

The GTRI Connector

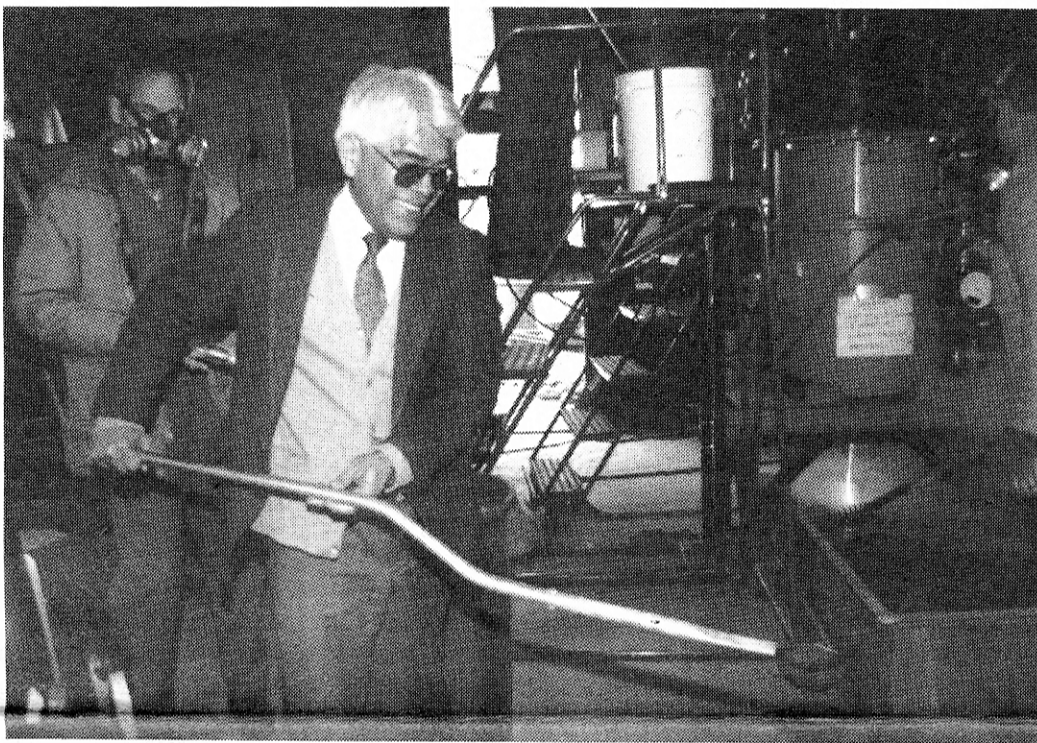
Secrets to success

- It takes as much courage to have tried and failed as it does to have tried and succeeded.
— Anne Morrow Lindbergh
- Those who fail in life often pursue the path of least persistence.
— Anonymous
- Nobody can make you feel inferior without your consent.
— Eleanor Roosevelt

Vol. 9 • No. 5

Published Monthly for the Georgia Tech Research Institute Family

March 1993



Clinton's Federal Budget Plan: How Will It Affect GTRI?

By Lea McLees, RCO

The arrival of the first Democratic administration in Washington, D.C. in 12 years means a myriad of changes in many aspects of government spending. Some GTRI folks took time this month to comment on the initial budget ideas President Bill Clinton shared with the nation in a mid-February speech, and what these plans may mean for GTRI.

Clinton and Vice President Al Gore's inter-

est in the environment might create opportunities for research institutions once funding plans are set, said John Nemeth, director of the Environmental Science and Technology Laboratory. Clinton's plan includes a spending increase of about \$8 billion on environmental technology, clean water, protecting natural resources, and forestry between 1994 and 1997.

"Whether there is going to be a traditional sort of infrastructure to adequately support research needs, and how that is going to happen in the context of the budget cuts, is not clear," Nemeth said. "The Clinton administration may look more strongly toward university/government/industry partnerships like the Georgia Research Alliance and the Georgia Environmental Technology Consortium."

Continued on page 3

Defense Conversion Group Formed

GTRI's Office of the Director (OOD) is coordinating a newly formed Defense Conversion Working Group at Georgia Tech.

This group will be the focal point in Georgia Tech's efforts to obtain funds from the \$1.5 billion identified by Congress for programs related to defense conversion, reinvestment, and transition assistance.

Explaining the need for this group, GTRI Director Admiral Richard H. Truly said that "most industrial concerns having significant defense business are rapidly investigating conversion."

Jim Cofer, a principal research engineer in OOD, will lead this 10-member panel. Other members include: Ron Bohlander, a principal research scientist in OOD; Randy Case, director of CSFTL; David Clifton, director of economic development and technology transfer in GTRI; John Copeland, a chaired professor of technology transfer; Lanny Feorene, director of Tech's Office of Technology Integration; Bob Fulton, professor of mechanical engineering; Mike Kelly, director of the Manufacturing Research Center; Leon McGinnis, director of the CIMS program; and Dick Higgins, director of the Microelectronics Research Center.

The working group will: coordinate pursuit of new conversion opportunities; serve as a clearinghouse for conversion information; assemble a "capabilities base" to facilitate rapid proposal response; recommend strategic alliances with industry, government, academia, and other organizations; leverage the combined strengths of all teams seeking defense conversion funding; bring in external resource speakers; and carry out other appropriate activities in the defense conversion area.

ESTL's Russell Ray, back left, and Bob Newsom, back right, monitor the performance of the plasma torch in Area 2. The torch's developer, Dr. Salvador "Bud" Comacho, center, displays the molten end product of exposing incinerator ash to the torch. Research efforts with potential environmental applications could benefit from President Clinton's budget proposals. (Photo by Rae Adams)

Observed & Noted

THE GTRI CONNECTOR is now being produced in electronic as well as hard-copy form. *Read about how to access the publication electronically on page 2.*

GTRI research contract awards showed strength again in February. *Executive Associate Director Robert*

Shackelford comments on the trends in a story on page 2.

GTRI's investments in semiconductor materials research are creating a combination of skills that few other U.S. universities can match. *The story appears on page 3.*

At the end of March, former GTRI Director Don Grace retires. *A profile of Grace appears on page 4.*

Retiring GTRI Associate Director Jerry Carey reflects on some of the new challenges facing GTRI and America in the near future.

This story can be found on page 5.

On February 23, Tech student Jay Nemeth became GTRI director for the day, while Admiral Richard Truly got some new experience as a student. *See page 6.*

GTRI researchers often receive com-

pliments about their work from sponsors and other observers. *Two recent commendations appear on page 6.*

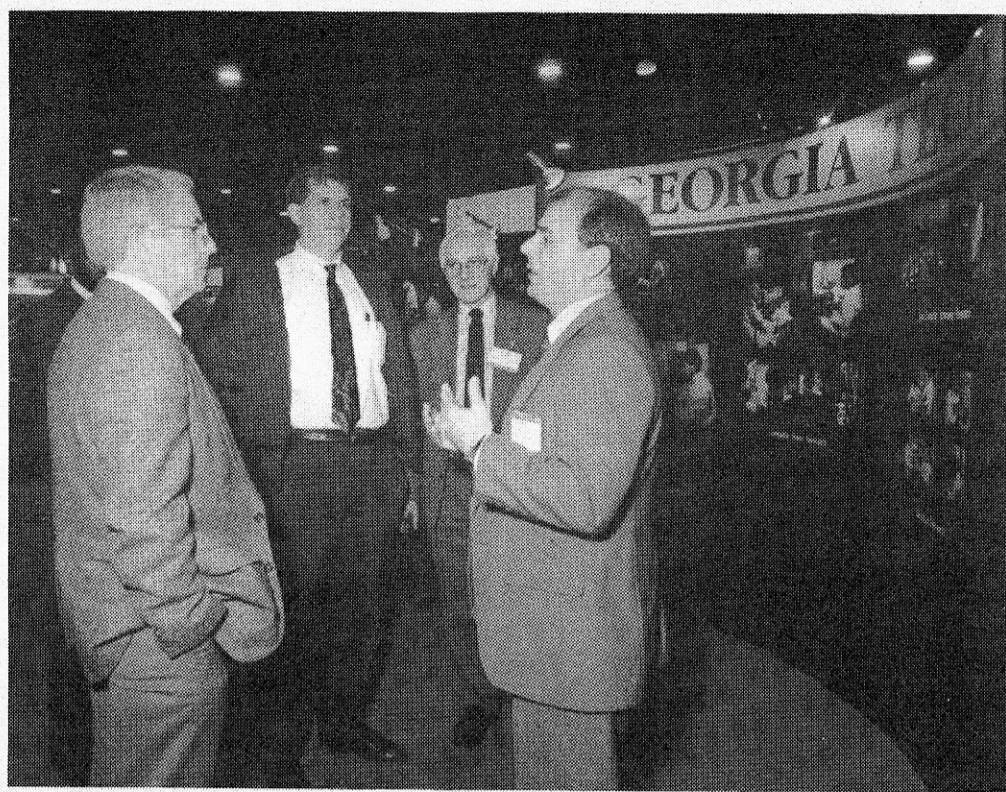
April promises to be a busy time at GTRI and Georgia Tech. *See the Calendar of Events on page 7 to find out more about what's*

happening on the Tech campus.

Finally, mark this date on your calendars! On May 19, GTRI will celebrate the coming of warm weather with its annual Spring Fling Picnic from 11 a.m. to 2 p.m. at Tech's Burger Bowl. *See you there!*

**News
&
Notes**

At right, Craig Wyvill, director of Agricultural Technology Research Programs, discusses his group's ongoing projects while manning a booth at the International Poultry Show in February. Listening attentively are Admiral Richard H. Truly, Chief Scientist and Associate Director Devon Crowe, and ESTL Director John Nemeth. (Photo by Rae Adams)



22,000 View GTRI Poultry Exhibit

By Craig Wyvill, EOPSL

More than 22,000 visitors to Atlanta recently had a chance to learn about the work of GTRI's Agricultural Technology Research Program (ATRP). GTRI participants set up a booth at the 1993 International Poultry Trade Show, held January 20 through 22 at the World Congress Center here in Atlanta. That show is the largest exhibition of poultry industry automation technology and support services; it featured more than 900 exhibits this year. ATRP's booth featured photographs and

videotapes of ongoing research in robotics, computer vision, sensors, ergonomics, and environmental studies for the poultry and food processing industries. Also included was a replica of the Tech Tower containing a menu-selectable computer video and sound program, which explained ATRP's research activities. A working exhibit showed off ATRP's computer based Ergonomic Work Assessment System (EWAS).

ATRP has supported the poultry industry since 1973, working in cooperation with the Georgia Poultry Federation and receiving funding from the Georgia Legislature.

**Atlanta IEEE AESS:
GTRI Contributes to 10
Years of Excellence**

By Andre Lovas, TSDL

The Atlanta Chapter of the Institute of Electrical and Electronics Engineers Aerospace Electronic Systems Society (IEEE AESS) celebrated its 10th anniversary recently at one of its technical programs. The event was celebrated by recognizing past chapter chairmen. Six of eight past chairmen were present, all GTRI employees. The chapter was privileged to have AESS Executive Vice President Ed Reedy (OOD) in attendance. The technical program, "Space-Time Adaptive Processing for Airborne Surveillance Radar," was given by Dan Fitch of Sensis Corporation.

The Atlanta Chapter has enjoyed many years of activity thanks to the dedication of its past chairmen. Currently serving as officers are Andre Lovas (TSDL), chairman; David Flowers (CMDL), vice chairman; Linda Harkness (RSAL), secretary; and Whit Smith (EE), treasurer.

Past chairmen of the Atlanta IEEE Chapter of the Aerospace and Electronic Systems Society include:

- Neaf Alexander 1982-1983
- Nick Currie 1983-1984
- Bill Holm 1984-1986

- Bob Trebits 1986-1988
- Jim Kurtz 1988-1989
- Sam Piper 1989-1990
- Guy Morris 1990-1991
- Joe Bruder 1991-1992

A full slate of programs was scheduled for the 1992-1993 year. Topics addressed thus far include:

- F-22 Integrated Avionics, presented by Tom McDermott of Lockheed Aeronautical Systems Company;
- Technology Applications Against Terrorism, presented by Wg. Cdr. Bruce Burman, RAF/UK;
- Spaceborne Sensor Systems, presented by S. Hovanessian, IEEE AESS Distinguished Speaker;
- Joint U.S./Russian Radar Ventures, presented by Larry Corey, GTRI (MATD);
- Wavelets for Sensor Signal Processing, presented by Jeff Holder, GTRI (MAL); and,
- Radiometric Imaging Systems and Applications, presented by Paul Goldsmith, IEEE APS Distinguished Speaker.

The April 5 program topic will be Advances in Adaptive Antenna Systems, presented by William Gabriel, NRL, Retired.

There is no charge for attending the meetings. Students and non-members are welcome. For more information on chapter activities, please call Andre Lovas (404) 528-7109 or David Flowers (404) 894-7195.

**February awards
performance
'very strong'**

By Mark Hodges, RCO

GTRI's awards performance was "very strong" during February, according to Executive Associate Director Robert G. Shackelford.

In a report at the GTRI Senior Staff meeting March 1, Shackelford said that awards were \$2.7 million higher for this February than for the same month a year ago. In addition, he said, awards for the fiscal year through February totalled \$57.4 million—some \$4.3 million higher than they were at the same point in FY 92.

It is still too early to predict what GTRI's awards total will be at year's end, Shackelford said. However, he added that if awards for each remaining month in FY 93 average about the same as those for January and February, this year's annual awards will total approximately \$85 million to \$90 million. That would represent a substantial increase over the \$75 million in awards that GTRI received in FY 92.

Georgia Tech also had a good month for research awards, Shackelford said, with Resident Instruction finishing \$1.7 million ahead of its February 1992 pace. For the fiscal year through February, Georgia Tech has received approximately \$7 million more in total research awards than during the same period of FY 92.

On other financial issues, Shackelford told the Senior Staff that GTRI research expenditures are about the same for the year to date as they were in the July to February period of FY 92.

He added that staff coverage problems continue in some GTRI labs but that these difficulties were largely accountable to "mismatches" between unit work needs and individual skills.

Connector Goes On-Line!

THE GTRI CONNECTOR has begun publishing an electronic edition. "Hard-copy" editions of The Connector will continue to appear, but all stories in each issue will also appear on Georgia Tech's Gopher server in the "Research Communications" directory.

THE CONNECTOR isn't the only RCO publication accessible through the Gopher server. RESEARCH HORIZONS magazine, many RCO news releases, and other research information resources will also be published electronically.

All of these articles can either be read on computer screens or downloaded in hard-copy form with appropriate software.

Readers can call up the main menu of Research Communications directory in two ways:

- PRISM users can type the word *research* at the standard Hydra prompt.

- Other users will need to acquire software on the campus FTP server, "ftp.gatech.edu," which is located in the /pub/inforsevice/gopher directory. The software for PC users is called "pcg2 105.zip". Software for Macintosh users is called "Turbo Gopher". Software for accessing the Gopher server from several other computer types is also available. After copying the appropriate program, readers can follow the instructions in "read me" files.

For assistance in accessing this directory on the Gopher, call the Office of Information Technology HelpDesk at 894-7173.

Budget*From page 1*

He also noted a movement to set up a National Institutes for the Environment, modeled after the National Institutes of Health.

"Something like that could be very important," Nemeth explained. "Combined with the coming cabinet-level status of the U.S. Environmental Protection Agency, there would be a whole new, relatively organized way of distributing environmental research funds — it offers the potential to institutionalize research priority setting."

Telecommunications might also be an area of research and development where GTRI might find funding opportunities, said Senior Research Engineer Bill Smith. He is director of Georgia Tech's Washington, D.C. Office of Federal Relations.

Smith, who works to find federal funding for Tech's research programs, believes that GTRI can benefit from pursuing some of the almost \$600 million available for technical programs in the private sector, as part of the defense conversion efforts of the Department of Defense. Information on these programs was scheduled to be released around March 15.

Smith advocates using GTRI's strong in-house capabilities to diversify its research program, in light of the new administration's civilian technology priorities. GTRI Associate Director Gen. Gerald Carey agrees with Smith on this point.

"GTRI has to adjust its research priorities to those which the nation and society have identified as needs," said Carey. "Some of the major priorities of the new administration are improving the infrastructure, the transportation network, and the environmental network. These are areas in which we have initiatives."

But Carey also sees need for and applications of continued defense research. Clinton's defense budget is about 66 percent of its Reagan/Bush predecessors, but both Clinton and U.S. Secretary of Defense Les Aspin have said they wish to maintain the military's research and technology edge. Carey predicts a need for work supporting smaller operations, such as those in Somalia and Bosnia. Even now, satellite-based global positioning systems (GPS) and LIDAR technologies could be used to improve the accuracy of airdrops to starving Muslims in Bosnia, he noted.

Maintaining contacts in Washington will be important as the budget takes shape, Carey said, because priorities are evolving daily. Just as important is investing discretionary funding in equipment, seed research, and program development at GTRI.

"You need to bring research capability to the marketplace if you are going to be successful," he said. "If you look at GTRI, with \$100 million in research contracts, we should be spending in the neighborhood of \$2 million on internal research to remain competitive, and to bring new ideas to our potential sponsors."

A willingness to cooperate with other institutions may also be a key to securing new budget funding, Nemeth said.

"If we combine with our sister institutions in the Southeast, we have rich potential for a major national center of excellence in one or several aspects of the environment," he explained. "The key is being willing to form consortia and share the vision, the work and the funding."

Spotlight on Internal Research

STGC Investment Develops Skills Combination Few Universities Can Match

By Lea McLees, RCO

This is the tenth in a series of articles reporting on projects funded by GTRI's Senior Technology Guidance Council (STGC).

Personal communications, collision avoidance systems and other applications may benefit one day from an STGC investment in combining a proven semiconductor fabrication process with new materials developed at Georgia Tech.

The effort also has helped develop a set of demonstrated skills here that few universities have, says senior research engineer Mike Harris (EOPSL).

"Not many universities have the full capability that we have as far as semiconductor materials growth, device fabrication, assembly and testing," he said. "Probably our biggest competition as far as contracts is industry. Some of the aerospace companies have this type of capability."

Solid state devices and circuits similar to those being produced here at GTRI as a result of this STGC project are used in direct broadcast satellite operations and global positioning. In the future they might be part of collision avoidance radars in automobiles; they also may contribute to further miniaturization of personal communication equipment, such as portable telephones.

Harris and several colleagues began in 1988 to develop high-performance, high electron mobility transistors (HEMTs) using the semiconductor materials aluminum gallium arsenide and gallium arsenide. The fabrication process involved etching defined regions on two-inch diameter gallium arsenide wafers. Ohmic contact metals and Schottky barrier metals were deposited and patterned on the wafers. The Schottky barrier gate, one of the structures constructed on the wafers, must be extremely tiny — the smaller it is, the faster electrical charges can be moved through the device. The gate lengths the researchers were constructing measured about half a micron long, more than 100 times smaller than the width of a human hair.

The aluminum gallium arsenide and gallium arsenide materials were grown by principal research scientist Dr. Chris Summers and research scientist Dr. Abbas Torabi.

They used a process called molecular beam epitaxy, which involves heating materials until they evaporate and are deposited on a wafer. This technique allows researchers to grow the materials they need at very controlled, slow rates. That, in turn, provides time to precisely tailor each substance's electrical characteristics.

The materials grow at about one micron per hour using this process, compared to the five or 10 microns per hour common with other approaches. When grown properly, aluminum gallium arsenide and gallium arsenide allow the Schottky barrier gate to control a larger electrical current using less voltage, which makes the device more efficient.

This STGC project led to sponsored research work in developing integrated circuits based on HEMTs. The project was the subject of several papers and two conference presentations, as well. Three co-op students participated in the program, some of them by working on the early development of the devices and co-authoring one of the papers. One student, electrical engineering major Jeff Farley of Southern Technical Institute in Marietta, was recognized at December's Research Awards ceremony for Outstanding Performance as a Student Employee.

Those who contributed to the project along with Harris, Summers, Torabi and Farley include co-op student/former research technologist Michael Horn (MATD) and co-op student Peter Tiller, who helped

Researcher Mike Harris holds a photomask, which is used to transfer patterns to silicon wafers. A round, reflective silicon wafer lies on the equipment to his left. (Photo by Billy Banks)



with device fabrication and materials growth; research equipment specialist Stan Halpern (EOPSL), device assembly; director Bill Cooke and research engineer Glenn Hopkins (MATD), measurements; and research scientist Gene Weaver (MATD), equipment. The group also used equipment at the Microelectronics Research Center.

In the future, the researchers want to develop better uniformity among the devices they make. Eventually they would like to develop circuits for use in radar systems and other programs at Georgia Tech.

Georgia Tech
RESEARCH INSTITUTE

**Profile
&
Insight**

**Former GTRI
Director Retires
At End of March**

By Mark Hodges, RCO

The administrator who led GTRI through its period of most pronounced growth is retiring from Georgia Tech at the end of March.

Dr. Donald J. Grace stepped down as GTRI director on December 1, after 16 years at the helm of the organization. He presided over GTRI's evolution from a small engineering experiment station to a research institute with a \$100 million a year budget and a national reputation for excellence in applied engineering.

Not surprisingly, a quality that Grace has always admired in Georgia Tech—and GTRI—

headed efforts to organize the Stanford instructional television network, an operation which remains active today.

After eighteen and a half years at Stanford, Don and Joan Grace decided to move their family west again. This time, their destination was Hawaii, where Grace became director of research at Kentron Hawaii, then part of LTV Aerospace. He was at Kentron for four years before moving to the University of Hawaii to direct the Center for Engineering Research.

"At that time, the center did not have any full-time research activity," Grace says. "My job was to help the academics find and manage research projects."

After four years at the University of Hawaii, Grace and his family found they had contracted "island fever" and were anxious to get back to the U.S. mainland. Grace began interviewing for jobs, among them the position of director at GTRI's predecessor organization, the Engineering Experiment Station.

ments is Grace's own emphasis on personal relations. Associate Director Dr. Ed Reedy calls Grace "a person who cares for people."

Reedy adds that, "Don exhibited a very high regard for the people that make up GTRI and a concern for their job satisfaction and professional development. He tried to take that personal concern and reflect it in the way that the organization did its business."

Associate Director Pat O'Hare concurs with Reedy's assessment. "He showed me over all the time and in very tense situations that for him people ALWAYS came first," O'Hare says. "The level of interest he could generate in an idea someone has is beyond what I have ever seen in any other person."

Among the specific accomplishments of GTRI during this administration, Grace singles out the "creative efforts" that allowed GTRI to obtain new building space in the form of the Centennial Research Building and the leased facilities in Cobb County near Dobbins Naval Air Station. Without the establishment of a foundation to acquire facilities for Georgia public research institutions, he says, "we would have needed to get the state to allocate funds to build a new building."

Grace also is pleased by the progress made during his tenure in improving ties between GTRI and academic units. Dr. Demetrius Paris, vice president for research and graduate programs, believes that Grace has played an important role in this process. "We have placed a great deal of emphasis on nurturing relationships between GTRI and the academic side. Dr. Grace has been very instrumental in getting these efforts moving."

Grace sees a number of important challenges facing GTRI as it moves toward the year 2000. First, he says, the organization must deal effectively with new restrictions that the federal government is placing on universities in their use of research funds—most importantly, the cap on the administrative component of overhead for federally sponsored grants and contracts.

Second, Grace adds, other fiscal forces are making it difficult for GTRI "to generate funds for equipment, mentoring programs, junior faculty grants" and all the other programs that the organization needs to enhance rather than simply maintain its programs.

Third, Grace believes GTRI needs to continue improving its communications efforts so that "we are better understood and appreciated by the rest of the state."

Future plans

Since stepping down as GTRI's director in December, Grace has remained at Tech—cataloguing materials from his administration, winding down involvements in campus-wide activities, and assisting with special problems where a historical perspective is needed.

"I've been putting in four to five hours a day," Grace says. "Because of the continuing physical problems my wife is having, I'm taking a significant amount of sick time during this period."

Grace does not plan to take a "major full-time job" after his retirement from Georgia Tech.

"Our immediate plans call for us to remain in Atlanta," he says. "I'm interested in doing some consulting in management or analysis of R&D technologies."

Otherwise, Grace expects to spend more time cultivating such hobbies as playing bridge, gardening, and reading historical fiction.



GTRI grew from a small engineering experiment station to a research institute with a \$100 million annual budget under the leadership of former Director Don Grace. (Photo by Gary Meek)

is its can-do spirit and willingness to innovate.

"Tech, it seems to me, has always been scrambling to move forward," Grace says. "I like Pat Crecine's goal of Tech being the premier technological university in the world. That positive attitude is what I like about Georgia Tech."

Oklahoma native

A native of Oklahoma City, Grace was a student at the University of Oklahoma when World War II broke out. After serving in that conflict, he enrolled at Ohio State University, where he earned bachelor's and master's degrees in electrical engineering. He then moved to Long Island, N.Y., to work for the Airborne Instruments Laboratory.

Two years later, Grace and his wife, Joan, decided to move to California, where he found a job at Stanford University. During his tenure in Palo Alto, he earned his doctoral degree in electrical engineering. Grace rose to the rank of associate dean of the School of Engineering, whose dean, Joseph M. Pettit, later became president of Georgia Tech. In this job, Grace

"I had never been to Atlanta before interviewing here," Grace said. "I liked it and turned down another job offer in Washington state to come here."

Growth, breadth, and stability

During Grace's directorship, GTRI experienced dynamic growth. He is proud that this expansion took place in a general atmosphere of stability while enhancing the organization's technological breadth. During the 1970s, GTRI was known best for its work in defense electronics and economic development. Today, it has developed additional expertise in such varied areas as environmental science and technology, manufacturing, materials science, and energy development.

"I think we've built a lot of camaraderie among our own staff, and self-motivation," Grace says. He also believes that relationships have steadily improved between GTRI and other elements of the Georgia Tech community—so much so that interdisciplinary collaborations have become increasingly common.

One important factor in these accomplish-

America and GTRI Face New Kind of War, Says Retiring Associate Director

By John Toon, RCO

When Gerald J. Carey left West Point to enter flight training school in 1952, Cold War tensions were high and the United States was embroiled in the Korean Conflict.

As he retires this month after a 30-year Air Force career and nearly 12 years at GTRI, Carey finds the nation involved in different kind of war that he fears could undermine its prior military successes.

"We need to defend the country not only militarily, but also economically," he said. "People out there are willing to take our markets away, which would impact our standard of living just as dramatically as if we had lost the wars."

To win this new war, America will have to change the way it does business and adapt to economic conditions that are dramatically different from those of just a few years ago. Carey, who leaves GTRI after serving as associate director and laboratory group director, believes the research institute faces a similar set of challenges with stakes that are every bit as high.

"This is a most dramatic time for GTRI as it changes its sponsor base and tries to help the university achieve its objectives to become the leading technological university for the 21st century, without the level of investment commensurate with those new objectives," he said. "But I am very upbeat that GTRI will succeed during this period of transition."

Carey believes GTRI has matured significantly as an organization over the past decade, making a transition from small individual research efforts to large and complex projects which require teamwork to win. During that same time, GTRI's research volume grew from less than \$50 million a year to \$100 million, a success in which he proud to have played a part.

But the Institute cannot expect the same strategies to bring success in the future.

"We cannot necessarily steer by our wake," he said. "Success in the past does not necessarily portend success in the future. We had an expanding marketplace within the defense sector that we had to adapt to; we now have a considerably changing marketplace with a different set of priorities."

As he leaves GTRI, Carey looks back fondly to the people with whom he has worked. But he also looks ahead to new opportunities for contributing to causes that are important to him: international policy issues at the Carter Center, service to the homeless in Atlanta, and correcting wrongs left over from the Vietnam War — assistance to the Asian-American children fathered by American servicemen and the resettlement of Laotian tribesmen.

"The Mung Tribesman in Laos were our allies, and many of my squadron-mates who were shot down owe their lives to the courageous efforts of these people," he explained. "When we pulled out of Southeast Asia, they were left to themselves and nearly exterminated. They paid a high price for helping us."

Brought to the United States for resettlement, the Mung have not adapted as well as other nationalities. Carey believes it is time



Associate Director Jerry Carey is looking forward to addressing international policy issues at the Carter Center, helping Atlanta's homeless and assisting the Mung Tribesmen of Laos after he retires. (Photo by John Toon)

for the United States to invest in proper assistance efforts for them.

Carey's 163 combat missions in Southeast Asia are part of a career that included three years as an attache with the U.S. Embassy in Tokyo, ten years as an aeronautical engineer and two years as Commander of the First Tactical Fighter Wing, which had its origins in World War I Ace Eddie Rickenbacker's "Hat-in-the-Ring" Squadron.

During the 1970s, he served as Assistant Director of Operations for the Tactical Air Command at Langley Air Force Base, and as Commander of the Air Force's Tactical Air Warfare Center at Eglin Air Force Base. He retired there as a Major General.

A 1981 board meeting of the Georgia Tech Research Corporation held at Fort Walton Beach, Florida — not far from Eglin — set the stage for Carey to join GTRI, then known as

the Engineering Experiment Station. During the Board's tour of Eglin, he was introduced to the late Dr. Joseph M. Petit, then president of Georgia Tech, and to Dr. Thomas E. Stelson, then vice president of research. EES was expanding, and needed a person with Carey's background and expertise.

"It was really serendipity," he recalled. "I was aware of the work Georgia Tech did at Eglin, but I was not aware of the organization or the size of it. If they had not held their meeting at Fort Walton Beach, it might not have happened."

The New York City native will continue to be a member of the Air Force Scientific Advisory Board, and is presently working on several technical projects. He hopes to spend more time now with his wife, four children and seven grandchildren. He and his wife plan to maintain their home in Atlanta.

Using the Telephone Economically

Unlike that space alien and film star E.T., GTRI folks need to phone further than just home. Following are tips on calling and faxing from work, courtesy of assistant managers Harry Vann and Carl Baxter, Facilities Management Department.

*Which calls require an "8" preface?

Dial "8" before the area code/number of long-distance calls or faxes within the continental United States. That places the call via GIST (Georgia Interactive Statewide Telecommunications) lines. Such calls are billed at seven cents per minute less than regular calls. That provides a savings of \$2.10 per 30-minute call, for example. When dialing Hawaii, Alaska, or international locations, preface the codes and numbers with a "9".

*Can GIST lines be used for personal calls?

The lines are for business calls only. Labs and offices are billed for each individual call — therefore, excessive personal use of GIST lines indeed increases phone bills. Each GIST or regular long-distance call is individually itemized on a bill.

*What else should we check? Periodically look at the list of phone numbers attributed to the lab. "The bill lists every phone number the lab has," Baxter said. "If you see a number you don't recognize for one of your people, fax machines, or computers, you should check it out."

*What if we don't use one of our phones?

Labs are billed per telephone — not per phone number — for use of the fiber optic network on campus. If an unused phone will be put to work soon — a vacancy will be filled, for example — keep the phone. If a phone is not expected to be used again, removing it will drop charges by \$14.09 for fiber optics service and maintenance. Reductions would show up starting with July 1993 bills.

*What if we need access to a "1-900" number?

More companies are making their technical support lines "1-900" numbers. For "1-900" access, get approval from the correct unit heads or lab director and contact Baxter at carl.baxter@gtri.gatech.edu or 894-3511.

*Who do we call to solve phone problems?

Dial 656-0000. If you have problems with a particular feature on your phone, the operator may ask you for that feature's work order number. To get that number, or to ask general phone questions, call or e-mail Baxter at the numbers listed above.

THE CONNECTOR wants to share your tips for saving time and money in the lab or office. Please send your ideas to Lea McLees at RCO/GTRI 0800. Thanks to Mary Ann Burke (RCO) for suggesting this topic.

**News
&
Notes**

Truly Becomes Tech Student for A Day

Admiral Richard H. Truly recently returned to the Tech classrooms of his youth — but to listen, not to lecture. The GTRI Director and 1959 Tech graduate became a student for a day as part of a Georgia Tech Student Foundation fund-raising campaign that brought in \$500.

The Foundation invests in a \$280,000 portfolio, allocating interest and dividends to student projects and organizations. Two of the students who made \$1 contributions to the endowment fund were chosen randomly to spend February 23 as either Truly or Tech President John P. Crecine.

Jay Nemeth, a junior electrical engineering major, (not related to our own John Nemeth, Director of the Environmental Science and Technology Lab) traded places with Truly.

"I am thinking about what I want to do with my career," Nemeth said. "I was interested in Admiral Truly's job because I wanted to find out what he does."

Truly was equally interested in trading places with a student.

"When the Student Foundation asked if I was interested, I immediately accepted," he said. "I thought that I would learn a great deal about today's Tech student, plus I knew it would be fun ... I was right on both counts."

The two began with breakfast at Junior's

Grill on North Avenue. Nemeth was greeted at the Centennial Research Building by a reserved parking space and a personalized nameplate outside what is normally Truly's office. He then attended the President's staff meeting with Dr. Crecine's stand-in for the day, sophomore Martha Lora, a fellow electrical engineering major. Nemeth's day included attendance at research coordination and program development meetings and a tour of the Countermeasures Development Laboratory.

Truly, meanwhile, had a student ID made, dealt with financial aid, attended a graduate aerospace engineering class, and sat in on a Graduate Student Senate meeting. He lunched at the Kappa Alpha fraternity house and stopped by the Student Center. About the only routine student experience he missed was getting a parking ticket.

"I hid my car so they couldn't find it; some things don't change over 30-plus years!" Truly said.

The two ended the day together at a reception and headed to the Coliseum to watch Tech beat Virginia 73 to 61.

Nemeth particularly enjoyed the program development meeting.

"They made me feel involved and they let me ask questions," he said. "It even seemed like something I wouldn't mind doing as a career."

Truly found the day rewarding, as well.

"Jay did a fine job of running GTRI for a day, and I learned a lot, too. I'd recommend the experience to anyone lucky enough to get the opportunity," he said.

Kudos...kudos...kudos!

Editor's Note: GTRI prides itself on being responsive to the needs of industry. Following are excerpts from two letters written by individual companies to express their appreciation of GTRI's and Georgia Tech's assistance.

(This letter was written to Gov. Zell Miller in appreciation of work done by EDL's regional offices.)

October 5, 1992

Dear Governor Miller:

I am writing to you to express my appreciation for the hard work and efforts of the numerous state organizations that assisted Evenflo in our decision to relocate our manufacturing operations to Canton, Georgia.... Georgia Tech played a significant role in our decision-making process.

In particular,...the unique services to be received from Georgia Tech put Georgia far ahead of the other states we considered. As we now move into the design phase of the new facility, the help from Georgia Tech is the center point of all of our efforts. The successful conclusion of this project will be largely attributed to the work that is done in the planning stages by Georgia Tech. In fact, as I am writing this, we have two Georgia Tech engineers in our plant from the Rome and Dublin regional offices. They are beginning work on the plant sizing and layout for our new Georgia facility and will be working closely with our architectural and plastics engineering consultants.

In addition to the services Georgia Tech will be providing in our relocation planning, their continuing support once we start operations in Georgia make the overall Georgia package especially attractive. Access to Georgia Tech plastics and polymer research, the problem-solving capabilities of the regional offices, and the specialized engineering services available, will aid Evenflo in improving and retaining our competitive edge.

Sincerely,
Evenflo Products Company
James J. Keane
Vice President-Operations

(This letter compliments staff of the Aerospace Lab on their work. Dr. Krish Ahuja credits his students, led by Tim Hamel, and members of Design Services for their outstanding efforts, which have brought a promise of a \$500,000 follow-on for next year.)

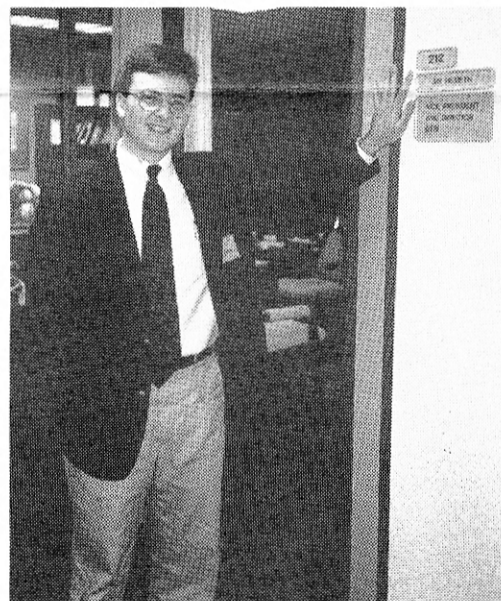
September 17, 1992

Dear Krish,

I would like to compliment your staff for their exceptionally high quality work and creativity in developing and implementing new instrumentation and data analysis techniques. It is obvious from the quantity and quality of the work that your staff produced that they are motivated by the challenges of automotive aero acoustics. We know that we can count on you and your staff to exert whatever efforts are required to produce high quality results within deadlines. Please extend my thanks to your staff.

Sincerely yours,
William J. Quinlan
Design Center
Ford Motor Company

At left, Admiral Richard H. Truly concentrates on a lecture in a graduate aerospace engineering class. (Photo by Margaret Barrett) At right, electrical engineering student Jay Nemeth easily located his GTRI office for the day, thanks to a personalized nameplate. (Photo by John Toon)



Intramurals Update

The "Wild Weasels" intramural basketball team (B League) roared into the 1993 final playoffs after excellent performance during the regular season. The team went undefeated during the season and won its first two playoff games 54-38 and 56-39. A 40-42 loss during a March 3 playoff match ended the Weasels' 1993 championship hopes — but look for their return next year. Team members include Walter Addison, Kim Cole, Russell Leath, Danial Mack, and Robert Raboud (ESML); Lou Fertig and Rob Kossler (CMDL); and Tim Floyd (CAL).

Investing in the Future

A group of 120 aspiring scientists and engineers from 21 elementary, middle and high schools around Georgia gathered at SciTrek, The Science Museum of Atlanta, on February 20 for the second annual "Toothpick Bridge Building Event." The activity,

sponsored by the Atlanta Chapter 61 of the Society of Manufacturing Engineers, featured 86 bridges, each constructed from a maximum of 500 toothpicks and 1 1/4 ounces of white glue. The bridges held as much as 68 pounds over a span of 16 5/8 inches and up to 125 pounds over shorter spans.

The event was conducted by more than 30 volunteers, including the following Georgia Tech representatives: Rae Adams (ESTL); Charlotte Batson (MAPS); Ron Bohlander (OOD); Mike Burrow (OIP); Richard Carey (EOPSL); student David Cawffiel; Jim Clark (ESTL); Ingrid Daley (OHR); Wayne Daley (EOPSL); Wiley Holcombe (EOPSL); Claudia Huff (ESTL); student Loren Kallenbach; Nancy Kelley (EOPSL); Mani Manivannan (ISyE); Marlon Moses (EOPSL); student John Ray; Bill Riall (EDL); student Robert Stroud; Chris Thompson (EOPSL); Craig Wyvill (EOPSL); and Chen Zhou (ISyE).

Calendar

Events of Interest

April 2

Basics of Using Hydra, 10 a.m. to noon, Room 239/Rich Building. How to connect to the Georgia Tech network using your Hydra account, and understanding what UNIX means on Hydra. For more information or to register call 894-4660.

April 3

Admiral Richard Truly speaks to the Glassblowers Society, 7 p.m., Embassy Suites Hotel near Cumberland Mall.

April 6

Principles of Electronic Counter-Counter Measures. Georgia Tech Continuing Education course led by Senior Research Engineer Guy Morris (RSA). Runs through April 8. To register and check location, call 894-2547.

April 7

Introduction to NuPop, 1 to 3 p.m., Room 239/Rich Building. Installation, configuration and use of this electronic mailer for PCs. Bring Hydra account/host information and a double-sided, double-density disk. For more information or to register call 894-4660.

April 8

The American Institute of Aeronautics and Astronautics hosts Admiral Richard Truly as its luncheon speaker, Lanier Plaza Hotel.

Introduction to UNIX, 1 to 5 p.m., Room 239/Rich Building. Continuation of the "Basics of Using Hydra" seminar. Covers UNIX file system, shell basics, and the vi editor. For more information or to register, call 894-4660.

April 9

Introduction to Eudora, 9 to 11 a.m., Room 239/Rich Building. This electronic mail package runs on Macintosh computers and is highly recommended by OIT as an alternative to PROFS. For more information or to register, call 894-4660.

April 12

Lead Abatement for Supervisors and Contractors. Georgia Tech Continuing Education course. Runs through April 16. To register and check location, call 894-2547.

April 13

Phased Array Radar System Design. Georgia Tech Continuing Education course led by Principal Research Engineer Josh Nessmith (RSA). Runs through April 16. To register and check location, call 894-2547.

"Tools for Protocol Development: Many Promises and A Few Success Stories," 4 p.m. Room 102, Microelectronics Research Center. Presented by Harry Rudin, IBM. One of the AT&T Distinguished Lectures in Telecommunications/Networking of the College of Computing. For more information, call 853-2682.

Admiral Richard Truly speaks to the Kiwanis Club of Atlanta during its lunch hour program. Location to be announced.

Introduction to Elm and the Pico Editor, 10 a.m. to noon, Room 239/Rich Building. Introduction for terminal users to elm (electronic mail) and the user-friendly editor, Pico. Please bring Hydra account information. For more information or to register, call 894-4660.

April 14

WordPerfect (DOS) Tips & Tricks, 10 a.m. to noon, Room 239/Rich Building. Learn to use tables, spreadsheet linking, menus, merge, macros and style sheets. Presented by WordPerfect. For more information or to register call 894-4660.

Performance Programming and Debugging on the Cray, 3 to 5 p.m., Room 105/French Building. For those interested in using the Cray YMP-EL. Covers vector architectures, processing and programming. Will include use of debugger and performance monitoring tools through XWindows. For more information, call 894-4660.

April 19

Hazardous Material Control and Emergency Response. Georgia Tech Continuing Education course. Runs through April 23. To register and check location, call 894-2547.

Inspecting for Lead Hazards in Residences and Lead-Based Paint Risk Assessment. Georgia Tech Continuing Education course. Runs through April 23. To register and check location, call 894-2547.

April 21

Introduction to Eudora, 2 to 4 p.m., Room 239/Rich Building. See April 9 listing.

Using DEC FUSE, DEC VUIT, and Mathematica, 5 to 7 p.m., Rooms 201-259/College of Computing. Overview of software available on DEC Visualization Reference Center machines. For more information or to register call 894-4660.

April 22

The Armed Forces Communications Electronics Association hosts Admiral Richard Truly during its lunch meeting at Fort MacPherson.

Introduction to NuPop, 10 a.m. to noon, Room 239/Rich Building. See April 7 listing.

April 23

Basics of Using Hydra, 10 a.m. to noon, Room 239/Rich Building. See April 2 listing.

April 26

Southeastern Safety and Health Conference. Runs through April 28. For registration information, call 894-2547.

ISO 9000 Standards for Quality Management. Runs through April 27. Learn what to expect from auditors, why ISO 9000 registration is important, and steps of the registration process. Led by Harrison Wadsworth and Jerry Banks of ISYE and ISO 9004 developer Robert Peach. For information or to register, call 894-2400.

April 27

Infrared Visible Signature Suppression. Georgia Tech Continuing Education course taught by Chief Scientist Dave Schmieder (EOPSL).



Dr. Carl Verber (right), School of Electrical Engineering, was recognized by GTRI Chief Scientist Devon Crowe for his outstanding contributions as a member of the Senior Technology Guidance Council. He served on the council from 1989 to 1992. (Photo by Dayton Funk)

Runs through April 30. To register and check location, call 894-2547.

April 28

Advanced Technology Development Center's Fourth Annual Spring Open House, 1 to 4 p.m., 430 Tenth Street, Suite N-116. See high-tech exhibits and demonstrations; the giving of the ATDC Entrepreneurship Awards; and presentations on biosensor technology for near-patient clinical testing and non-invasive laser-based medical diagnostics. ATDC is one of the nation's oldest business development programs for budding high-tech companies. For more information, call Vivian Chandler at 894-4904.

WordPerfect 5.2 for Windows, 10 a.m. to noon, Room 239/Rich Building. This version allows users to see graphics and fonts without having to enter preview mode. For more information or to register, call 894-4660.

Code Optimization on KSRI: Examples in Fortran and C, 3 to 5 p.m., Room 239/Rich Building. Picks up where introductory seminars left off. Will include examples of porting and optimization of three Fortran codes and implementing p-threads calls in C codes. For more information or to register, call 894-4660.

April 29

"What Does 'Robust' Mean for A Computer Network Protocol?" 4 p.m., Room 102, Microelectronics Research Center. Presented by Radia Perlman, Digital Equipment Corporation. One of the AT&T Distinguished Lectures in Telecommunications/Networking of the College of Computing. For more information, call 853-2682.

LOOKING AHEAD...**May 19**

GTRI's Spring Fling Picnic, 11 a.m. to 2 p.m. in the Burger Bowl. That's the grassy area next to the Purchasing/Central Receiving Building at Hemphill and Eighth streets, the same location as last year. Rain date: May 27. Mark these dates on your calendar today!

Submissions for the calendar may be sent to the associate editors listed in the bottom left corner of page 8, or to Lea McLees, RCO/GTRI, 0800. The deadline is the first Tuesday of the month before the event is scheduled.

Mark May 19 on your calendar for GTRI's annual Spring Fling Picnic, which will be held from 11 a.m. to 2 p.m. at the Georgia Tech Burger Bowl.

Focus on Folks

Professional Activities

Economic Development Lab

James E. Seals of the Gainesville Regional Office was awarded his MBA in finance from Georgia State University during December 1992.

Recently registered as a Professional Engineer is **Dennis Kelly** of the Macon Regional Office.

Harris Johnson and **John Mills**, in Hawaii for the winter Board and State Presidents Meeting of the National Society of Professional Engineers, encountered an earthquake and a major Pacific storm during their island stay. Major issues at the meeting affecting the Georgia Tech community include 1) mandatory continuing education requirements implemented by some states, 2) professional practice taxes levied on all Professional Engineers by some states, 3) individual liability for violation of environmental laws, and 4) qualifications-based selection for professional services. If you have questions, contact Johnson in the Carrollton Regional Office at (706) 568-2482 or Mills in the Columbus Regional Office at (706) 836-6665.

Electronic Support Measures Lab

Terry Tibbitts, **Kim Cole**, and **Robert Raboud** traveled to Warner Robins Air Logistics Center to teach a short course on the AN/ALR-69 software. Twenty-five current and potential customers from five government agencies attended the January 25 through February 5 program.

Larry Holland presented a paper and led a workshop on "ABC's of Implementing TQM for Co-op" at the American Society for Engineering Education's 1993 College Industry Education Conference on January 27.

Dick Ingle and **Ahmet Erbil** (Physics) presented an invited program at the annual conference of the Electrical Apparatus Service Association in Savannah.

On January 23 **Kathy Schlag** was an invited speaker for the Futurescape program.

Electro-Optics and Physical Sciences Lab

Paul Wine and 12 colleagues in the Physical and Atmospheric Chemistry Branch contributed the first chapter of a book titled *Optical Methods in Atmospheric Chemistry*. Their chapter addressed "Laser Flash Photolysis Studies of Atmospheric Free Radical Chemistry Using Optical Diagnostic Techniques." The book is published by the Society of Photo-Optical Instrumentation Engineers.

The Agriculture Technology Research Program (ATRP) made the cover of the February 1993 issue of *Broiler Industry Magazine*. The photo featured a robotic packing work cell developed by **Wiley Holcombe**, **Gary McMurray**, **Chris Thompson**, and **Marlon Moses**. The lead story, "The Potential for Robotics in Poultry Processing," was written by **Craig Wyvill**. He has been elected 1993-94 chairman of the Atlanta Chapter of the Society of Manufacturing Engineers.

On March 2, **Jim Beletic** attended meetings for two working groups concerning the Gemini 8-Meter Telescope: The Optical Image Working Group and the Acquisition Guiding and Wavefront Sensing Working Group. The meetings were held in Tucson (AZ).



Friends and colleagues wished **Jack Dell**, right, a happy retirement on February 26 and congratulated **Duane Hutchison**, left, as he replaced Dell as Associate Director in the Office of Contract Administration. Also pictured are their spouses, **Susan Hutchison**, second from left, and **Lynette Dell**, second from right. (Photo by Dayton Funk)

Environmental Science and Technology Lab

On March 2, **Steve Hays** discussed "Contractor Safety — Who Has the Responsibility?" at the 16th Annual Health and Safety Conference of the American Textile Manufacturers Institute. **Mike Lowish**, **Kirk Mahan** and **Steve Hays** all conducted sessions at the Greenville (SC) conference.

Paul Schlumper presided over February "kickoff" meetings for two companies — Geiger International and Sheboygan Paint Company — following their receipt of grants from the Georgia Hazardous Waste Management Authority. The grants are for projects related to hazardous waste reductions. He also recently presented an overview of OSHA regulations to the Polk County Chamber of Commerce during its quarterly meeting.

On February 3, **Scott Brueck** addressed the Association of Official Analytical Chemists' Seventh Annual Meeting, Southeast Regional Section. He discussed the OSHA Hazard Communication Standard. On February 16, he presented an overview of OSHA inspection procedures to the Atlanta Printing Ink Association.

Mike Lowish was presented the 1992 "Outstanding Service on the Education and Training Committee" award by the Atlanta Chapter of the American Society of Safety Engineers at their February meeting. He was a featured speaker at the meeting, where he put on a practical demonstration of common electrical safety hazards. In mid-January, he conducted a safety seminar on OSHA compliance for the Southeastern Lumber Manufacturers Association.

Microwave and Antenna Technology Development Lab

Dayton Adams and **Glenn Hopkins** attended the January 10 Technical Program Committee meeting for the 1993 IEEE MIT-S International Symposium, to be held in Atlanta during June. Adams will lead a session on phased and active arrays. Hopkins is serving on the steering committee, and he will lead a session at the EEs of (Electrical Engineering Software) Users' Group meeting planned in conjunction with the IEEE Symposium.

"A Beam-Forming Network for Mobile Satellite Communications Antennas" was published in the January 1993 issue of EEs of User's Group News. The authors were **Glenn Hopkins**, **Victor Tripp**, **Julie Walters**, and **Johnson Wang**.

Personnel News

Aerospace Lab

Three new co-ops, **Susan Carcione**, **Curt Niebur**, and **Steve Turney**, have begun work.

Electro-Optics and Physical Sciences Lab

Seven new graduate students have joined the lab. They are **Amy Daniels**, **Ronaldo Luna**, **Matt V. Mazurczyk**, **Lori Sene Sorrow**, and **James Tsai**. Image Processing Branch; **Kevin W. Bowman**, Electro-Optical Devices Branch; and **Raenell Soller**, Physical and Atmospheric Chemistry Branch.

Microwave and Antenna Technology Development Lab

William J. Dittman retired on February 26 after 30 years with Georgia Tech.

Threat Systems Development Lab

Ronald J. Puent has resigned. **Samuel T. Alford** and **Robert D. Thompson** are scheduled to retire on March 31.

Personal Notes

Our Sympathy

... to **Angela Dubose** of Research Property Management, whose grandmother died February 6.

... to **Duane Patterson** (TSDL), whose father-in-law died February 17.

... to **David Asbell** (MATDL), upon the February 21 death of his father.

Cradle Roll

A son, **Robert Kyle**, was born to **Yvonne** and **Lee Evans** (ESML) on January 9.

Pat and **Jim Page** (RIDL) welcomed a son, **Charles Stanley Page**, born February 2.

Annette and **Rickey Cotton** (MATDL) welcomed a daughter, **Rebekah Anne**, born February 20.

A daughter, **Caroline**, was born to **Tracy** and **Wayne Cassaday** (RIDL) on February 21.

The GTRI Connector
Vol. 9 No. 5 March 1993

Published by the Research Communications Office, Centennial Research Building, Georgia Institute of Technology, Atlanta, GA 30332. Georgia Tech is a unit of the University System of Georgia. The deadline for submission of copy is the first Tuesday of each month.

EDITOR

Lea McLees, RCO
853-9079

GRAPHICS

James E. Kloepfel
and Mark Hodges, RCO
894-3444

EDITORIAL REVIEW

Patrick O'Hare, OOD
894-3490

ASSOCIATE EDITORS

Marsha Barton, Cobb II
528-7750

Lincoln Bates, O'Keefe
894-6091

Michele Brown, CRB
853-0486

Janice Davis, ERB
894-8229

Carey Floyd, Cobb I
528-7012

Wendy Hanigofsky, CRB
894-7136

Eunice Kelsey, Services
894-6972

Joanna King, Baker
853-0460

Janice Porter, OOD
894-3401



This publication is printed in part on recycled paper.