EES Report

ENGINEERING EXPERIMENT STATION • GEORGIA TECH

Serving Georgia and the Nation

President Carter's Speech Reflects Research Urgency

President Carter returned to Georgia Tech on February 20 to receive an honorary degree and an award. He then made a major address to the nation. In his speech, the far-reaching impact of research such as that currently conducted at EES was indirectly evident as the President emphasized two crucial issues facing this country's future: energy and national defense preparedness.

Both areas continue to receive priority attention in research at Georgia Tech's EES as projects are underway in solar energy development and applications, biomass, energy conservation and waste utilization. EES also has many programs which assist in strengthening the nation's defense.

A happy occasion it was for President Jimmy Carter and Georgia Tech President Joseph M. Pettit when the Chief Executive received an honorary doctorate and the Alumni Distinguished Service Award at Tech.

EES Research Demonstrated for Chinese

Dr. Thomas Brown of EES explains the solar energy DOE/ACTF for the Chinese delegation during a recent visit. In the foreground (right) are: Georgia's Governor George Busbee, Vice Premier Fang Yi and Georgia Tech President Joseph M. Pettit.

When the People's Republic of China delegation made its unprecedented visit to the U.S., Georgia Tech was the only institution for higher learning selected to be on the schedule. On February 1, Vice Premier for Science and Technology Fang Yi and his accompanying group learned firsthand about two significant research focal points at Tech's Engineering Experiment Station: solar energy and remote sensing applications.

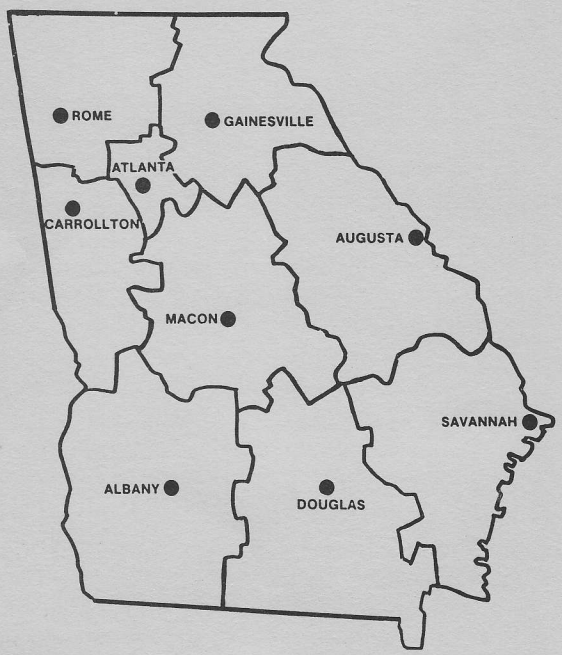
Solar energy researcher Dr. Thomas Brown of EES gave a demonstration of the Department of Energy Advanced Components Test Facility, operated by Georgia Tech. The DOE/ACTF, the second largest of its kind in this country, is the third largest in the world. According to Brown, questions by the Chinese indicated a sincere interest in solar applications, especially in using such a facility to run turbines to generate electricity.

Demonstration of the Earth Resources Data Analysis System (ERDAS) acquainted the international visitors with EES capabilities in taking raw data from NASA's LANDSAT satellites and developing it into a highly usable, visual form which can benefit government, farmer, forester, land developer or anyone involved with land use, land cover and land planning decisions and management.

March, 1979

EES Opens New Area Office

February 2 was opening day for the Northeast Georgia Area Office in Gainesville. Joining Office Director Phil Loveless (center) at an event introducing the facility to legislators, municipal officials, business and industrial leaders are: Dr. Donald J. Grace (left), EES director, and Abit Massey, director of the Georgia Poultry Federation.



Georgia Tech's service extends beyond the campus in Atlanta and reaches every part of the state through a network of area offices located in Albany, Augusta, Carrollton, Douglas, Macon, Rome, Savannah and, as of this year, Gainesville.

By having management, engineering and development specialists in residence in each major area in Georgia, the Georgia Tech team has first-hand knowledge of community and industrial needs and also first-hand access to the resources of academic and research units of Georgia Tech in Atlanta.

The eight area offices provide an industrial extension service that emphasizes the creation of jobs — jobs that will increase the per capita income of the state and thereby improve its economy. This involves assistance to local communities and groups in preparing for economic growth and in attracting new business and industry. The engineering staff also assists existing firms in identifying and resolving problems that are inhibiting their growth.

Water Pumps For Developing Countries

The Agency for International Development (AID) has awarded the EES Office of International Programs a two-year contract to respond on a task-order basis to requests from AID Missions worldwide for technical assistance on rural water supply problems. Expenditure of up to $350,000 a year is authorized, according to Phillip Potts, project director.

As a result of the expertise gained in the recently concluded two-year program of field testing of the AID manually-operated water pump at 30 rural sites in Costa Rica and Nicaragua, EES has several other pump projects currently underway or committed. Water pumps are being installed in the Dominican Republic, and local manufacture of the pump is in progress in Indonesia. EES is presently conducting on-site pump project feasibility studies in Bolivia, Pakistan and the Philippines during the January-March period, and installation of U.S.-manufactured Moyno pumps in Togo and Benin also is pending.

EES Uses Radar To Detect Voids Under Highways

Radar research at Georgia Tech could lead to smoother roads with fewer detours. Preliminary research has indicated that radar techniques can be used to locate voids beneath concrete highways that cause the roadway to be rough and often hazardous to rapidly moving traffic. Maintenance to correct cracks, settlement, bumps and depressions due to voids beneath the pavement is time consuming, costly and disruptive to normal traffic movement. Radar detection of these voids during periodic nondestructive surveys would permit replacement of support material before the development of pavement distress and loss of structural qualities, according to project director Dr. Jim Echard of Georgia Tech's Engineering Experiment Station. The study is sponsored by the Georgia Department of Transportation.

Tech Uses Plastic to Improve Georgia's Roads

Improving Georgia's roads with plastic is the object of a $40,000 grant recently awarded EES by the Georgia Department of Transportation.

According to Dr. Dan O'Neil, the objective of the GDOT project is to prevent deterioration of concrete bridges and roads by reinforcing them with plastic materials. The Tech chemist explains that a chemical mixture in its pre-plastic state is poured onto the concrete structures where it seeps into air pockets and then hardens into plastic. This repair method under proper conditions produces an impregnation that can increase the strength of concrete up to four-fold, thereby lengthening the life on the structure.

In order to carry out this project, EES engineers and DOT personnel will reinforce both old and new bridge decks in the state. They will also repair concrete pavements by replacing conventional concrete with a plastic binder called polymer-concrete. O'Neil says that this plastic binder hardens quickly which means that pot-holes on high-traffic roads can be repaired and then opened to traffic within an hour or two instead of the usual half to full day.

If the plastic repair techniques are adopted by DOT, O'Neil says the agency could expect a subsequent reduction in the costs of repair, maintenance and replacement of Georgia's highways and structures.

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EES Studies Pest Insect Behavior

As more and more pesticides are banned by EPA, and as the boll weevil, cabbage looper and locust continue to be attracted to U.S. crops, more effective means for controlling these pest insects must be found. EES is currently assisting the U.S. Department of Agriculture in determining some of the problems in using radar to locate insects and possibly identify them as they spread. The program is funded through USDA's Southwestern Cotton Research Laboratory in Phoenix, Arizona.

If the radar system concept works, insects could be located in highly concentrated swarms while they are in flight. The spraying of the airborne swarms could reduce the amount of normally necessary pesticides and increase the efficiency. Radar also is valuable, according to EES Project Director Gene Greneker, in detecting nocturnal habits of insects and the speed with which the infestations are spreading. Before advanced insect control techniques can be used successfully, insects' dispersal patterns must be known since this behavior often results in new infestations and expanded populations which must, in turn, be compensated for by pest management programs.

Edith W. Martin, chief of the Computer Science and Technology Division of EES, has been invited to join the Editorial Review Board of *Military Electronics Countermeasures* magazine in the capacity of computer science expert and also to write monthly by-lined articles for the internationally-distributed publication.

EES Helps Georgia Industries Reduce Fuel Costs

Georgia Tech's Industrial Energy Extension Service (IEES) has helped Georgia industries save more than $8-million in fuel costs during 1978, according to recently compiled data. The savings — adding up to about 3.1 trillion BTU's — was accomplished by energy conservation assistance to individual plants and by energy conservation workshops held throughout Georgia. The textile industry realized the greatest energy savings, according to researchers. The IEES goal is a 10-20 percent reduction in the projected 1980 energy needs of Georgia's industries.

As part of Georgia Tech's ongoing efforts to assist the state in cutting energy costs and conserving energy use, an Energy Update Seminar was held on March 7 on the Tech campus. Presented by the Industrial Energy Extension Service, which is sponsored by the Georgia Office of Energy Resources, the seminar was conducted by EES.

The seminar addressed those aspects of energy — operational, economic and governmental — that affect formulation of energy policies. Energy experts from the Georgia Power Co., Atlanta Gas Light Co., the Georgia Office of Energy Resources and other professionals from industry and from the University System of Georgia spoke on a panorama of topics aimed at answering such concerns as: Will tomorrow's energy rates significantly affect product price? Should plant expansion be delayed until sufficient energy supplies are certain? Can expenditures for energy conservation be partially offset by tax incentives?

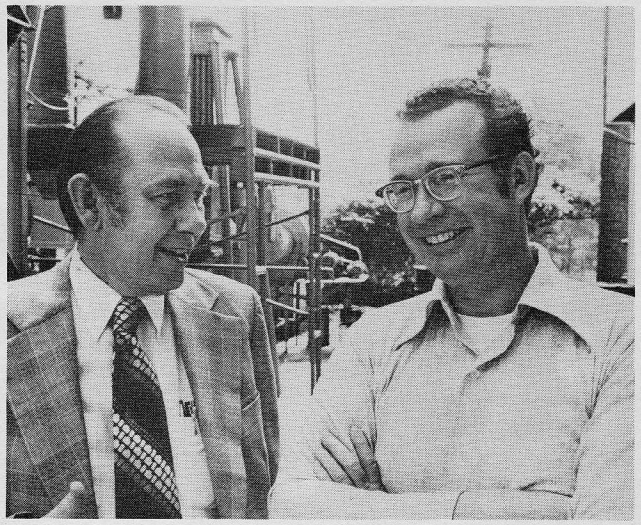
Georgia Tech's EES Responds To Research Needs—Update '79

Research activities at Georgia Tech's Engineering Experiment Station continue to grow, and nearly 1000 persons now comprise the regular and supplementary staff which is housed in several on-campus buildings, in the C & S Bank Tower, in the Georgia Tech Research Facility, Cobb County, and in eight area offices around the state. EES, growing at a rate of about 30 percent per year, now has an annual research volume of about $25 million. It is an integral part of Georgia Tech, reporting directly to the vice president for research.

Most of the EES activities are client-oriented, with a primary focus on applied research. Major areas of current involvement at EES include: energy, economic development, computer applications, electronics, systems analysis, and applications of physical, chemical and material sciences. EES also has a diversity of sponsors — federal, state and local government agencies as well as business and industrial firms — in its important mission to carry out investigations in engineering, science and economic development.

During the past year, research studies included: testing of high temperature solar energy devices, wood energy applications; waste utilization, radar applications (in defense preparedness, in weather, and even in pest insect behavior), heart pacemakers, assistance to the handicapped, aid to motorists in trouble on Georgia's highways, expansion of international programs, technical assistance to various industries including poultry and textiles, and continued attention to environmental and resources problems.

Georgia Tech's EES continues to serve the community, the state of Georgia and the nation in our technologically changing times.



Dr. Donald J. Grace, EES director, and Georgia Tech's vice president for research, Dr. Thomas E. Stelson, visit the EES pyrolysis research project which focuses on waste utilization and energy-related problems.

Research Monographs

Available upon request are the following monographs on topics of vital and current interest to the public and which emphasize research at the Engineering Experiment Station and elsewhere at Georgia Tech:

Waste Not, Want Not
Solar Energy Research at Georgia Tech
Georgia Tech's Service to Georgia
Remote Sensing Research at Georgia Tech
Profiles in Energy
Technology for Today and Tomorrow

An Equal Opportunity and Educational Institution

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