out of this came a commitment for a regional program to address local and regional problems in a unique way. We formed the regional applications program.

We have the nation categorized in three regions, with a distinct responsibility that each center has for all the states. Prior to this, we had an informal regional program. One of the problems we faced was that several NASA centers might be talking to one state, and a lot of confusion resulted. One of the reasons for developing this program was to eliminate that.

We had universities to build a long term capacity, ASVDs to verify technology dissemination for the regional program - user requirements and awareness and we are looking to determine what needs to be done in the future to see how NASA R&D will develop and progress. One successful program in accomplishing this involves our relationship with NCSL, NGA and the National Association of Counties.

We are conducting user requirement studies in the field center in support of that. After the user needs are determined - areas of deep economic uses - we conduct feasibility studies to determine if something will work in a particular area. The utilities project was started in that way to determine if the technology is feasible in this particular industry. After completion of that, we normally phase into the ASVT program. We are working with a national innovation network on American landscape, the Architects Association. During the last year we worked with NOAA. One example is this conference co-sponsored with NOAA.

On 10 March 1981, President Reagan sent to congress the new administration budget for FY 82 and a revised budget for FY 81. They contain significant changes for our program. The President's budget has the objective of reducing federal expenditures as well as improving and trying to revive the economy. Therefore they eliminate programs that competed with the private sector or provided a partial or what the administration considered an unnecessary subsidy to users who should pay for this service. This is some of the philosophy that was used toward technology transfer. Technology transfer was cut throughout the federal government. Very few federal technology transfer programs survived because the administration considered these programs that should be carried out and funded by the private sector. One of the recommended cuts in the Reagan budget was to phase out and terminate the regional programs - the ASVT and user requirements and awareness programs at the end of FY 81. The university applications program will be phased down and terminated by 1985. The overall implication is that there is a more rapid phase-out of the federal government's role in

remote sensing with more reliance on the private sector. The private sector should do a lot of things that we are doing now. There will be a reduction in the low risk opportunity that has been offered to programs, such as the regional program. We will try to put a lot of emphasis during the next six months on documentation and techniques, and make it available to the private sector. We will review the ongoing projects in the next month and develop a strategy. Essentially, we will complete all our present project commitments, phasing down some projects prematurely. No additional projects will be started and no continuous assistance provided.

There has been a substantial user development completed. We have conducted demonstration projects in 36 states. We have trained more than 2,000 state, university and federal officials. Depending upon how you define the word operational, 15 states are in operational status. We have good university centers of expertise in 20 states.

The NCSL and NGA developed a national network for communicating with states in the remote sensing field. We have also had cooperative projects with federal agencies and have developed interest and appreciation of remote sensing in state programs. All these things in combination with an emerging private sector industry slowly will enable this whole process to be carried out independently, or with less involvement with the federal government.

NASA will continue working with the user more in an R&D capacity and an applications development capacity and not in a national scale of administration way. Although there is much more that could be done, I feel we have made a tremendous start with the users. The next six months to one year will tell us what will happen as the congressional process takes place.