

# the GTRI connector

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Volume 1 Number 6

April 1985

## Elfe Works on Electric Power System for Space Station

Tom Elfe of the Energy and Materials Sciences Laboratory (EMSL) is helping to design an electric power system for the NASA space station.

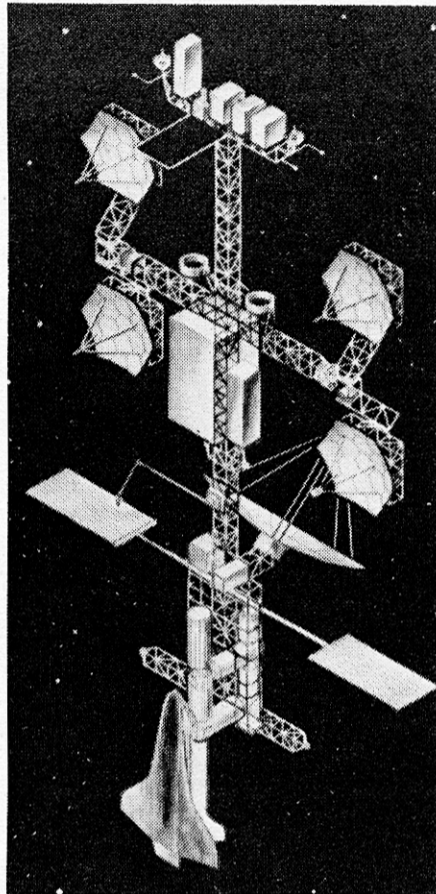
Working under a subcontract to the Rocketdyne Division of Rockwell International, Elfe is assisting in the preliminary design of a solar dynamic system involving large dish solar collectors. Sunlight captured by the solar collectors will heat a fluid or gas to drive a heat engine/generator combination that will generate electricity to power the space station.

Elfe will analyze, via computer modeling, the optical properties of various parabolic dish concentrator designs. "The size of the concentrator will be determined by the amount of electric power that each module will be required to deliver to run the space station," Elfe said. "Four modules, one of which may be a backup, are presently planned. Each probably will be capable of producing no less than 25 kilowatts for a station requiring a total of 75 to 100 kilowatts initially. In that case, each concentrator probably will be about 15 to 20 meters in diameter."

Both Rockwell and TRW Federal Systems Division are competing under contract to the NASA Lewis Research Center to assess various electrical power options, including photovoltaic arrays and solar dynamic systems. If the Rockwell solar thermal design wins, Elfe anticipates EMSL involvement in some follow-on work, expanding into testing and other types of analysis.

Photovoltaics is the technology currently used for solar power in space. The panels are lightweight and simple to operate. But solar cells are very inefficient, so a huge array would be required to produce 100 kWe.

Solar dynamic systems are much more efficient and can produce the same amount of electricity with a much smaller surface area. In fact, NASA ex-



Courtesy Rocketdyne Div./Rockwell

This Rocketdyne drawing shows how the space station might look with a solar dynamic power system. The truss structure would be about 450 feet long. Each solar collector dish would be about 60 feet in diameter, and the solar receiver at the focal point would be 8 feet long.

perts estimate that a power generation/energy storage system using solar thermal collectors would be three to five times as efficient as one using photovoltaic cells. Thus, their use in a space vehicle would cause less "drag" and less orbit decay.

But solar collectors have certain inherent disadvantages. They are heavier than photovoltaic arrays. They also are not quite as reliable because they have moving parts and operate at high temperatures. Consequently, they have never been used in space before.

The new program will be taking expertise acquired in the Department of Energy (DOE) terrestrial solar collector program and applying the same technology to space. EMSL engineers recently helped DOE contractors in the development of a parabolic dish solar collector utilizing a Stirling heat engine to drive an electrical generator. Elfe and others performed the optical design and analysis, as well as the structural analysis, on the solar concentrator.

## TAL Disbands Personnel Join Other Labs

The Georgia Tech Research Institute is realigning some of its research activities. As a result of GTRI's long-range planning study, the Technology Application Laboratory (TAL) has disbanded, and its staff and programs have been administratively transferred to other laboratories. According to GTRI Associate Director Robert G. Shackelford, it was decided that the best option to build effectively on TAL's sponsored program base was to realign the TAL branch-level operations with complementary counterparts in other GTRI laboratories.

"This should provide the best potential for improving the working environment, encouraging program growth and vitality, accelerating team building, and providing opportunities for professional career advancement," Shackelford said. "For example, TAL's Industrial Systems Branch is joining with the Computer Technology and Applications Division of the Electronics and Computer Systems Lab (ECSL) to form a critical mass in the area of manufacturing technology. This is the first stage of a planned major thrust in GTRI in manufacturing technology."

Dispersal of the TAL units and personnel began on March 18 and was completed on April 2. In addition to the transfer to ECSL mentioned above, other assignments are as follows:

The Economic Development Lab (EDL) received five units:

- The Agricultural Technology Branch, which serves the state's poultry industry, went to EDL's Environmental

Health and Safety Division. This will allow the group to pursue environmental engineering issues in a supportive research setting. Craig Wyvill continues as branch head.

- EDL's Industrial Extension Division is incorporating three TAL units that perform extension services to Georgia industries—the Energy Conservation Branch, the Technology Transfer Branch, and the Industrial Education Department. The Energy Conservation Branch, renamed the Industrial Energy Group, will be the nucleus of an evolving productivity program thrust. John Adams has been appointed group leader. Ben Roberson continues to lead the Industrial Education Group.

- The International Programs Division was transferred to EDL for administrative support in developing a long-term program plan. EDL Director David Clifton is acting manager.

Tom McGowan and programs in the Energy Technology Branch were transferred to the Energy Conversion Division of the Energy and Materials Sciences Lab (EMSL), combining the biomass program efforts of these two groups. Walter ("Bo") Hendrix has joined EMSL's Thermal Sciences Division, where he will continue his work on heat pipe technology and contribute to divisional defense programs.

TAL programs relating to the Material Handling Research Center have been transferred to the Electromagnetics Lab (EML). The initial assignment is to the Industrial Sensors Program Office.

## Curtis Safely Home from Sudan

"It was the greatest relief of my life," Grant Curtis said, "when I realized that my plane was safely in the air over Sudan and on its way to London." Curtis had spent a tense 10 days in Khartoum during the recent consumer riots and military coup.

Curtis and Don Peterson, GTRI's resident chief-of-party for the Sudan Renewable Energy Project, spent three days without electricity, water, transportation or communications services during the general strike. With the military takeover on April 6, order was

restored, but the airport was closed. Curtis managed to take the first flight out when the airport reopened on April 13, arriving in Atlanta the next day.

Curtis had been in Sudan since March 13, adapting a technique that he has invented to make charcoal briquettes. Charcoal is the standard household fuel in Sudan, and the country has been all but denuded of trees to supply the demand. Using natural binders made with materials that are readily available in Sudan, Curtis fashion-

See "Sudan," page 3

## Legislature Votes \$631,696 in Additional Funds for GTRI

The Georgia legislature in mid-March passed a budget that included \$631,696 in additional monies for GTRI in FY 1986, and Governor Harris signed the bill in mid-April.

The Economic Development Lab (EDL) will receive \$300,000 to add one full-time engineer and one half-time co-op student to several of the more active field offices as a first step in expanding them into Georgia Technology Centers. The enlarged staff will be able to provide technical assistance to more industries, give greater technical support to local economic development groups, and offer expanded extension education opportunities to local industries.

This is the second year in a row that the legislature has voted to expand GTRI's industrial extension service. In 1984, they appropriated \$320,000 to open four new field offices, bringing the total to 12.

Another \$200,000 will go to EDL to add several new positions and operating expenses to conduct additional economic development research studies. The money will be used to analyze each region in Georgia to determine its comparative advantages; identify at least four significant new industrial opportunities for the state; and perform detailed industry feasibility studies to help identify industrial prospects. At least four studies will

be undertaken to stimulate utilization of the state's natural and man-made resources.

The Agricultural Technology Branch of EDL is slated for \$131,696 to accelerate its research on applying microprocessor technology to help the poultry farmer control costs, improve product quality, forecast output, and anticipate conditions that negatively impact production. The package includes \$71,696 to add one professional plus support staff and \$60,000 for equipment.

The legislature also authorized the issuance of up to \$15 million in five-year bonds to expand the Microelectronics Research Center. About \$5 million is planned for a new

building and \$10 million for equipment. However, Georgia Tech must match the funds dollar-for-dollar from "non-state" sources, such as industry and foundations. Although the center is a separate entity, GTRI's capabilities will be greatly enhanced by the facilities and equipment made available when the center is built.

Thanks go to Governor Joe Frank Harris for proposing these improvements and to the legislature for passing them. The additional funding for the Microelectronics Center, in particular, came about at the Governor's initiative and because of his high interest in this matter.



Harold Bassett (left) and Ray Moore view the photographic display at the Design Services Group's open house at the Cobb County Research Facility.

### STL Group Serves All of GTRI

## Design Services Available

The Design Services Group (DSG) of the Systems and Techniques Laboratory held an open house on April 1 at the Cobb County Research Facility following the senior staff and lab directors' meetings. On display in the lobby of Building 1 were samples of the group's capabilities, including map enhancements, enlargement and reduction of photos and artwork, photo mylar drawings, airbrush artwork, and

computer-aided design services.

DSG consists of three research personnel and 12 technicians, drafters, photographers and illustrators. The group provides photographic support, proposal and report illustration, reprographics, and electronics and mechanical design and drafting.

For additional information on DSG's capabilities, contact Bill Leverett at 424-9677.

## Alumni "Perks" Available to Tech Staff, Too

The next time you get *Tech Topics*, the Alumni Association tabloid, read the ads carefully. You'll discover some discounts and special services that are available not only to Tech alumni, but also to the entire Georgia Tech community.

Consider the following offers in the April-May issue:

Are Cousin Horace, his wife and two children coming to town for a basketball game or Centennial event? They can stay (one to four to a room) at special "Yellow Jacket" rates at the following hotels: Radisson Inn, Days Inn, Ramada Inn Central, and Hyatt Regency.

If they're flying into Atlanta (or if you're flying out of Atlanta), call Delta Air Lines. Their full-page ad lists a special telephone number and a special code to cite in order to get V.I.P. reservation treatment. You don't get extra discounts on individual travel, but you don't have to wait for busy reservationists to get to you,

and you are served by personnel with at least 15 years experience. And if you have 10 or more people going to the same event, you may get a discount off regular coach fares—the equivalent of a Super Saver rate without restrictions (must be coordinated through Alumni Marketing Director John Carter).

Are you recruiting a new employee from out of town? While you're talking to the prospect, let a local realtor cleared by the Alumni Office show the spouse what kind of living conditions they can look forward to if they move to Atlanta. And once the deal is clinched, the realtor will provide relocation assistance through special agents who have been briefed on the requirements of GIT and GTRI employees. They will provide comprehensive information on the entire metro area — neighborhoods, schools, taxes, etc.

These and other "specials" have been arranged by John B.

Carter, Jr., director of marketing for the Georgia Tech Alumni Association. "Essentially what we ask corporations to do is to become official sponsors of our alumni publications," Carter said. "The services and discounts vary, depending on the sponsor's products and services provided. Each sponsor is under contract for a 12-month period.

"In the relocation line, we are negotiating now with a local financial institution for services that will enable a new employee to have a checking account and established credit before he/she gets here," Carter added. "We are investigating offering employment services for the spouse of a new employee, too.

"Occasionally we offer discounts on car rental. And we are looking into the area of fleet rates on leased cars for personal use. Other possible future offerings are referrals to financial planners, attorneys and CPAs. GTRI staff should

read *Tech Topics* to learn about new services as they become available."

For those who like to travel, the Alumni Association offers top-quality guided tours not available on the commercial market. These tours are planned and conducted by three tour operators who were carefully chosen for their past experience and professionalism. The seven tours planned for 1985 range in length from seven to 13 days and in price from \$1399 to \$4610. Six of them include cruises. Five of them are international; two, U.S. only.

Tech employees and their spouses also are eligible for cheap group term life insurance through the Alumni Association. It is available in amounts up to \$200,000. In addition, the Tech community is invited to continuing education programs offered by the Association.

Want more information? Call John Carter at ext. 2391.

## Congress Hears TAAC Testimony

Representatives of the Southeastern Trade Adjustment Assistance Center (SETAAC) at Georgia Tech testified before a Congressional subcommittee on April 6. Members of the House Ways and Means Subcommittee on Trade came to Atlanta to examine the TAAC program, which is designed to assist U.S. firms hurt by foreign imports.

The program, which supports a national network of TAAC centers, is funded only through August of this year. The subcommittee is looking into the advisability of extending the 1974 Trade Act, which authorized the program.

SETAAC Director Bob Springfield pointed out that the nation is undergoing a period of plant closures and record trade deficits. "Against that

backdrop," he said, "SETAAC helped some 50 regional firms that were showing declines in employment, sales or production regain their competitive positions during 1984-85."

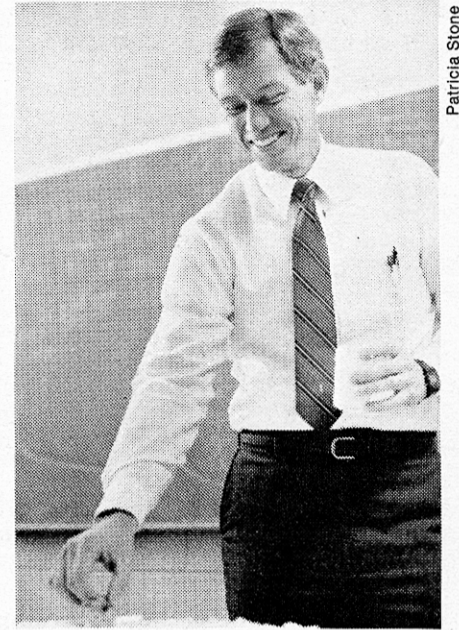
The subcommittee also heard testimony by spokesmen from companies and trade associations in the region. They represented industries assisted by the program, such as apparel, textile machinery, and furniture. Representatives Ed Jenkins (Georgia), Donald Pease (Ohio), and Sam Gibbons (Florida) conducted the hearing.

SETAAC staffers have held briefings for Congressional aides in Atlanta and Nashville over the past several months to heighten Congressional awareness of the benefits of the TAAC program.

## Walter Cox Heads EML

Walter Cox has been appointed director of the Electromagnetics Laboratory (EML) after a nationwide search. He has been acting director since Bob Shackelford's elevation to GTRI associate director last September.

Dr. Cox has been at EES/GTRI for 12 years. He has been chief of EML's Physical Sciences Division since 1975 and associate director of EML since 1982. As division chief, he has managed a staff engaged in basic and applied research in solid-state materials, devices and components; molecular sciences and crystal physics. His particular fields of expertise are microwave and millimeter wave solid-state sources and amplifiers, semiconductor materials and devices, molecular beam epitaxy, millimeter mixer diodes, and gallium arsenide integrated circuits. He has been heavily involved in the work of the Microelectronics Center at Georgia Tech.



Patricia Stone

Walter Cox enjoys his cake at the party the EML staff gave for him in honor of his appointment as laboratory director.

Dr. Cox received his bachelor's, master's and doctoral degrees in electrical engineering from Georgia Tech. He was an assistant professor of electrical engineering for two years. He then worked at Sperry Rand for four years before joining the EES staff in 1973. He is the author or coauthor of 29 major publications.



MEMORY LANE: Dedication of the Harry L. Baker Building on September 29, 1973. Mrs. Baker and family are seated on the front row.

### Sudan (from page 1)

ed briquettes from charcoal "fines" that are ordinarily wasted. He experimented with different formulations, arriving at one that duplicates the characteristics of conventional charcoal. Now the Sudanese will build a small pilot plant to produce briquettes for field testing by consumers.

Curtis says they also are looking into the possibility of using cotton stalks to make charcoal. Sudan grows large quantities of cotton, and the leftover stalks would be more than enough to supply all their charcoal needs. The stalks would be reduced to charcoal powder, which could then be compressed into briquettes, thus saving Sudan's precious trees.

## PROFESSIONAL ACTIVITIES

**ECONOMIC DEVELOPMENT LAB**  
Phil Williams conducted a campus-based course on industrial toxicology March 26-28. Twenty professionals from across the country participated.

John Nemeth has been appointed vice chairman of the Forest Biology Committee of the Technical Association of the Pulp and Paper Industry (TAPPI). He has been asked to make a presentation on Georgia Tech's Small Quantity Generator Hazardous Waste Program at an upcoming workshop hosted by North Carolina's Pollution Prevention Pays program.

Paul Middendorf has been chosen president-elect and Bill Ewing secretary of the Georgia section of the American Industrial Hygiene Association.

Two EDL staffers found themselves in the media spotlight in March. William Spain was interviewed by the *Wall Street Journal* and quoted in *Chemical & Engineering News* regarding asbestos abatement. Ed Bethea was interviewed by Boston-based *Inc.* magazine concerning minority entrepreneurship.

**ELECTROMAGNETICS LAB**  
Chris Summers gave a presentation entitled "Photoluminescence Properties of CdTe Layers Grown by Molecular Beam Epitaxy" at the

American Physical Society Meeting in Baltimore, MD, March 25-29. Coauthors were Earl Meeks, Henry Zenie, and Charles Bryant.

### ELECTRONICS & COMPUTER SYSTEMS LAB

Congratulations to Dave Millard, who has been awarded a GTRC fellowship stipend for the next year to work full time on his doctoral dissertation. His topic is "Electromagnetic Pulse Excitation of Interconnected Power Systems."

### ENERGY & MATERIALS SCIENCES LAB

Stuart McLemore presented an invited paper, coauthored with Kathryn Logan, at the meeting of the Southeastern Section of the American Ceramic Society on March 23 in Asheville, NC. It was entitled "Use of a Thermite Reaction to Synthesize Refractory Materials."

At the National Association of Corrosion Engineers meeting in Boston on March 25-29, Garth Freeman presented a paper on "Surface Evolution of Austenitic Stainless Steels in Coal Liquids Containing Chlorides."

### SYSTEMS ENGINEERING LAB

In March, Richard Ingle presented a slide-talk on the space shuttle program to the West Georgia Purchasing Management Association.



## Software Review

by Pat Mathiasmeier

The Research Software Training Facility staff have moved into their new offices in the basement of the Centennial Research Building (CRB) and are offering a wide range of classes. Classes available at RSTF include:

- Beginning and Advanced DOS
- Beginning and Advanced Lotus 1-2-3
- Beginning and Advanced dBASE II
- PROFS—Beginning, Advanced, Document Processing, Scheduling Symphony
- LISP
- Wordstar
- Volkswriter
- Personal Editor
- "C" Programming Language
- Basics of Computer Literacy
- GTIMS

During the next few months, we will describe several of the classes in each issue of *The Connector*. The schedule of RSTF classes is

available on PROFS. Persons interested in signing up for a class should call ext. 6206.

### Beginning and Advanced DOS

The DOS classes take a beginner from turning on the IBM microcomputer to full usage of the operating system. The novice user will learn essential operations such as formatting diskettes and copying files. Those with a moderate level of experience will find a wide range of techniques, including memory management and tree-structured directories. Advanced users can tailor their system to best match their work-style.

### Beginning Lotus 1-2-3

The beginning course provides practical experience in the three major environments of Lotus 1-2-3: electronic worksheets, the database manager, and the graphics generator. Emphasis is on using the locational keys on the keyboard and setting up numeric analyses on the spreadsheet for maximum efficiency.

### Advanced Lotus 1-2-3

Advanced 1-2-3 concentrates on macros, macro-menus, and multiple-linked worksheets. These techniques permit complete automation of key tasks performed within one or more worksheets. This class is designed for experienced 1-2-3 users with at least 20 hours of personal time in the spread-sheet environment.

## PERSONNEL NEWS

### ECONOMIC DEVELOPMENT LAB

**Jim Mann** has joined the Environmental Health & Safety Division as a research scientist. He formerly was an industrial hygienist with Morton Thiokol. A hazardous waste specialist, he holds a master's degree in Public Health from the University of North Carolina.

EDL welcomed the following groups from the Technology Applications Lab in March: Forming the Industrial Energy Group are research engineers **John Adams, Michael Brown, Doug Moore, and Lamar Griffin**, and senior secretary **Marguerite Osborne**. Now forming the Agricultural Technology Branch are research engineers **Craig Wyvill, Ralph Lamade, Wayne Daley, Constantin Soulakos, Michael Smith, Charles Ross, and Wiley Holcombe**; research scientist **Edd Valentine**; and research associate **Nancy Davis**. Research engineer **Carol Aton** and research associate **Claudia Huff** have been assigned to EDL's Industrial Extension Division. **Deborah Lockman** is now a staff assistant in IED's Productivity Technology Branch.

**Frank Brown** left the Business Development Division in March.

### ELECTRONICS & COMPUTER SYSTEMS LAB

**Jack C. Wallace** has joined the Command & Control Division as a

research scientist I. He will be working in the areas of C<sup>2</sup> analysis/simulation and battle management decision aids. He has his master's in Computer Science from Virginia Polytechnic Institute.

Former student employee **Margaret Matheny** has joined the CCD professional staff as a research scientist I following the completion of her B.S. in Information and Computer Science from Georgia Tech in March.

The Computer Technology & Applications Division welcomes senior research scientist **Linda Martinson**. She has 12 years of corporate, consulting and university experience in computer applications, electric utility planning, economic evaluation, forecasting and statistical analysis. She was a senior power supply analyst at the Georgia Power Company and a principal research scientist at Battelle Laboratories. Linda holds M.S. and Ph.D. degrees in Experimental Statistics from Stanford University.

### RADAR & INSTRUMENTATION LAB

**Molly Gary** is changing to a full-time position in April. She is a research scientist I.

### SERVICE GROUPS

**Accounting:** **Carol Hogan** has been promoted to accounting assistant.

**Machine Shop:** **Martin Harmon** has been promoted to accounting

assistant, and **Ned West** to mechanical technician II.

**Personnel Services:** New employees are **Debee Avery**, personnel assistant I (has been hourly as needed), and **Dennis Wanless**, clerk I. Both formerly worked for Physical Plant. **Cynthia Rogers** has transferred to the Systems Engineering Lab.

**Supply Services:** Welcome to **Erma Johnson**, clerk-typist II, and **LaVerne Spearman**, accounting assistant.

### SYSTEMS & TECHNIQUES LAB

**Nicholas A. (Tony) Clarke** has been promoted to mechanical technician III. His responsibilities in the Design Services Group are to design, supervise and instruct in the layout and documentation of mechanical assemblies.

**Katheryn F. (Kay) Lindsey** has been promoted to photographic supervisor of Design Services Photographic. A graduate of Georgia State University, she has been employed by GTRI for four years as a drafter and photographer.

Defense Electronics Division (DED) employees **Andrew LiCausi** and **Jonathan Hoffmeister** have been promoted to electronics technicians III. Andy joined GTRI in 1980 to design and lay out high density printed circuit boards to military standards, to design and fabricate chassis, and to perform circuit testing. Jon joined GTRI in 1979, and has served as Task

leader on two special-purpose printed wiring board electronics programs.



DED welcomes former co-op **Robert L. Howard** to its professional staff as a research engineer I. Robert was graduated

from Georgia Tech in March with a B.E.E. degree and has been accepted for graduate work in Electrical Engineering. During his employment as a co-op, he worked on several major research programs and made significant technical contributions to the efforts in STL. He developed a modular RF assembly and solved several electronic density problems on the SADS VIII program. He also developed a complex software program on computer-aided techniques for phased array geometries under study in STL. Robert received one of the 1984 GTRI awards for "Outstanding Performance as an Undergraduate Student Employee."

**William F. Duke** has resigned from the Microwave Systems Division.

### SYSTEMS ENGINEERING LAB

**Neil Hilsen** has returned to SEL and is working in the Electronic Support Measures Division.



The Tech-TAAC-Toes running team model their T-shirts. From left to right: Charles France, Rita Warwick, Dave Marsh, and Art Brown. Charles Estes was absent.

## PERSONAL NOTES

### ECONOMIC DEVELOPMENT LAB

Five EDL staffers participated in the annual Heart Trek, a 10K run through downtown Atlanta, on March 30. Representing the Trade Adjustment Assistance Center, **Charles Estes, Dave Marsh, Rita Warwick, Charles France, and Art Brown** ran as a team—the Tech

TAAC Toes—with T-shirts to prove it. Fees from the popular run benefit the Heart Association. All five finished the course, but no finish times were given.

### RADAR & INSTRUMENTATION LAB

**Carol York** had a baby girl weighing 7½ pounds on April 1.

## WHAT'S AHEAD

### Events of Interest to GTRI Employees

#### MAY

- 8-10 Continuing Education Course, "Artificial Intelligence and Expert Systems." Academic Instructor and Administrator: John Gilmore (EML).
- 13-14 Continuing Education Course, "Remote Sensing of the Earth and Atmosphere." Faculty includes personnel from NASA, the schools of Geophysical Sciences and Electrical Engineering, and Nick Faust and Jim Gallagher from EML.
- 15 IEES Workshop, "Energy Measurement Instrumentation and Techniques." Location: Harvest House Hotel, Atlanta.
- 21-23 Continuing Education Course, "Fundamentals of Electronic Defense." Academic Administrators: Robert P. Zimmer and Thomas M. Miller (SEL). Security clearance required for all attendees.
- 23 Dedication of the Centennial Research Building. (Note change in date.)
- 26-31 American Association for the Advancement of Science Annual Meeting, "Science and Engineering: Diversity and Convergence." Location: Los Angeles. To feature 160+ symposia, 9 public lectures, science film festival, exhibit.

#### JUNE

- 16-20 American Society for Engineering Education Annual Conference, "Computer-Aided Engineering." Host: Georgia Tech. Location: Atlanta Hilton and Towers.

Note: This column will list seminars, short courses, meetings, conferences, and other events to which GTRI staff are invited or which are of general interest. To have your special event included, send details to Connector Calendar, RCO-GTRI, Campus. Requests should be sent at least one month in advance, since *The Connector* is a monthly publication.

## HELP YOURSELF!

### Training Programs for GTRI Employees

#### Software Training

- Computer Literacy (9-12): May 1, 29.
- Beginning DOS (1:30-4:30): May 2, 21; (9-12): May 13.
- Advanced DOS (1:30-4:30): May 9, 30.
- GTIMS (9-4:30): May 3.
- Beginning PROFS (10-12 or 2-4): May 10.
- Advanced PROFS (10-12 or 2-4): May 31.
- PROFS Scheduling (10-12 or 2-4): May 17.
- PROFS Document Processing (10-12 or 2-4): May 24.
- Beginning dBASE II (9-4:30): May 20.
- Advanced dBase II (9-4:30): May 28.

Lotus 1-2-3 (9-4:30): May 27.

Symphony (9-4:30): May 22-23.

LISP (9-4:30): May 6-8.

Volkswriter: (9-12): May 14.

Wordstar (9-12): May 30.

To register, call Research Software Training Facility, ext. 6206.

#### Staff Development

**Strategies for Winning Worthwhile Research Projects.** May 14.

The above seminar, designed for research staff, is free and taught by GTRI personnel. Persons completing it earn .6 CEU. For more information, call Bob Collier, ext. 6238.

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