

the GTRI connector

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New Uses for Polymers Under Study by EMSL and ECSL

Corrosion-resistant sealants for aircraft joints and touch-sensitive coverings for robot fingers are two new applications for polymeric materials currently being investigated by the Energy and Materials Sciences Laboratory (EMSL) with the assistance of the Electronics and Computer Systems Laboratory (ECSL).

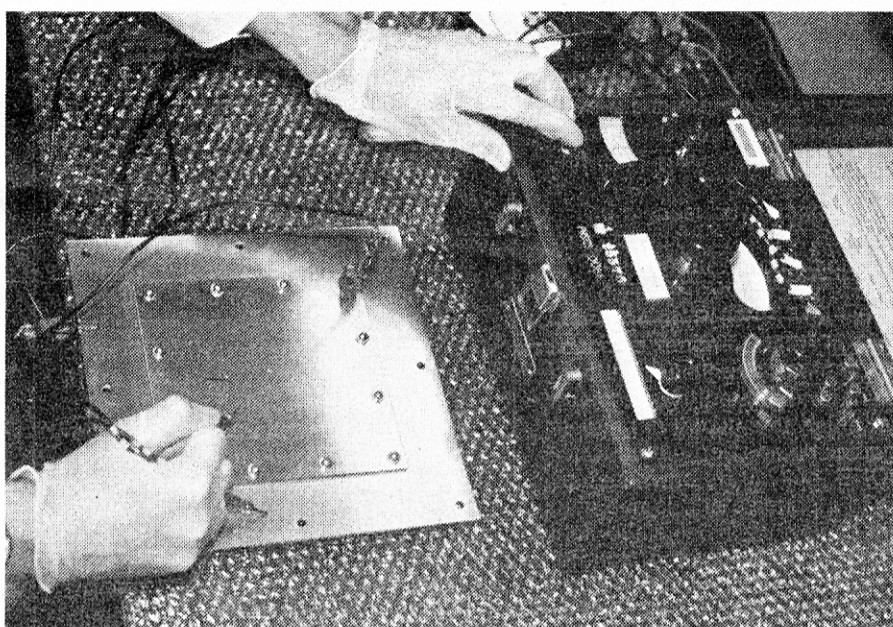
"We're looking into new polymer and coatings materials and moving into electronic applications of polymeric materials," says Jan Gooch of EMSL's Materials Science Division.

Sealants Protect Joints

One project, sponsored by the Warner Robins Air Logistics Command, seeks to prevent corrosion of the outer shield (usually aluminum) that protects aircraft from the electromagnetic effects of lightning strikes and nuclear blasts. In such instances, the aircraft skin must be able to conduct electricity, not only to minimize electromagnetic interference with electronic components inside, but also to prevent structural damage to the aircraft from melting or fires due to heat buildup or arcing.

Corrosion at the joints reduces conductivity and, unfortunately, aluminum-to-aluminum joints are highly susceptible to corrosion. The standard anti-corrosion treatment today is "chromate chemical conversion," but it has a very short life.

"We're identifying and developing conductive sealants and coatings that we hope will pre-



Researcher tests electrical resistance of a polymeric sealant developed by EMSL and ECSL to protect aircraft joints from corrosion. (Special Photo)

vent corrosion of aircraft joints while maintaining their conductivity," Gooch says. "We use polymeric materials filled with micron-sized metal particles to provide good conductivity. These materials are liquid-applied to aluminum plate joints, which are then tested for electrical resistance and subjected to durability testing in a salt fog chamber."

John Daher of ECSL's Electromagnetic Compatibility Division is working on shielding effectiveness measurements of the test joints. The team has had particularly good results so far with polysilicone filled with silver-coated aluminum, which shows

very low resistance (10^{-4} ohms). Another promising material is polysulfide filled with aluminum.

Both labs will write the new specifications for anti-corrosion treatment, which will be written to meet stringent military requirements.

The Magic Touch

Gooch's polymer and coatings group also has developed a new polymeric matrix material for tactile sensing by robots that is as elastic as human flesh. John Mills and Roy Scruggs of ECSL's Computer Technology and Applications Division are developing the electronic sensors to be embedded in the material, which

will be applied to robot fingers.

Tactile sensors currently are made of hard rubber, which stretches unevenly and wears out quickly, resulting in inconsistent measurements. With the new sensor matrix material, the robot will be able to pick up small objects and sense what they are more accurately. "You could put it over a penny and it could read the data on it," Gooch says.

"We're developing a completely new technology for tactile sensing," says Mills. "The material is basically a polysilicone similar to that used in breast prostheses, but in this application, it's filled with particles that provide electrical conductivity between electrodes. The trick is to find a suitable type of conductive material that will stay in place in the matrix material and won't damage the polymer during repeated flexing. Gooch and Paula Hammond in EMSL are tackling this task."

ECSL researchers are handling the electronics aspects, including designing a system that will allow computers to read contacts over hundreds of points within the sensors.

The project is an outgrowth of Roy Scruggs' automated robotics study for the NASA Space Station (see September *Connector*). Initial investigation has been done independently, but the EMSL/ECSL collaborators have submitted proposals for both federal and internal funding to extend their work to the demonstration stage.

Multi-Lab Effort Breaks in Electromagnetic Test Facility

Four GTRI laboratories have collaborated on a large Department of Defense-sponsored program that marked the first major use of GTRI's new Electromagnetic Test Facility in Cobb County. The project is proprietary, so it cannot be described in this story.

While the program was conducted primarily by the Electronics and Computer Systems Laboratory, it also utilized the resources of the Electromagnetics Laboratory, the Radar and Instrumentation Laboratory, and the Systems and Techniques Laboratory. According to Project Director Eric Barnhart of ECSL's Communications Systems Divisions, the Millimeter

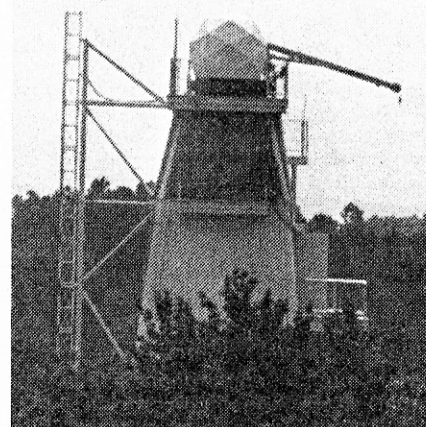
Wave Technology Division of EML provided management support, and RAIL's Technology Development Division provided field support. STL's Antenna Measurements Branch, which operates the Electromagnetic Test Facility, provided facility support under the direction of Howard Atkinson.

Barnhart says he also had to enlist the cooperation of the Cobb-Marietta Water Authority and a private property owner in order to obtain sites for transmitter operation outside the Cobb County Research Facility.

"The requirements of the program simply could not have been met without the participation of

the four laboratories," Barnhart says. "Today the cooperation of multiple divisions and laboratories is more essential than ever to the continued growth and success of GTRI. Many DoD-sponsored programs have become too complex to be adequately addressed by using the skills and resources available within a single organizational unit."

Barnhart says delays beyond GTRI's control and expansions of the scope of the program without increases in funding contributed to the management challenge of the program. But he credits the good support from the other three labs with easing the for-



Telephoto view of radome installation on the Electromagnetic Test Facility source tower for a four-lab cooperative effort. (Photo by Anita Edwards)

See "EMTF," page 2

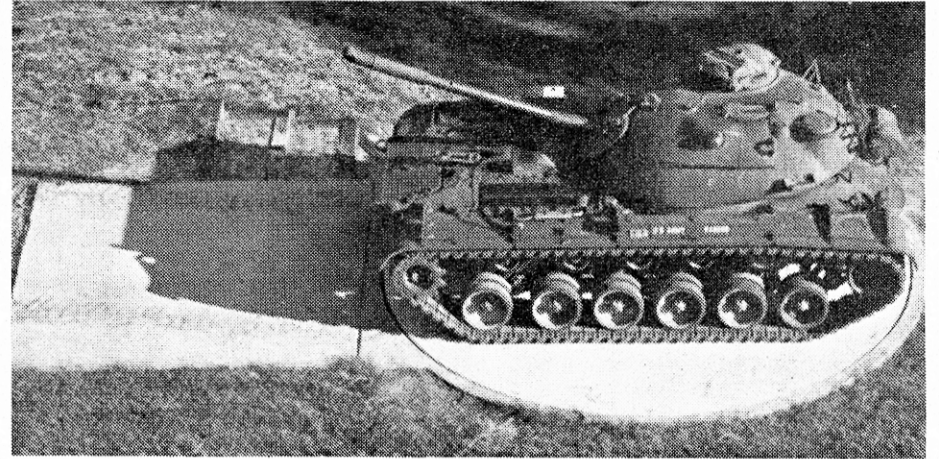
EMTF (from page 1)

midable task of coordinating the activities of the four labs, the Water Authority, the property owner, 12 visiting employees of the sponsor, two visiting aircraft company employees, and \$4.8 million in government-owned equipment.

Project engineers mounted test components on the source tower of the Electromagnetic Test Facility because of its height and because the receive tower was still under construction. Since the source tower was not designed specifically for the use planned

under the program, several modifications to the tower had to be completed before the testing program could begin.

"The fact that the tower was used for a purpose beyond the intent of its original design by its first tenant is indicative of the flexibility and far-reaching potential of the facility," Barnhart comments. "I'm sure that many of the possible applications for the test facility haven't been conceived yet, although it has been designed to handle a multitude of applications. Its staff has provided us excellent support in all phases of the testing program."



The Electromagnetic Test Facility turntable is being used by RAIL to make radar cross section measurements on an M48 tank. (Photo by Anita Edwards)

Tech Leads Asbestos Conference in London

by Lincoln Bates, EDL

Environmental health specialists from EDL broke new ground in late October, conducting a four-day asbestos abatement conference in London, England.

"International meetings concerning asbestos health effects and analytical techniques have been held in the past," says Bill Ewing, head of the Asbestos Programs Groups, "but this was the

first such conference to address abatement procedures and practices."

The conference, which ran from October 27 through 30, featured 31 speakers and drew participants from the United States, Great Britain, Germany, France, Sweden, Spain, Italy and Africa. It provided ample opportunity for exchanging information and ideas. Mark Demyanek, director of Tech's Southeastern Asbestos Information Center,

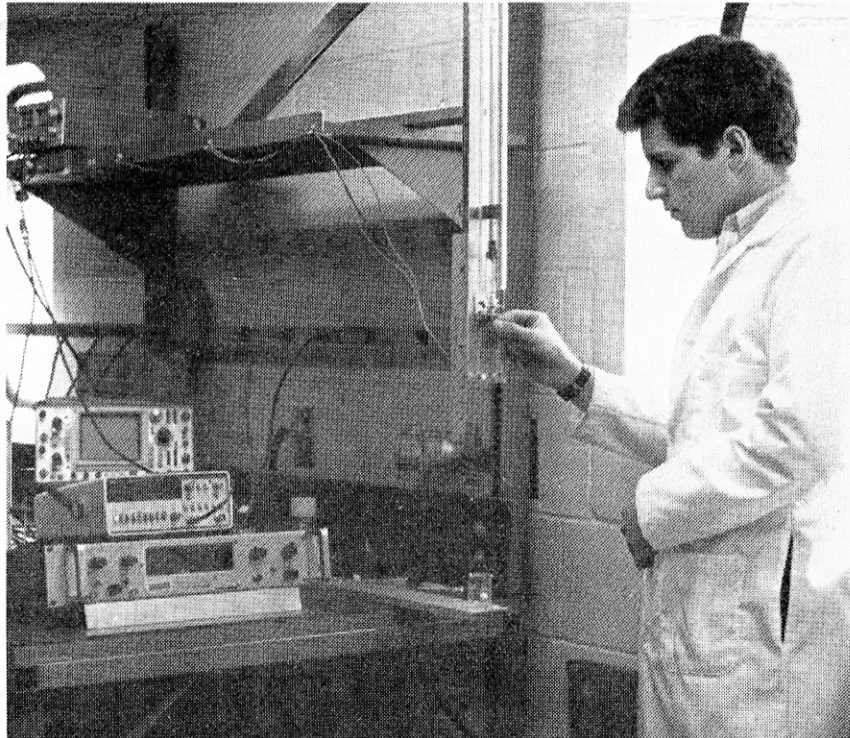
says topics ranged from ethics and professionalism in the asbestos abatement industry to government regulations and air monitoring. Other important areas included worker protection and engineering controls.

Awareness of asbestos as a major problem appears lower in continental Europe than in Great Britain and the U.S., Demyanek says. He adds that most European countries have experienced

comparatively little asbestos-related litigation, a driving force in the expansion of abatement laws and technologies in the U.S.

"We opened lines of communication and established a rapport," Demyanek says, "and the conference received good initial reviews. It's possible we could return in a couple of years, with the University of London as cosponsor and the conference conducted on a larger scale."

RAIL Sponsors High School Intern



John Rectenwald is testing the accuracy of a raindrop generator he developed. A Marist High School senior, he was RAIL's summer intern. (Photo by Gene Greneker)

John Rectenwald, a 16-year-old Marist High School senior, spent last summer working at the Cobb County Facility on a raindrop distrometer calibrator. The special project, sponsored jointly by RAIL and OOD, was designed to provide an exceptional high school student with an experience in GTRI research.

John's project actually was begun by two students from Lovett High School two years ago when RAIL sponsored the first high school intern program. They were unable to finish the project

before returning to school, so John inherited the task of completing the project and taking enough data to show that the calibrator was operating within the design parameters.

Over a 2-1/2 month period, John built the calibrator in the RAIL shop, set it up, and took measurements to confirm that the calibrator produced repeatable results. The calibrator will be used to generate water droplets of known size to calibrate a raindrop distrometer when personnel of RAIL's Technology Develop-

ment Division measure the radar cross section of a target in artificially generated rain.

Gene Greneker of TDD/RAIL served as John's adviser during the project.

GTRI Brochure Available

The Georgia Tech Research Institute is a new promotional folder that briefly describes GTRI's missions, staff, locations and facilities, organization, and areas of research. Copies are being sent to all laboratories and service units, and are available for use as a marketing tool. The folder can be mailed in a business-size letter envelope.

If you need copies for distribution to visitors and prospective sponsors, or at meetings, conferences, and exhibitions, please contact Research Communications, 227 CRB, ext. 3444.

Thanks to you...
it works...
for ALL OF US



*Get It In Gear...
Come To The Party!*



You're Invited!

GTRI will hold its annual Christmas party on Wednesday, December 17, from 3:00 to 5:30 p.m. at the Radisson Inn and Conference Center, located at I-75 and Howell Mill Road. GTRI will provide food and soft drinks. Beer and wine will be available on a cash bar basis.

Deejay Al Gay (of Studebaker's) will play your requests. If you have a favorite, send your request to Mary Ann Burke, GTRI/RCO, 223 CRB. COME ONE, COME ALL— SEE YOU THERE!

Q & A

A Note From the Director

Employees attending the recent "GTRI—Present and Future" meeting submitted a total of 47 questions—more than could be answered during the time allotted. They covered such diverse areas as the new cost and overhead recovery system, research directions, facilities and locations, marketing, contract development and competition, organization, management and support, as well as numerous miscellaneous topics.

In the next several issues of the *Connector*, we will try to answer each question that was submitted in written form. All questions dealing with the same general topic will be grouped for a single comprehensive answer. The questions will be printed as they were stated on the cards. Since they were scribbled in haste, we trust you will understand if they are not always worded in the most elegant manner.

You may want to keep some of these articles for future reference, particularly those dealing with procedural matters that are rather complex. If you feel that some of the topics dealt with in these pages need further clarification, please let us know.

We realize that some of the discussions may be more detailed than your level of interest, but for those who really want to know . . . here goes!

Donald J. Grace

You Asked About It . . . The New Cost Recovery System

A Burning Issue

Many of your questions related to our new sponsored research cost recovery system. Before you read our responses, it would be helpful to review the background, events, and consequences associated with the change:

- GTRI was nearing financial desperation, primarily from the under-recovery of indirect expenses that resulted from using overhead rates "averaged" for all of Georgia Tech—rates which typically were 10% to 15% lower than those based solely on GTRI expenses would have been. We obtained university approval to establish a separate, more realistic overhead rate for GTRI, beginning July 1, 1986. This separate rate would have risen to more than 80% in FY 87 if we had used our old cost recovery system.

- In the spring of 1986, the U.S. Office of Management and Budget (OMB) initiated an effort to severely limit or "cap" university academic departmental overhead cost recovery. Although the cap was aimed at academic departments, the effect on GTRI would have been disastrous. OMB also urged that research costs be charged to direct expenses rather than indirect expenses whenever their rules permitted.

- GTRI proceeded to develop a new cost recovery plan based on a separate overhead rate for GTRI and on direct charging of project-level costs wherever feasible. The mechanics of our plan, modeled after similar systems in other universities, have provisional approval from the cognizant federal audit agency.

- Although our costs to sponsors have risen from the change to a separate rate, we are still very competitive with other not-for-profit research organizations

and industry performing applied research. We do not foresee further large cost increases in the next several years.

- After the current transition period of working through the contract backlog which was "sold" at the old rates, we should once again have reasonable resources to invest in research equipment and programs.

- Our contract cost rates are entirely dependent on expenses. To help our future, we will all need to contain and reduce these expenses through good management and good work systems at all levels.

Mechanics of the New Cost Recovery System

Q: How do we respond to clients who openly suggest that the new GTRI cost recovery system is simply a way of charging twice for the same items?

Q: In deciding the cost of a project, adding in overhead, PMC (Project Management Cost), and APLC (Allocated Project Level Costs) can be justified (maybe), but why apply overhead to PMC and APLC, or apply APLC or PMC (isn't that just adding insult to injury)?

Q: Since some costs are allocated, and since the number of projects in-house varies from month to month, are costs allocated across active programs regardless of number?

Q: What is the justification of basing APLC/Materials and Supplies on modified total direct costs, which includes PS? In a division that has PS-

intensive projects (which produce computer programs or studies) it is often the case that APLC-MS exceeds actual MS by a large margin (greater than 200%).

A. Why not base it on actual MS?

B. More importantly, indicate the materials and supplies APLC-MS actually procures.

A: The new GTRI cost recovery system does not recover any costs twice. What the new system does is organize costs which were previously in one pool allocated on one basis into a series of cost groupings which are allocated on different bases (much like the separate cost groupings that GTRI has for compensated absences and fringe benefits). Cost accounting is not an exact science, but does attempt to use cost groupings and allocation bases which approximate a cause-and-effect or cost/benefit relationship. The new cost groupings and allocation bases better reflect the cause/cost/benefit relationships which exist in our real world.

To illustrate, under the old system, all management and support costs were allocated together in the overhead charge based on Modified Total Direct Costs (MTDC) of the technical effort. The result was to relate a dollar of management/support to a dollar of technical effort in a uniform way, regardless of the nature of the efforts involved. For example, Laboratory management was allocated uniformly to all technical MTDC. The old system, therefore, contained the implicit assumption that it takes 50 times as much management review and administrative support to purchase a \$50,000 item on a project as it does to purchase a \$1,000 item. By separating the project management effort from

See "Mechanics," page 4

Some Useful Definitions

Direct Costs of Technical Effort: Personal services (PS), fringe benefits (FB), materials and supplies (MS), travel, computer, equipment, subcontracts, other memo-type charges, capital outlay.

Project Management Costs (PMC): Partial salaries and fringe benefits of lab management and support personnel who formerly charged project support activities to overhead numbers.

Modified Total Direct Costs Prior to Allocation: The sum of PMC and Direct Costs of Technical Effort excluding equip-

ment, subcontracts, capital outlay.

Allocated Project Level Costs (APLC): Covers the non-PS costs that used to be included in the old Overhead category, including: office supplies, equipment maintenance agreements, equipment leasing and repair, and many other costs formerly covered by the GTRI overhead budget. Also includes PS costs for selected service groups. APLC has four parts—PS, FB, MS, and Computer—all of which are calculated as a percentage of Modified Total Direct Costs Prior to Allocation.

Modified Total Direct Costs (MTDC): All direct costs in the categories PS, FB, MS, Travel,

and Computer. Includes APLC and PMC.

Overhead (OH): Applied to the same categories as before—PS, FB, MS, Travel, and Computer—but these categories now include PMC and APLC. The new Overhead rate (52.8%) is lower than the old rate (63.5% in FY 86).

How the New System Works

The new way of costing essentially breaks down the old Overhead category into three separate categories: PMC, APLC, and OH. Each cost group is allocated on a base that better

reflects its actual cost/benefit relationship with research projects than did the old single allocation system.

Under the new cost recovery system, the dollar figures upon which Overhead is calculated are larger than under the old method, but the Overhead percentage is much smaller than before. The main reason Total Project Costs are higher under the new system is that the GTRI Overhead rate is now separate from the rate for Academic Research and reflects GTRI's higher nonsubsidized cost level. The other major cause is the real increase in support costs without a proportionate increase in direct research.

The New Cost Recovery System . . .

Mechanics (from page 3)

the overhead, we are able to allocate these costs on a personal services base, which we feel more accurately reflects the measure of management and support required at the Laboratory level for any research effort.

Cost items included in the Allocated Project Level Costs (APLC) grouping support the technical effort, both the PS and non-PS, and the Laboratory project management effort. These costs support all project-related activities.

The support is not discrete by category. The need for accounting services in the production of green sheets, invoices, and the maintenance of cost information is caused by all categories and by the total project. The computer costs in Accounting do not relate to the computer costs in projects, but to the existence of the project itself, and are proportional to the size of the total effort. Supply Services expends PS in support of non-PS categories. Instrumentation and Calibration also expends PS and non-PS to perform its function of maintaining the Laboratory equipment base. The Laboratory non-personal services costs support all aspects of project work and project management; for example, word processing equipment/software in the laboratories is used for processing documents relating to each category separately as well as reports for the total project. MTDC is the correct base for the allocation of the APLC because the support activities involved relate to the necessary project processes for all categories in the project.

Citing some negative examples, if the costs were distributed in a discrete-by-category distribution, the projects which were computer-intensive would have to pay the cost of everybody's green sheets, and hardware projects would have to cover most of the Laboratory supplies costs. This type of allocation could not be defended, because it would have no cause and effect or cost/benefit basis. Also, it is correct accounting procedure, complying with State Board of Regents accounting principles, for these costs to retain their category integrity, being distributed to the categories in which they were incurred, to the projects which benefit from the cost.

Some of the materials and supplies items included in the APLC are:

- General supplies for technical and scientific laboratories: chemicals, semiconductor devices, wire, etc.
- Laboratory equipment maintenance contracts, calibration fees, etc.

- Laboratory software support expenses

- Research equipment lease costs

- Laboratory printing and photographic costs for research work, internal reports, and manuals

- General supplies to support data and documentation work

- Costs of acquiring project technical reference materials, subscriptions, etc.

- Costs in purchasing support group for supplies and equipment leasing and maintenance

- Costs in accounting support group for supplies and equipment leasing and maintenance

- Costs of research personnel hiring, i.e., advertisements, computer equipment leasing and maintenance

- Instrument calibration supplies and maintenance of calibration equipment

- Office supplies, including computer supplies for non-cost-centered work stations

APLC costs are distributed to all projects based on their pro rata portion of the monthly MTDC, independent of the number of active projects in any given month. The relationship is cost to cost.

Overhead is applied to all these groupings of costs because they are all direct costs. The method of charging them to each project is just that—a direct charging method, just as any timesheet or MR is a charging method; therefore, these costs are subject to overhead just like any other direct charge. If you look at the activities in the PMC and APLC groupings, it is clear that any exclusion would not be appropriate as the costs in the indirect cost pool support all of the activities. They all require space, heat, light, executive management, and support from the campus business office. As the benefit is to all research activity, allocation is to all research activity.

The Impact of the New Cost Recovery System

Impact on Competitive Position

Q: Please discuss how competitive we are with our competitors since we adopted the new overhead recovery system.

Q: Until we develop a reliable way around CICA (Competition in Contracting Act), are we cost competitive?

Q: Has a list been produced of other nonprofit organizations, their overhead rates, and their mission areas?

A: As a consequence of concern for our competitive position, GTRI for many years has monitored the overhead rates and cost multipliers for not-for-profit organizations as well as universities. The last survey of "not-for-profits," who are more like GTRI than universities, was conducted about two years ago. (A new survey is in progress.) It included such institutions as IITRI, Battelle (Columbus), Midwest Research Institute, Southwest Research Institute, SRI, RTI, and Southern Research Institute. The cost multipliers for these organizations even then ranged from 2.8 to 3.3+ compared with our present multiplier of 2.71 for a lab with a Project Management Cost (PMC) rate of 12.8%. With our multiplier, we should continue to be very competitive with those institutions and with most industries; of course, we and others are always exposed to competition from subsidized "buy-in" bids, particularly from the industrial sector, and to competition from the smaller non-laboratory intensive operators such as those that proliferate around funding centers as in the Huntsville, Alabama, area.

In comparison with other engineering universities, Georgia Tech has been in the upper quartile of overhead rates; it has not been dissimilar to the major engineering institutions such as MIT when costs are viewed with comparable methodologies. With its new rates, GTRI compares less well in competition for academically oriented grants or contracts, as encountered in the more basic research programs. In that arena, academic costs and rates are inherently heavily subsidized, particularly for facilities and equipment, and they also benefit cost-wise from sharing with instructional programs. Although only a very modest portion of GTRI's research program is in the basic research areas, we are concerned. We intend to



Art by Jerry Webb

Impact (from page 4)

protect and continue that activity through cost sharing or other alternatives when we view that research as important to GTRI's vitality.

The cost multiplier for GTRI proposals depends on the ratio of costs for personal services to non-personal services costs; the multiplier is also dependent on the PMC rate, which varies from lab to lab. Figure 1 illustrates the current multipliers for a lab with an average PMC rate compared with the multipliers for last year (FY 86).

Impact on Current Contracts and New Awards

Q: If more proposals for more dollars are being submitted, what percentage of the recently decided proposals were winners? How does that percentage compare to prior years?

Q: With regard to the new cost recovery system, what are the negative consequences that you project, short-term and long-term?

Q: Rumors abound on projects cancelled due to the requirements of imposing the new cost accounting system on existing contracts. What are the actual numbers of:

A. Projects cancelled and/or not renewed due to sponsor dissatisfaction with the cost accounting system?

B. Projects where GTRI will absorb the costs of the new system (rumored to be called "planned overruns")?

C. Projects where the directors haven't even informed the sponsors of the new system yet? (Some project directors I know waited up to three months before telling the sponsors. All but one responded negatively.)

Q: Has higher cost recovery raised any concern in the sponsored project projections you have just made (i.e., will higher costs impact sponsor growth)?

A: The near-term impact of our increased rates will occur in our existing backlog of contracts which were "sold" using the lower FY 86 rates. Although most of these contracts are cost reimbursable, the funding for many of them is inflexible. We expect all project directors to keep their sponsors appropriately informed and to seek their help with the problem. When the sponsors of this backlog are unable or unwilling to add funds for the cost increases, we will have to reduce work efforts or supplement contracts by the overrun or cost-sharing routes. Based on a review of the backlog by the respective laboratories, we estimate the amount of subsidy

required for impacted projects to be about \$1.3 million. However, after we work through the present backlog and enter into new contracts with budgets based on the new rates, this part of the impact will be over.

Many of the currently outstanding proposals were prepared with old rates which will have to be revised in any negotiation and awards that ensue. Newer proposals prepared since July 1 should already reflect the new rates. It is too early to have meaningful win-lose statistics for proposals with the new rates; therefore, we cannot yet make comparisons with our traditional success ratios.

We are not aware of any project cancellations or non-renewals because of the mechanics of our current cost system. However, the government auditors assigned to review our basic cost structure and to perform pre-award audits are not familiar with our current system, although similar systems have been approved at other universities. As a consequence, we have encountered some award delays and are operating with only provisional approval of our basic system. This condition is related only to the mechanics of direct and indirect charges and is not a result of the cost increases which would yield the same multipliers by either the old or new GTRI systems.

There should be no long-term negative consequences from the new cost recovery system and its focus on direct charging. The system highlights cost areas such as the PMC costs which are controllable by the laboratories, and thereby gives incentive to reduce those costs. The system is responsive to the U.S. Office of Management and Budget's direction to resort to direct charging wherever possible. Our overall cost multiplier, however, is a separate issue, regardless of what cost recovery system is used. We should be striving continually to reduce that multiplier by good management and effective administration or support operations throughout GTRI.

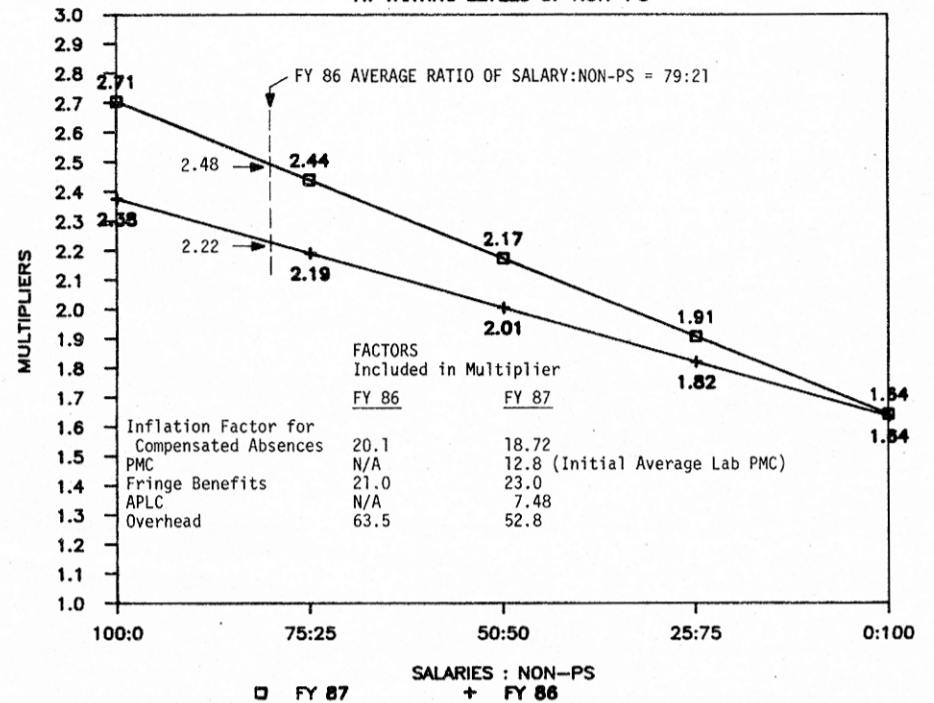
Cost Reduction

Q: What is OOD doing to cut costs? Is there a ratio of research funds to OOD budget?

Q: Given the consistent increase in our operating costs which seems to be accelerating, how can we remain competitive? (Current equivalent PS loading varies from 2.6 to 3.0.)

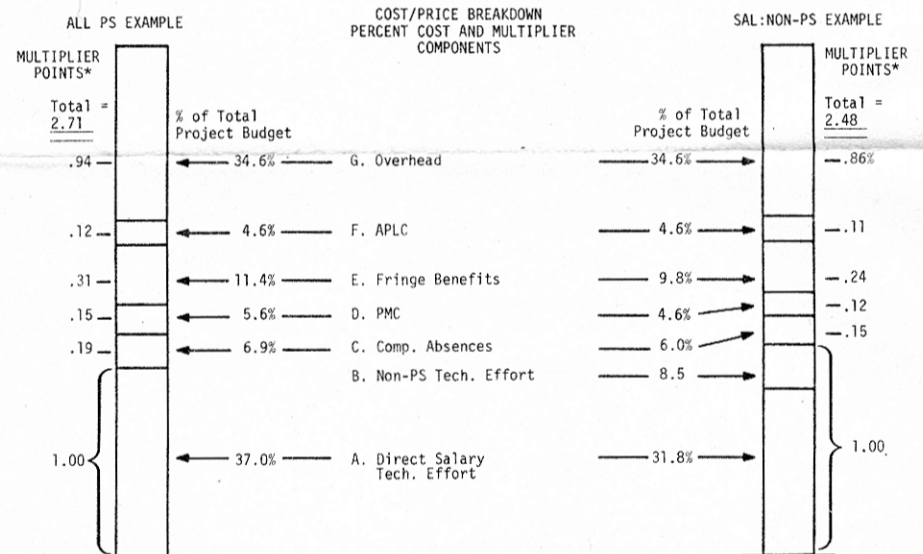
Q: Currently the "personal services" multiplier in proposed budgets is 2.71, roughly. Is there a long-term goal for this number? If so, what? If not, why not 2.00 (I believe that this is the highest number at which research is viable in the long run)?

FIGURE 1
FY 86 and 87 MULTIPLIERS
AT VARYING LEVELS OF NON-PS



NOTE: Salaries are base salaries not including inflation factor for compensated absences and not including fringe benefits. Factor to be multiplied by salaries and non-PS.

FIGURE 2



* Components of multiplier computed on same basis as percentage points.

- | | |
|---|--|
| A. DIRECT SALARIES - TECH. EFFORT | E. COMPENSATED ABSENCES |
| Salaries of Research Staff Involved in Direct Technical Work | Cost of Vacation, Sick Leave, Holidays, etc. |
| B. APLC | F. TECHNICAL EFFORT NON-PS |
| Lab Non-PS, Non-managerial Personal Services in Selected Service Groups | G. OVERHEAD |
| C. FRINGE BENEFITS | Space Cost Incl. Leases Campus Business Office Contract Development Some Service Depts. OOD, OCA, GTRC Bldg. & Equip. Use Charges All Service Dept. Managers |
| D. PROJECT MANAGEMENT COSTS | |
| Laboratory Project Management and Support | |

A: The change to a separate overhead rate for GTRI gave us a traumatic step-function cost increase, but it has the important benefit of enabling us to recover the real costs we are incurring. We no longer should have to pay operating expenses with diverted funds needed for equipment and seed research. However, the change also highlights our costs as reflected by the overall cost multipliers.

While we do not see any forces at work to give us another large cost increase, we intend to initiate an ongoing cost containment and cost reduction effort. Many of our costs are dictated by external factors, i.e., leases of buildings and equipment, utilities, maintenance, police security, business office and other Georgia Tech costs. For our other operating costs, we will appoint

See "Impact," page 6

Support Staff Costs vs. Research Staff Costs

Q: The multiplier on salaries has gone up 46.4% in the last five years. This is unrelated to inflation, which shows up in the salaries. Which costs have risen so drastically, and can they be reduced?

Q: Are you aware of the extreme dissatisfaction of many employees over the high net overhead? Can things be done to calm the masses down? Most feel that a proper solution is to cut fat out of services rather than escalate the overhead. There are three support staff for every five researchers. That is an unusually high figure, and contributes to costs significantly.

Q: Many of us work on contracts which are relatively fixed on a year-to-year basis. The new cost-recovery system may be good for the administration of GTRI, but it reduces the covered personnel on those projects. Current personnel must then sell additional services at a higher rate to survive here. Are any efforts under way to streamline the administrative costs, and thus reduce overhead? The Productivity Center should be able to help in this matter.

Q: In 1978 there were 3.36 researchers to one support staff member. In 1986 this ratio has dropped to 1.88. Why?

A: The multiplier has grown principally for two reasons: cost growth without a corresponding increase in research volume, and the change to a separate rate from academic research. The most significant cost increase within the GTRI portion of the overhead costs has been in two areas: space-related costs (increase of \$2.5 million from FY 83 to FY 85, our last audited year) and the H accounts in the Laboratories (increase of \$1.4 million from FY 83 to FY 85). The increase in Laboratory H accounts has been the result of the normal allocation process based on sponsored PS and a change in the spending pattern. We have been shifting from investments in equipment and internal research, which do not count as overhead-type costs, to nearly 100% H-type expenditures, collectively exceeding the costs associated with Lab operations in prior years. OOD also has had to increase H-type expenditures on behalf of the laboratories (H900's) to assist in support of these same areas. These increases are NOT independent of raises, as individuals paid from overhead-funded budgets get raises, too. Space cost increases have been driven largely by the lease costs of Cobb County and CRB, and the additions of utility and janitorial costs for the CRB space. Aggravating the effect of these cost increases was a

slowdown in the growth of sponsored research; consequently, while the numerator of the overhead rate fraction grew by 27%, the denominator grew by only 6% during the same two years.

The single largest factor in the increase in the multiplier was the switch to a separate rate from academic research. The multiplier (for our average Salary-Non-PS relationship of 79:21) increased a total of .26 compared with FY 86, from 2.22 to 2.48, a 12% increase. The portion of that increase which was due to the decision to go with a separate rate was .18, the difference between the multiplier under our current system and the multiplier we would have had at a joint rate of 69%. This is a one-time-only change whose impact should be felt only once. We believe that the multiplier will stabilize, given a healthy growth in sponsored research, for the following reasons: no large increases in space are planned for the near-term; the new cost recovery system should help the Labs to fight increases in their costs by raising the visibility of and resistance to increases; and OOD is searching for ways to streamline and decrease support costs in general.

In FY 78, the ratio of professional to support staff was 2.4. (The ratio as stated in the question was the result of comparing

FY 78 support with FY 79 professionals—the FY 78 figure for professionals was not included in the slide.) In 1986, this ratio had decreased to 1.9, defining professional and support as we do now; thus, the density of support staff has increased somewhat less than was indicated in the question, but even this smaller increase in support density is worrisome. Some 63% of the total GTRI support staff is employed in the Laboratories, an increase of 87% during the FY 78-86 period, during which time professional staff members in the Labs increased by only 48%. OOD and Services increased their support staffs by 54 persons, which included the formation of several new service groups, including Computer Related Services, Research Property Management, and Research Security (previously included in OCA data, and therefore excluded from the 1978 statistics in our recent presentations to you), adding 17 support staff members in these new groups by 1986. Without the addition of these new groups, the rate of growth of support staff in OOD/Services would have been much lower than that in the Laboratories. Any attempt to "cut the fat" by addressing the ratio of support staff to professionals will need to look at the Laboratories in addition to the Service Departments and all other elements of GTRI.

HRD Developmental Seminars Are Big Success

by Charles McCullough, HRD

Have you noticed a marked improvement in the way your coworkers are managing their time? Are they planning and organizing better? They're even dealing with stress better, aren't they?

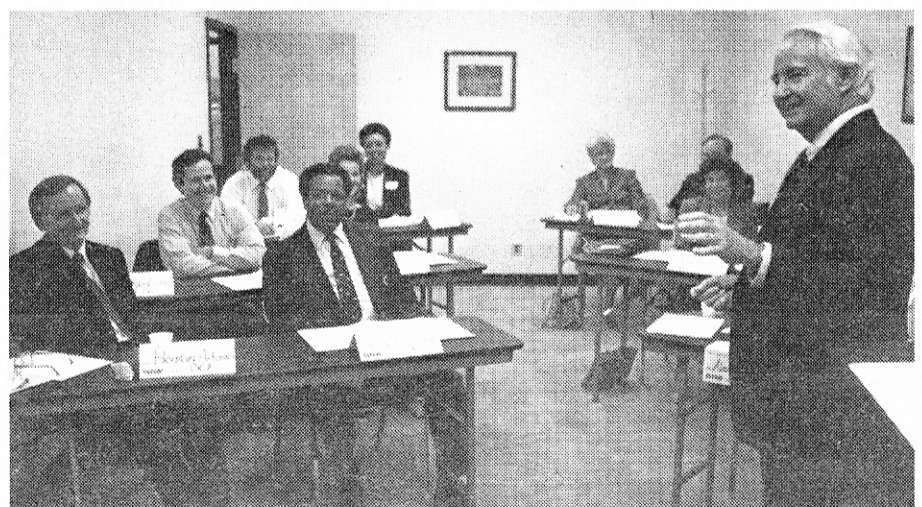
What's the source of all this improvement? No, it's not vitamins or aerobics. It's the result of Round One of the developmental seminars presented by the Human Resources Department's Training and Staff Development Section. Eight different topics, taught by trainers from EDL's Industrial Education Group, were available in this first series of seminars.

Says Jean Fuller, head of HRD's Training and Staff Development Section, "The response to these seminars has been enthusiastic, to say the least. We scheduled repeat sessions to accommodate overflow registration for each topic, and the evaluations regarding the quality of the sessions have been consistently superior. Employees in any industry—not just an R&D

environment—can realize tremendous benefits from developmental seminars such as 'Positive Human Relations' and 'Effective Communications.' Bill Whitworth, the director of Industrial Education, and his staff have done an outstanding job."

So far, 93 attendees have participated in more than 42 hours of instruction, and another 46 employees are signed up for the fully booked seminars that will close out Round One in December. "The subjects covered in the courses that have been offered are suitable for all types of employees. Something like 'Decision Making and Problem Solving' is as appropriate for a department manager or project director as it is for a mechanical technician or an administrative secretary," says Betty Yarborough, manager of HRD.

What's in store for the future? Round Two, naturally! A schedule of similar courses, including a repeat of some of the best-received courses from Round One, is already in the planning stages. Your laboratory's or



Bill Whitworth, head of Industrial Education, is teaching a class on "Decision Making and Problem Solving," one of a series of developmental seminars offered by HRD's Training and Staff Development Section. (Photo by Charles Haynes)

department's Administrative Network member will be distributing

specific information as soon as the schedule is finalized.

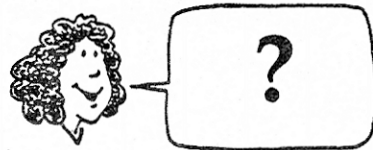
Impact (from page 5)

small teams, including project-level and service group personnel, to examine and recommend more cost-effective ways to per-

form our work. We will announce the results of these efforts as we make progress.

For your information, Figure 2 gives the present perspective on various GTRI major cost categories.

QUESTIONS, ANYONE?



by Charles McCullough, HRD

What is COBRA?

1. A project deliverable in STL?
2. What you want a pair of red pumps made of?
3. New federal legislation that might concern your group health insurance?

While the first two answers might be correct, it's what's behind Door #3 that's today's personnel lesson. The new Consolidated Omnibus Reconciliation Act (COBRA—which is as easy a name as its alias, Public Law 99-272, Title X) means considerable

protection for employees covered under the group health insurance plans of their employer or their spouse's employer because it provides for continuation of coverage at group rates in many instances where coverage under the plan would otherwise end.

Would you like a translation of that mouthful?

A hypothetical situation: Jane Doe, a GTRI employee, has been covered by health insurance through the group plan of her husband's employer. Jane and her husband divorce. Pre-COBRA, Jane would have been up a creek: She would no longer be eligible to participate in her

ex's group plan, open enrollment at Georgia Tech might have been months away, and, if Jane had a pre-existing medical condition, obtaining an individual plan would be costly and time consuming, and perhaps provide minimal coverage. Under COBRA, however, Jane can pay the premiums of the plan under which she was covered for up to 36 months as a divorced spouse, buying herself the time to become eligible for her own employer's plan or to do some comparison shopping for the most suitable and economical health coverage.

What's the impact on those of you here at GTRI who are covered by one of the many health plans offered by Tech? Not much, since most of the group plans here already provide for conversion to an individual plan should your employment terminate. Within the Tech community, the ones who will benefit from COBRA the most are those not covered by one of Tech's plans and who, instead,

are participating in their spouse's employer's plan. Other situations besides divorce or separation now receiving COBRA protection: death of a spouse, retirement or other termination of employment (except termination for gross misconduct), or reduction in hours.

Naturally, there are limitations: COBRA applies only to businesses with more than 20 employees; does not include the federal government; is effective in most cases with plan renewals beginning after 1 July 1986; and requires that you pay both the employee and the employer portions of the premium.

As with any newly enacted legislation, it is still open to a great deal of interpretation. But the bottom line is this: If you are faced with a potential loss of coverage, it's **your** responsibility to notify the benefits coordinator of the plan under which you are covered about an event such as divorce or layoff to ensure continuation of your coverage.

STL Reorganizes Division

ECSL's Technology Assessment Branch, headed by George Whitley, has transferred to the Systems and Techniques Lab (STL) effective November 1. The move brought about a reevaluation of the organizational structure of STL's Technology and Analysis Division.

"Combining the two units while maintaining their identities appears the most effective means of utilizing their common yet complementary missions in the area of intelligence and threat systems, ranging from pure analysis to simulation and hardware implementation," says STL

Director Charles Watt. "We feel that combining them under a new division structure will provide an exceptionally strong base for growth and expansion into other related technical areas such as threat C³I (communications, command, control and intelligence) and threat electro-optical/infrared."

The new division is named the Advanced Technology Division. It comprises two branches, the

Concepts and Development Branch under George Whitley and the Systems Assessment Branch under Charles Wilson.

Dr. Donald Bodnar has been selected as division chief. "Don brings a strong technical background to this role," Watt says. "He is a long-time member of the STL staff, most recently as a principal research engineer in the Microwave Systems Division."

PROFESSIONAL ACTIVITIES

ECONOMIC DEVELOPMENT LAB

Claudia Huff made two presentations in early November—"Growing Your Own: the Georgia Tech Management Training Program" at HRD Atlanta '86, a training and expo forum sponsored by the American Society for Training and Development, and "Tricks and Techniques of Working with the Hospitality Industry" at the fall conference of the Georgia Society for Textile Training and Development.

Art Brown was elected a director of the National Association of Management and Technical Assistance Centers (NAMTAC) at the association's annual meeting in Washington, D.C., in October.

In late October, **Carol Aton** discussed using "Effective Follow-up Procedures to Get a Job Offer" with the Georgia Tech student section of the Society of Women Engineers.

Marilyn Black made a presentation to the ASTM Workshop on Environmental Chamber Testing for Formaldehyde October 21 in Phoenix (AZ).

On October 17, **Kevin Downes** addressed the Annual Conference of Occupational Health Nurses in Savannah on "OSHA Update: Issues and Answers."

Paul Middendorf gave an invited talk on "Occupational Exposure to Nitrous Oxide" at the International Analgesia Society meeting in Miami in mid-October.

Chuck Ross presented two papers (coauthored by **Jim Walsh**) in October—"Operational Character-

istics of a Plug-Flow Digester" at the Southern Regional Biomass Energy Resource Conference in Athens and "Small-Scale Cogeneration at a Southeastern Dairy" at the 9th World Energy Engineering Conference in Atlanta.

Gainesville Regional Office Director **Phil Loveless** was graduated from the University of Oklahoma's Economic Development Institute in August. His thesis, "A Computerized Methodology for Establishing Retail Market Potential," won the Bob Cassell Outstanding Thesis Award given by the Southern Industrial Development Council.

In early November, **Phil Williams** traveled to Israel for the 31st Oholo International Conference on Model Systems in Neurotoxicology—Alternative Approaches to Animal Testing. He spoke on his joint research with Dr. David Dusenbery (Applied Biology) concerning "A Screening Test for Neurotoxins Using the Nematode *C. Elegans*." The conference was sponsored by the Israel Institute for Biological Research.

ELECTROMAGNETICS LAB

Ron Bohlander presented the keynote address at the Material Handling Institute's AGVS86 seminar, held October 28-30 in Atlanta.

Joe Gagliano presented a paper at the 11th IEEE International Conference held in Pisa, Italy, October 20-24, and gave a lecture on "Millimeter Wave Radiometry" at the University of Rome.

The October issue of *Applied Physics Letters* featured a paper by **David Benson, Brent Wagner, Abbas Torabi, and Chris Summers** entitled "Surface Stoichiometry and Reaction Kinetics of Molecular Beam Epitaxially Grown (001) CdTe Surfaces."

ENERGY & MATERIALS SCIENCES LAB

On October 22, **Hans Spauschus** presented an invited seminar on advanced lubricants for refrigeration systems to the Thermal Machinery Group at the National Bureau of Standards.

Ray Kovac presented a paper, "Design and Performance of a Novel Rotary Separator for Clean Off-Gas Production from Biomass," at the Fourth Southern Biomass Energy Research Conference, held in Athens (GA) October 7-9. Coauthors were **Lewis Elston** and **Dan O'Neil**.

Kovac also made a presentation on "Oil Production in Entrained Flow Pyrolysis—Pilot Plant Design and Process Economics" to the Confederation of Engineering Industry of India, part of the 9th World Energy Engineering Congress, held in Atlanta October 22-24.

Jan Gooch was on assignment in the Republic of Korea in November to interact with Korea's coating industry and provide technical expertise.

Dan O'Neil participated in the National Review of Solar Thermal Technologies, held at the Sandia National Laboratory in Albuquerque September 24-25, at the invitation of the Assistant Secretary for Conservation and Renewable Energies, U.S. Department of Energy.

SYSTEMS ENGINEERING LAB

At the AAAIC '86 meeting in Dayton (OH) October 14-17, **Fred Cox** presented a paper entitled, "Artificial Intelligence Planning Team Design Automation Workshop."

Ted Doll presented two papers in October. One, given at the Society of Automotive Engineers/Aerospace Technology Conference in Long Beach (CA) October 14, was entitled "Development of 3-D Audio Signals." The other, presented at the Human Factors Society meeting in Dayton on October 3, was entitled "Syntheses of Auditory Localization Cues for Aircraft Cockpit Applications."

At the meeting of the IEEE Systems, Man, and Cybernetics Society in Atlanta, **Joanne Green** chaired a session on "Neural Models" on October 16, and **Lloyd Konneker** presented a paper entitled "Automating Receptionists" on October 17.

SYSTEMS & TECHNIQUES LAB

Henry Cotten and **John Sanford** attended the MONTECH '86 conference on antennas and communications in Montreal, Quebec, September 29-October 1. Cotten presented a paper entitled "Automated Data Acquisition and Analysis System for Antenna Measurements," coauthored by **Connie Green, John Estes, Scott McBride, and Tony White**. Sanford presented a paper entitled "Optimal Array Antenna Geometries," coauthored by **Larry Corey** and **Jeff Holder**.

A.J. Chimera participated in a management seminar on October 7-8, provided by Clemson University's Office of Professional Development in Clemson (SC).



Software Review

by John Dillard, CRSD

PROFS is often regarded as simply an electronic mail system for GTRI and Georgia Tech. The PROFS calendar, however, is an overlooked function that offers many useful features. While it may seem easier to keep your personal schedule on a desk calendar, the PROFS calendar has many advantages that make the extra effort worthwhile. When you and your co-workers keep your calendars on PROFS, they can look at your schedule and you can look at theirs. It also makes it possible for those you authorize, such as your secretary, to make changes to your schedule. You can make personal or confidential entries, thus preventing other PROFS users from viewing these items.

PROFS also allows you to make recurring entries into your calendar by keying them only once. For example, a staff meeting held every other week can be entered for the next 12 months. If one of the meetings happens to fall on a GTRI holiday, PROFS will display a warning and give you the option of not scheduling for that day. Daily, weekly, and monthly entries can be entered in the same way. It also is possible to move and copy single events or an entire day of events from one day to

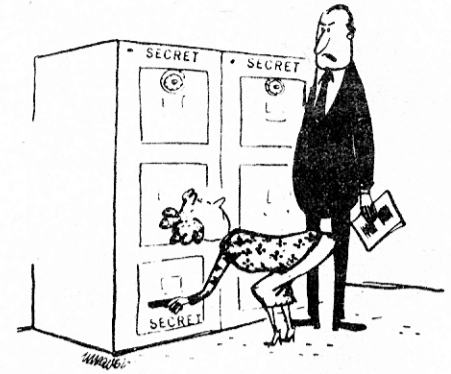
another. You can view more than one day of events on a single screen or you can view calendars from multiple users on a single screen.

Conference room schedules is another reason for using the PROFS calendar. PROFS currently contains the schedules for five conference rooms in CRB and three at CCRF. Instead of having to ask the person responsible for scheduling these rooms what times are available, you simply find a suitable time by viewing the schedules on PROFS and then contact the appropriate person by phone or through a PROFS note. Only the individuals listed by each conference room can actually schedule the room. (Note: If you have a conference room you want to add to PROFS for others to see, contact the CRSD Help Desk at 894-7173.)

The biggest advantage of keeping your schedule on PROFS is its ability to schedule meetings among a group of individuals. When you schedule meetings on PROFS, you simply specify a range of dates in which to hold the meeting, a conference room if necessary, the length of the meeting in minutes or hours, and a list of all the persons, including yourself, who are invited. PROFS will then search the calendars of all the individuals listed, as well as the conference room schedule, and return a list of available times when all the invitees and the conference room are free. You then choose from the times listed and enter a brief note describing the meeting. PROFS will send a note to everyone inviting them to the meeting.

PROFS does not actually schedule the meeting, however. When the users read the meeting invitation, a PF option is available which allows them to add the meeting notice to their calendars.

PROFS scheduling is simple to use and is well described in the "PROFS User's Manual." PROFS scheduling is now being included in the Beginning PROFS course offered by the CRSD Training Facility. If you have any questions concerning PROFS, call the CRSD Help Desk at 894-7173.



"JUST THE DOCUMENTS HAVE TO BE STAMPED TOP AND BOTTOM!"



Noel Garland, PPC assistant manager, was honored by the Printing and Photographic Center with a reception on November 14 on the occasion of his retirement after 30 years of service to Georgia Tech. Here he and his wife, Betty (seated), enjoy refreshments and conversation with Dennis Brooks and Diane Elsasser. (Photo by Dayton Funk)

PERSONNEL NEWS

ECONOMIC DEVELOPMENT LAB

Linda Galloway has joined the Analytical and Instrumentation Branch as an environmental chemist.

Jan Orcutt is a new research associate in the Savannah Regional Office, where her main responsibilities include government procurement counseling and marketing of industrial education programs.

Wendi Dodd has departed from GTRI.

ELECTROMAGNETICS LAB

Welcome to new graduate research assistant **Mason Gross**.

ELECTRONICS & COMPUTER SYSTEMS LAB

ECSL said good-bye to **Henry Hexmoor** in October.

ENERGY & MATERIALS SCIENCES LAB

EMSL said farewell in October to **Jim Lefferdo** and **Art Sales**. The lab also wished good luck to **Tom Brown** and **John Bearden**, who transferred to STL in early November.

OFFICE OF DIRECTOR

Jane Kaufmann has resigned effective November 12.

RADAR & INSTRUMENTATION LAB

Congratulations to **Joe Lindsey** on his recent reclassification to mechanical technician III.

Welcome to new employees **Jim Byrum**, RE I in the Radar Application Division, and **John Andrews**, RE II in the Modeling and Analysis Division.

SERVICE DEPARTMENTS

Computer Related Services: **Josh Nessmith** is now a full-time programmer I.

Facilities Management: Congratulations to **Steve Stafford**, promoted to storekeeper.

Human Resources: Welcome to **David Pitts**, mail clerk; **Dede Johnson**, personnel assistant II; **Andrea Lyons**, senior secretary; and **Vyki Walls**, data entry clerk. Congratulations to **Marianne Thompson**, who has been promoted to administrative assistant. **Maude Bruce** has resigned.

SYSTEMS ENGINEERING LAB

Dave Plummer was named October Employee of the Month for his work in coordinating the GTRI booths at the AOC Convention in Atlanta and the Warner Robins AFB Open House.

Loretta O'Neal is a new word pro-

cessor operator in the Defense Systems Division, and **Chris J. Hall** is a new RE II in the Countermeasures Development Division.

Welcome to new co-ops **Brendt Waters**, **Tim Drury**, and **Russell Heym**, and to new GRAs **Robert Yohman**, **George Fulton**, **Vincent Guinee**, **Adam Schwartz**, **Mark Dale**, **Tina Matthews**, **Randall Tarr**, **Samson Lui**, and **Scott McFarland**.

In the Eglin Office, **Ron Hensley** has resigned.

SYSTEMS & TECHNIQUES LAB

STL welcomes **James A. Worsham**, RE II; **George R. Whitley**, RE II; **Robert D. Thompson**, RS I; **Douglass E. Henry**, RE II; **David R. Blount**, RT II; **Antonio L. Gunther**, ET III; and **Charles N. Kelley**, **Ted D. Hartsoe**, **Robert H. Gibson**, student assistants—all transferring to STL from ECSL in a reorganization.

PERSONAL NOTES

EDL: **Keith Nelms** was married to **Carol Holmes** September 20.

Gina Jampetti, a student assistant in the EDL director's office, was one of five finalists for Georgia Tech homecoming queen.

ECSL: Condolences to **David Blount** on the recent death of his stepfather.

EML: **Coral** and **Dale Atkins** are proud parents of a baby girl, **Lauren Amanda**, born November 3.

RAIL: **Sandra Fiuta** of the new Jersey office recently was married to **Anthony Siano**.

Congratulations to new grandfather **Ted Lane**. His grandson is named

Robert Blake.

RAIL employees had great fun at the annual **RAIL** picnic. The barbecue was delicious, and many people enjoyed playing volleyball, croquet and badminton.

SEL: **Anne Gilchrist** welcomed a baby girl, **Joanna Christine Randazzo**, October 15.

STL: **Bob Kerr** participated in the 1986 Master's Rowing National Championships on Green Lake in Seattle September 21-22 with the Atlanta Rowing Club. He and his mates achieved one first place and two second place citations.

the GTRI connector

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