packages to visualize their data and then come to the lab for "publishable" versions of the graphs. A few faculty are beginning to do the same for maps by using GIS products for visualization. At the same time, their desires for presentation materials are becoming more sophisticated and there is an increase in requests for multicolor slides and overheads. Given these changes in the Lab's "customers," it will be increasingly important for the Lab to be able to work with data and graphics files from many different sources. It is anticipated that the Lab will increasingly serve as a resource center for faculty who would like to use computer software as a visualization tool and who also appreciate receiving advice on how to go about using it. Finally, the Lab should continue to have a steady, and even growing, number of requests for high quality final graphics; though the specific forms of these graphics will change as the technology develops. ❑

CARTOGRAPHIC LABORATORIES AT THE UNIVERSITY OF GEORGIA

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The Cartographic Services Laboratory and the Institute of Community and Area Development (ICAD) are the major cartographic production facilities at the University of Georgia. Cartographic Services is the campus cartography lab. It is located in the Geography-Geology building but it is not administratively part of either of those departments.

The Cartographic Services Laboratory is one of several research services facilities providing support services for faculty and students. Another major campus graphics lab, the Instructional Resources Center provides services primarily related to classroom instruction, however, it is seldom called upon to produce maps. The Cartographic Service Laboratory is partially self-supporting, with its revenue coming mainly from clients on campus. The Lab also does work for state agencies and, on rare occasions, for non-governmental clients who can make a case that there is no other place to obtain the services they want. The Lab employs seven full-time staff and does not provide instruction nor does it employ student workers.

Mapping is only one of the services provided by the Lab. The production of charts, graphs, slides, and photographs make up the majority of the work done by the Lab. Clients mainly come from the science departments (due, in part, to the Lab's physical location) and prints of autoradiograms and protein gels are a common product. Color and high-contrast slides are created from hardcopy originals or from digital images. Like other labs, Cartographic Services has made the transition from manual to digital production of graphics. The graphs, charts, and maps are produced using Macintosh software that includes FreeHand, Photoshop, and Delta Graph.

Map production is generally limited to small-format black and white laser printer output for publication in books and journals. A service bureau in Atlanta is used to provide film negatives when necessary. The Lab had previously engaged in manually drafting large-format, two and four color map projects. Now color maps are output only as slides. Clients wishing to obtain color maps other than slides are given assistance in finding a service bureau but they must deal with the service bureau directly.

The Institute of Community and Area Development is a service unit of the University of Georgia. ICAD is not actually a cartography lab at all, however it does publish *The Atlas of Georgia* and *The Interactive Atlas of Georgia*. As a service unit, it extends the University's expertise to the rest of the state and it is organized differently from academic departments on campus. ICAD employs approximately 30 faculty members, many of whom have joint appointments in other departments such as Environmental Design, Political Science, Psychology, Education, and Geography. ICAD's clients include communities in the state and organizations within Georgia and in the Southeast region. Clients receive services in the areas of community and economic development, natural resources management, growth management, land use planning, recreation planning, and regional planning.

Cartography at ICAD developed from ICAD/Geography professor Howard Schretter's idea that the state of Georgia needed an atlas. At the same time, the University began planning for its 1985 bicentennial and the Geography Department hired a cartography professor interested in atlas production. Space was provided by the Geography Department and ICAD organized funding to create *The Atlas of Georgia*.

The Atlas of Georgia was produced entirely in-house using manual photomechanical processes. The production staff included a combination of part-time student workers and full-time employees that were hired for the project. The marketing and sales were handled by ICAD staff.

The Atlas of Georgia was published in 1986 and its success

encouraged ICAD to support work on a new edition. Instead of producing a second edition of the printed book, however, the editors decided to create a digital atlas that would allow users to access the data directly from the maps. They envisioned the Atlas to be reasonably priced and to run on standard PCs found in homes and schools.

Commercial software was not available that could be adapted to meet their requirements so ICAD enlisted a Geography Department graduate student with programming skills to develop the software. The result was *The Interactive Atlas of Georgia* that was released in 1994. It updates many of the subjects illustrated in *The Atlas of Georgia* and most of its 256 maps can be queried to find county-level data by pointing at counties on the screen. County names and city locations can be viewed from any map screen. Atlas users can define regions by selecting multiple counties and can view data by region. Composite maps of counties meeting criteria specified by the user can also be viewed.

Due to the success of its projects, ICAD decided to make atlas production part of its mission. There is now a permanent staff for the development, production, marketing, and sales of *The Interactive Atlas of Georgia*. An updated version, that will expand the content and add new data and maps, is currently underway. Postcards have recently been mailed to registered users of the Atlas in order to solicit their ideas for inclusion in the new versions. Lesson plans have also been developed to help teachers use the Atlas for classroom instruction. ❑

SYRACUSE UNIVERSITY CARTOGRAPHIC LABORATORY

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The Syracuse University Cartographic Laboratory is a focus for cartographic activities at Syracuse University. The primary responsibility of the Laboratory is to meet the Geography Department's need for maps and graphics in scholarly publications. The Lab also provides the University community with advice and assistance for the professional, educational, and technical aspects of cartography and mapping. Cartographic services are available, at cost, to the University community and to nonprofit organizations such as the Syracuse Chamber of Commerce and area tourist and visitor bureaus. Most of the Lab's income for new equipment and software comes from these outside contracts.

At present, the Lab has two full time professional cartographers. Student assistants were once employed for drafting but as with most cartography labs, computer methods have replaced manual methods. Our Leroy pens have dried up, the darkroom is closed, and the stat camera is up for sale.

The Lab has two accelerated Power Macintosh computers primarily running Macromedia FreeHand and Adobe Photoshop. Aldus PageMaker, DeltaGraph Pro, Geocart, Microsoft Word, Microsoft Powerpoint, and Microsoft Excel are used occasionally, however, the bulk of the cartographic work is done with FreeHand. Recently, the Lab began using prepared map bases on CD-ROM from Cartesia for routine work such as creating simple outline maps for the classroom.

Most of the original maps, however, are made by scanning a base map on the HP ScanJet and then using the scan as a template in FreeHand. The HP ScanJet has replaced the stat camera for copying existing maps and Photoshop is used to correct imperfections in the original. Other laboratory equipment includes an HP LaserJet 4M and access to an HP Designjet 650C 36" wide color plotter. The HP LaserJet 600dpi resolution is suitable for some publications and proofing but most maps are sent to a service bureau for imagesetting.

Products produced by the Lab have not changed much since the introduction of computer technology. We still focus on thematic maps for publication but we now have greater design and editing flexibility. For instance, relief shading is easier to add and special type effects such as skewing and rotating are now possible. Perhaps the most significant benefit of the technology is in editing. Authors can review draft copies of the maps and easily make changes without sending the cartographer back to the darkroom for a tedious remake of positives and negatives.

The future of the Syracuse University Cartographic Laboratory seems secure and interesting. There is increasing demand for our services and we are looking forward to the possible production of the first *New York State Atlas* both in print and on CD ROM. We plan to continue a tradition of exploring new technology and utilizing it to support our clients needs. ❑