Like many labs in a similar setting, we have been going through a major technological transition and now have four 486 computers. Our principal software includes Aldus Freehand, Aldus PageMaker, Aldus Persuasion, Microsoft PowerPoint, Microsoft Excel, Microsoft Word, Photofinish, Harvard Graphics, Atlas*GIS, ArcInfo, and Intergraph MicroStation PC. Of course, what we do with these resources is more important than simply having them available.

About this time last year we were finally ready to try a large automated project. My student help had only limited experience with computer cartography, but they were eager to learn. I looked for a project which would help them learn the software and at the same time provide something of value to the State. We decided to create a Statistical Atlas of Alabama.

Much of the information contained in the Atlas was obtained by reading Census CD-ROMs and extracting selected data into dBASE. The data we were interested in was copied to Excel and linked to Atlas*GIS to create choropleth maps. We were able to produce both tabular and graphic output. Additional elements of the Atlas were produced using Harvard Graphics, FreeHand, Quatro Pro, and Word. We ended up with 269 pages of everything you ever wanted to know about Alabama along with four students ready to conquer the world of computer cartography. To date, we have sold over 1,000 copies. A modest number certainly, but enough to warrant similar projects in the future.

We achieved considerable savings in our output costs by investing in a LaserMaster WinJet 1200 print controller. When installed in our HP 4M laser printer, we get 1200 dpi output which looks really remarkable. While not suitable for every application, this output meets the needs of the majority of our clientele, and we skip the costs associated with service bureaus. We have just acquired software which will allow us to translate Tiger line files to polygons for use in Atlas*GIS. This will enable us to create new atlas projects focused on tract level data and as a result we are developing the Statistical Atlas of Birmingham.

Although this type of project does not sit on the cutting edge of cartography, there are several reasons why it is important to us. First, everything we do makes available a resource which was previously not available. I have received many letters from those who have our Alabama Atlas are asking for additional products. Second, it puts our Lab and Department in the spotlight on a statewide basis and I have received funding for a number of projects which were spin-offs of the Atlas. Finally, it can be done at a low cost.

This is just a single example of how we have tried broaden the services we offer as we take advantage of ever changing technology. In addition, our Lab has expanded its output capabilities through the purchase of a Polaroid CI 5000 Digital Palette. This image processing system allows us to produce color slides of screen images in a matter of minutes. It is not inexpensive, but it has saved the day for several of our most procrastinating customers. I'm happy to say the Department and the University have supported our efforts, allowing us continued growth. ❑

University Cartography Labs: A Decade of Transition

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In 1988 Doyon & Gibson (1990) conducted a survey of cartography labs in the United States and Canada to discover the management practices, services, and operations performed by these labs. In response to a question about production techniques, only 20 percent of cartography lab products were being done on computers in 1988 (Doyon and Gibson 1990). In the past 5 years we have seen automated production at the University of Akron Cartography Laboratory increase from approximately 25 percent of our work to 80 percent. Along with this change in technology we also experienced a significant drop in the number of jobs we did for other departments on campus. The usual graphs and charts that had formed a distinct part of our typical work load in the past were becoming almost nonexistent. Even special on-campus advertising on our part brought little added work (except for occasional darkroom work). Good community ties and reasonable rates seemed to encourage off-campus projects but not consistently enough to assure financial solvency. Departmental work remained relatively unchanged, however, it did not bring in outside funds and tended to drain the lab budget.

Along with changes in who we were producing work for we also were experiencing technical changes. New technology brought with it the pressure to obtain larger, faster machines, newer software, and higher quality peripherals to input and output products. Maintenance costs were higher, training for student

workers more demanding, and supervision of costly machines more intense. Our departmental income, faced with all too common cutbacks, was hard-pressed to cover costs associated with this new technology and new computers trickled in only as the budget allowed.

These changes gave pause for thought. Were other labs experiencing similar problems and challenges and if so how were they coping? Had any strategies for dealing with rapidly changing technology been devised for labs on limited budgets? A questionnaire was designed and mailed to cartography labs in the United States and Canada to answer some of these questions. Using the list of cartography labs published by Ellen White (1990), 82 questionnaires were mailed or faxed and several more were distributed at the 1993 NACIS Annual Meeting in Maryland. We received a total of 36 responses. We eliminated the response received from the Boston University lab (leaving a total of 35) because it had recently closed. The questionnaire solicited information on staffing, production, funding, and equipment. Laboratories were given the option to select the time frame for the reporting period. Twenty-five respondents answered for either a 5 year or a 5-10 year time frame, 3 for 11-20 years, and 4 for over 21-25 years. Two labs chose less than 5 years and one had no response for this portion of the survey.

Survey Results

Staffing. Nearly half of the 35 respondents indicated some change in staffing. Ten labs reported an increase in staffing, whereas 7 reported a decrease. A higher demand for cartographic products was cited most often (7 times) as the reason for increases. Financial cuts were the primary reason four of the labs lost staff. Oddly, policy changes and new technology were cited as responsible for cutbacks as well as for increases in staffing levels.

Student Workers and Training. Eighty percent of the respondents said their labs employed student workers and the average for all labs combined was 13.5 hours per week. Only 3 respondents felt that training requirements for student employees had not changed during their time frame (though these were all responding for a 5 year period). The remaining respondents thought new technology required more worker training in software use, hardware, math, design, and/or GIS concepts.

With the exception of 4 respondents, few were prepared to completely abandon traditional training in cartography. The majority (77%) felt training in traditional manual methods was a necessary and a desirable compliment to training on computers. Only 2 (both with 22 years experience in cartography) answered that no training on computers was necessary.

Teaching and Production. Thirty-one labs spent more than 50 percent of their time on production work. One was a teaching-only facility and 94 percent had at least some teaching function within their university setting.

Product Types. The products being produced by the labs have changed. Products based on new technology (digital, animated, interactive, color, and large format products) accounted for the greatest changes. Even labs whose products remained the same cited computers as new tools for generating them. Graphs, maps for publication, government work, and remote sensing projects experienced decreases.

Only 12 of the 35 labs attributed product changes to their clients obtaining their own software and hardware. Sixteen thought changes in products produced occurred independently of what their clients had or did not have. Several labs mentioned their services were needed to "clean up" or "pretty up" graphics and maps produced by their clients. Three labs mentioned providing services when the clients obtained sophisticated computer products and needed the cartography lab's expertise to help them use the software and create maps and graphs.

Production Sources. The sources that are generating work for cartography labs are changing. Work from resident geography departments declined for 16 of the labs. Other university departments accounted for declines for some labs and increases for others (about half reported changes for the better and half for the worse). Increases in production from non-university sources were reported by 13 respondents. Other sources of lab work included government contracts and book production. Only 7 labs reported no changes in production sources during their time frame.

Funding. Resident geography departments were the main source of support for 15 labs and the sole support for 9. Non-university sources were the next most important, followed by other sources and other departments. Of the 16 labs relying primarily on university sources (resident geography and other departments), 9 reported that funding was inadequate. Of the 13 labs relying on outside sources of funding, only 6 said the funds were inadequate.

Funding source changes were not quite as dramatic as production source changes. Seventeen

labs reported no changes in the source of their funding. Labs reporting changes most often showed increases from non-university or "other" sources and decreases from other departments or the resident geography department. The reasons for funding source changes were primarily increases generated by new research and production from outside sources. University funding was generally cited as decreasing rather than increasing. Several labs mentioned economic recessions as the primary impetus for decreased funding. Two labs stated that funding costs had decreased because operating costs had been lowered when newer technology was implemented.

The responses were divided almost in half as to whether current funding was adequate to support the hardware and software requirements of the lab. Eighteen said it was adequate and 15 that it was not. Those reporting a deficit said efforts were being made to offset this lack of funding. Eight hoped to attract more university funding in the form of grants, fees, projects, and other funds. Six were looking outside the university to bring in additional money and 4 stated the outlook was glum economically and that there was little hope of generating the necessary funds as things stood at present.

Conclusions

With only 35 cartography labs responding, it may be misleading to draw sweeping conclusions or generalizations about the overall state of university cartography labs and the ways they are dealing with technological and economic changes. The responses, however, give a clue as to some of the adjustments being made by these types of cartographic educational facilities.

The technological advances that have swept through the entire field of cartography in the last decade are making a mark on many university cartography labs. Computer have replaced traditional production techniques, even for those labs whose end products have remained consistent. Technology has opened a new vista of cartographic products, from interactive and animated maps to digital map files, and large format and/or color maps. Clients have changed too. Only 7 of the 35 respondents have been doing cartographic work for the same clients. Eighty percent have seen their sources of production work shift or change within the last decade, and 43 percent are trying to find new clients and funding to maintain their labs and equipment. Without exception, all cartographic facilities are confronting the "cartographic revolution" and it is shaping these organizations and the products they are creating.

References

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For a specialized survey of Cartography Laboratories also see:

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