STATION NEWS

EES

ENGINEERING EXPERIMENT STATION • GEORGIA TECH

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Conference for Executives

Whirlpool representatives take coffee break during EES presentation 21 March with EES staff members.

On March 21, about 15 executives from various Whirlpool Corporation plants toured EES and Georgia Tech. Although the group has been having an annual meeting in Atlanta for several years with Tech tours, this was the first time an EES presentation was included. Their yearly meeting is designed to provide a forum to discuss their individual plant problems and possible solutions. The information gained from their tours will undoubtedly assist them.

After a welcome from Director M. W. Long, **Howard Dean** introduced the program which started with a slide presentation about EES by **Jim Donovan,** Publications Services. Then several parts of EES were explained in detail. **John Brown,** AIL, showed slides on analytical instrumentation applications to industrial materials; **Robert Goodman,** SSD, talked about applied mechanical technology; **Dr. John Tatom,** TAG, showed EES' expertise in waste utilization, and **Robert Cassell,** IDD, discussed plant location and EES industrial services.

John Brown showed the visitors various equipment in the Analytical Instrumentation Labs. Then **J. W. Dees,** SSD, conducted a tour of the laser and optical labs in the Electronics Building.

New degrees

Henry Cotten, Sensor Systems Division, received his Master's Degree in Mechanical Engineering in the Winter Quarter.

William O'Dowd, also in the Sensor Systems Division, received the Ph.D. in Electrical Engineering.

H. L. Bassett, Special Techniques Division, has an article entitled "High Temperature RF Transmission Tests on EM Windows Conducted at the French Solar Furnace" in the January issue of *IEEE Transactions on Antennas and Propagation.*

New Research in PSD

Solid State Devices and Materials is one of the new areas of research in the Physical Sciences Division of ASD. This activity is receiving attention as a new area of major growth for the Division and EES. Four senior research staff members joined PSD/ASD in the summer of 1973 to spearhead this activity. Headed by Senior Research Engineer **Walter Cox,** the group consists of **John Amoss, Earl Meeks,** and **Charles Rucker.**

Initial emphasis is being placed on microwave solid state devices, materials and components even though facilities are being generated to conduct research for a broad-based semiconductor/microelectronics/components program.

The prime facility being groomed to support this research activity is the 3000 square feet of microelectronic/semiconductor clean room space located on the first floor of the Baker Building. Some of the equipment presently housed in this laboratory is ultrasonic and thermocompression bonders; ultrasonic cleaners; hot filtered de-ionized water system; micromanipulators; transistor curve tracer; sputtering and evaporation equipment for metallization; plating equipment; and photo-masking facilities.

While much of this year is being spent in preparing facilities, doing contract development, and interacting and interfacing with other staff members desiring support from this activity, the momentum has progressed to a point of anticipating additional expansion during the next year.

EES to Help Solve Georgia Energy Problems

At his Conference on the Energy Crisis in December, Governor Carter requested that Georgia Tech and the Engineering Experiment Station staff assist Georgia business and industry in solving problems brought on by the energy crisis. The EES has been actively involved in a variety of energy-related projects such as: solar energy development; the production of energy and clean fuels from community, industrial and agricultural wastes; and achieving greater efficiency in industrial use of energy.

Recently, a short questionnaire has been mailed to 1000 plant managers in Georgia by the EES in order to gather specific information on companies and their energy use. Questions relate to products, working hours, fuel consumption, energy sources and related fuel shortage/cost problems.

The purpose of the questionnaire is to gather direct and accurate data that will assist the EES researchers to formulate realistic suggestions and recommendations on conservation of energy measures helpful to managers of Georgia's industrial plants. It is believed that energy requirements can be reduced in many plants without major modifications to process or operating procedures and without affecting production.

Jim Akridge, Mechanical R&D Group, is Director of the Project for more efficient use of industrial energy. Bill Howard and Ben James, of IDD are also working with Akridge on the project.

Use appliances efficiently and sparingly

R. K. Hart, ASD, is author of Chapter 4 on Electron Diffraction: High Energy (HEED) in *Systematic Materials Analysis,* Volume 1 which has just been published by Academic Press, New York. This book, which will be issued in two volumes and contain 40 chapters, will be the most definitive work ever published on analytical methods of characterizing materials.

EM Window Symposium

The High Temperature Materials Division (HTMD) is known nationally and internationally for its radome materials work and for its outstanding contributions to this field of technology. This reputation prompted the U. S. Air Force to ask Georgia Tech to coordinate and host the Eighth EM Window Symposium in 1966. To date, Georgia Tech has hosted the Eighth through the Twelfth EM Window Symposia. Participation by foreign countries has been encouraged for these five consecutive biannual symposia. An increase in their participation has resulted and these symposia are now of international interest. Representatives from France, Great Britain, Germany, Israel, Italy, Sweden, Japan and Norway have participated.

The Twelfth Electromagnetic Window Symposium is to be held 12 to 14 June 1974, at the Student Center. This year the Symposium is being held during the same week as several other related meetings on the Georgia Tech campus. You may find it convenient to also attend one of these meetings. These other meetings and dates are:

1974 IEEE AP-S International Symposium
June 10-12, 1974

USNC/URSI Meeting
June 11-13, 1974

1974 International Microwave Symposium (MTT-S)
June 12-14, 1974

The purpose of the 1974 Symposium will be to review the state-of-the-art of radome technology with particular emphasis on EM window design and evaluation, EM window manufacturing technology, EM window analysis, advanced applications, environmental problems, and EM window materials. Registration details by contacting Joe N. Harris, Chairman, Twelfth EM Window Symposium at 894-3656.

Barbara Cartledge, Reactor Operations, EES, has resigned to accept a position as Secretary with Equitable Life.

Presentations

George Dodson, IDD, made a presentation on the Georgia Certified City Program to the Alpharetta City Council March 25.

On April 2, the Federal Regional Council, comprising the directors of the southeastern regional offices of the various federal agencies, heard a presentation on IDD's recently published *Economic Development Approaches for the Southeast* made by **Ross Hammond, David Clifton, Bill Howard** and **Bob Cassell.** The group already has made a similar presentation to the project's sponsor, the Economic Development Administration.

Nick's Show

Nick E. Poulos is preparing A Show-and-Tell brochure entitled "Hypersonic Radomes." Publication date is scheduled for April 15, 1974. The brochure "Tells" about HTMD's 17 years experience in the radome field and about its radome materials work from which it has gained national and international recognition and respect of radome researchers. Please make your request for copies to HTMD, Hinman Research Building.

George Morelos is back home at IDD after 21 months in Paraguay. The first year was spent on an IDD project, and the last eight months he was on leave of absence working on an Agency for International Development-sponsored rural industrial project.

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Tornado Detection

Tracking and Warning Concept for the State of Georgia

Under special funding from the Governor's emergency budget, EES has developed the concept for a tornado and severe storm detection, tracking, and warning system that could be implemented in the State of Georgia. This concept was developed by **Gene Greneker** and **H. H. Jenkins** under the direction of **Dr. Allen Ecker,** all of the Radar Div., S&T Dept. It consists of combining advanced radar techniques with new sferics direction finding techniques. With such an integrated system, tornadic activity could be detected and accurate tracks of tornado paths could be determined.

Currently, tornado warning consists of the National Weather Service identifying a large area in which meteorological conditions are such that tornadoes are possible. Actual warnings come only when visual observations of tornadoes are made. This new concept in tornado warning is directed toward electronic detection of tornadoes in their formative stages and tracking of the actual path of the tornado. Information on tornado formation and path locations would be provided to the National Weather Service to issue warnings. The Georgia Department of Civil Defense would also cooperate in the warning system.

In the proposed tornado warning system, data from the radar with special signal processing and the sferics direction finding system will be provided to a central plotting board where the locations of cells capable of spawning tornadoes and actual tornadic activity will be plotted. The paths of these cells and tornadoes will be determined and provided to the appropriate agencies for dissemination to the public. With this method, those individuals who will be directly affected by the tornadoes can be warned in time and others who will not be affected will not be unduly alarmed.

Staff Changes

Mrs. Molly Gary has resigned her position as Assistant Research Scientist in the Sensor Systems Division. She is moving to Loveland, Colorado where her husband has been transferred.

New secretaries in the Radar Division are **Joanne Ater** and **Fern Bechtold.** Mrs. Ater is working with the Systems Analysis Technical Area and Mrs. Bechtold is secretary for the Radar Area.

Ina Newton is transferring from the Communications Division to GTRI where she will be secretary to Mr. Bennett. Her position in the Communications Division will be filled by **Mrs. Cara Ann Bloom.**

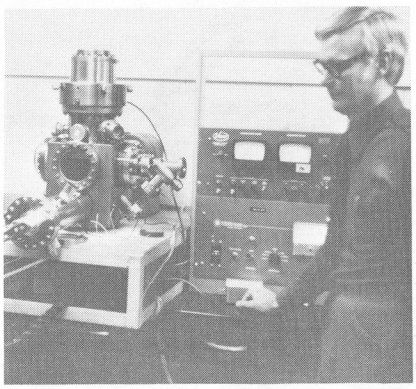
Nancy Goodson and Alan Weathers are new R&P employees.

Employment and Training Planners Meet

The EES hosted a meeting on February 14 of the Comprehensive Employment and Training Act Planning Committee. Governor Carter called the meeting which was held in the Baker Building.

The Governor asked Paul Hemmann, Executive Director of the State Manpower Planning Council, to conduct the meeting which was of a relatively technical nature. William C. Howard, manpower specialist of IDD was requested to help make recommendations and plan for implementation and operation of Georgia's programs under the Comprehensive Employment and Training Act (CETA) of 1973.

Representatives from some twenty other varied organizations such as the Georgia Municipal Association, City of Atlanta, City of Macon, Cobb County, Georgia Department of Labor, Office of Planning and Budget, AFL-CIO and the Georgia Business and Industry Association participated in the Planning Committee meeting.



Ray Hart and his 20 Kilovolt electron gun developed for NASA. It is used to process TV images from space vehicles.

R. K. Hart—Electron Optics Laboratory, ASD

Over the past year, and with considerable help from both ECOM and NASA contracts, we have established both the design capability and basic equipment necessary for a functional electron optics laboratory.

Currently, we have three electron gun systems, which produce electron beams in the energy range of 5 to 30 keV, and down to 100 Å in diameter. These electron sources are being used in systems for surface analysis and for studying the electro-optic effect in certain crystals.

The Wings Of Man

Dick Johnston, IDD, left March 26 on a five-week trip to visit four counterpart institutions in the Georgia Tech-Agency for International Development small-scale industry project. He will advise the counterparts in Nigeria (University of Ife), Kenya (Kenya Industrial Estates), Korea (Soong Jun University), and the Philippines (University of the Philippines) on improving their libraries of economic development resource material and expedite the interchange of information between them and Tech.

Ben James, IDD, will leave for Korea the last week in April for a two-month stay. He will assist Soong Jun University's Integrated Development Center in setting up an industrial extension service.

Ed Newkirk of the Accounting and Budget office will join the Office of Research Administration/GTRI on April 1 (no foolin'). While Ed will be missed by all at the Station, he will be responsible for the administration of grants and contracts for the General College, the Industrial Management College, the ASD of EES, and various centers.

PERSONALITY

Dr. Bob Ingols

Mr. Pollution Control

Dr. Robert S. Ingols, Principal Research Scientist, ASD, has been concerned about and working on water pollution before it became fashionable or under the auspices of the Environmental Protection Agency. Since working on his advanced degrees at Rutgers University 38 years ago, Dr. Ingols has completed basic research studies in water and sewage biochemistry. Other than teaching assignments at the University of Michigan and Tech, most of Dr. Ingols' professional life has been concerned with developing a basic understanding of the problems of control of pollution from waste water.

Dr. Ingols and his early colleagues were very careful to differentiate the extent of pollution control or waste water treatment required when the receiving stream was being used for a water supply or not. The public health aspects of water supply use demand a high degree of treatment while economics control the degradation of the esthetics. Today, all waste water discharges must receive the same high degree of treatment. The problem today, however, will be the cost of the required degree of treatment. In the case of the oceans, they have an almost limitless capacity to accept and treat pollution with time, but treating waste waters cleans up the oceans faster for use by people when and where they want to use them for recreation.

Dr. Ingols was brought to Tech as a worker on one of the first research grants given by the Federal government for environmental research. For many years since then, the Federal agencies supported basic research. Now the emphasis has shifted to sewage treatment plant construction while research must be sponsored by private sources, especially in the area of instrumentation. And, of course, like all government spending, research funds fluctuate as administrative philosophies go from intense interest to laissez-faire.

Dr. Ingols noted that he has seen major technological changes since he worked on his first contract. Some things known today were not even thought of then. He feels enough basic research has been done to improve waste water treatment, to answer specific questions and to direct developments of waste water treatment facilities.

The Newark, N. J., native's deep feelings about his work are evidenced by the enthusiastic brightness of his blue eyes and careful deliberation in answering questions. His only complaint is that "some aspects of this business are unesthetic." Such as the problems of doing something with the wastes gleaned from the waste water treatment processes. Some fully treated sludges are used for fertilizer along the interstate highways, some make golf course greens greener, some are burned and some are barged to sea. That last option is seldom utilized now, however.

Dr. Ingols has been in Atlanta since 1947. He taught 17 years at Tech and directed the School of Biology when it was formed in 1960. He has been full-time at EES since 1966. He is the recipient of an honorary degree from Bucknell, his undergraduate school, and in 1971 was named Mr. Pollution Control by the American Institute of Plant Engineers.

When he isn't finding new solutions for water pollution, Dr. Ingols and his wife Dorothy immerse themselves in working with young people. Dr. Ingols has taught a Sunday school "Career Adults" class for four years, and Mrs. Ingols has helped in the church nursery and with special girls groups. She also teaches at a nursery school during the week.

Dr. Ingols finds teaching young unmarrieds a challenge. "These people are looking for answers. Encouraging is that some young people are sufficiently motivated to find answers although their parents may not be around to force them to go to church. Many join us for awhile, then move on to other church groups. I think styles and mores should change with society and that we shouldn't balk at change. The 'Pill' has tremendously changed women's lives in our culture. Now they're free to enjoy life. And I think this is a healthy change."

In the rest of his free time, he enjoys reading and bridge, bowling and horseshoes, as well as seeing his two grandchildren. His younger daughter lives in Chicago where she teaches junior college. His daughter in Boston is a librarian. The Ingols have a son who is working with his first job in Charlotte after graduating from Georgia State.

Although he talks some about it, Dr. Ingols has not made firm retirement plans. He feels they have done enough traveling, so he would like to settle either here or in Florida. His love of his work also has him considering opening up his own consulting business.

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Two Wood Products Studies Issued

Tze I. Chiang recently added two more reports to the nearly two dozen wood products studies he has done since he came to IDD in 1958. *A New Look at Manufacturing Southern Pine Plywood in Oglethorpe County, Georgia* was prepared for the Georgia Department of Community Development, which is negotiating with Norcem, the largest building products manufacturer in Norway, to build a pine plywood plant near Crawford and Lexington, Georgia. The proposed $6 million plant would employ 180 workers and produce 90 million square feet a year, approximately 50% for European consumption.

Opportunities for Timber-Based Industries in Greene County, Alabama was funded by the U.S. Economic Development Administration and the Greene County Economic Development Commission. The study analyzes timber resources in Greene County and a six-county area, reviews the demand for and supply of timber and wood products in Greene County and the six-county area, and identifies the wood products with the best potential for manufacturing in Greene County. Yet to be funded is an in-depth study of the feasibility of manufacturing the eight identified products. These products are grouped in four potential manufacturing enterprises: a hardwood processing center, a Chip-N-Saw (lumber and wood chips) operation, a southern pine plywood plant, and a wood manufacturing complex that would incorporate several of these products.