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cartography bulletin board

GEOGRAPHIC INFORMATION SYSTEMS, IMAGE PROCESSING, AND MICROCOMPUTER LABORATORIES

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The Geographic Information Systems (GIS) & Image Processing Laboratory is a support facility of the Department of Geography & Planning at Appalachian State University. The Lab's functions are: 1) to provide GIS and image processing training to students through coursework and internships, 2) to support research, and 3) to provide services, often in fulfillment of the land planning and management needs of North Carolina's local, regional, and state agencies.

The GIS and Image Processing Lab houses a Sun SPARC station IPX with two remote terminals, five 486 PC computers and three Pentium computers, three large format digitizing tablets, two 8pen plotters, a color scanner, and a color deskjet printer. Plans are to purchase a Sun SPARC station 20 within the year. The main software used include ARC/INFO and ArcView for GIS, ERDAS for Image Processing, and Mosaic for access to data on the World Wide Web. Aldus Freehand is utilized to produce the camera-ready maps for a syndicated newspaper column, Geography in the News. The Research Lab library contains a wide variety of hardware and software manuals and research journals, plus numerous digital map and satellite image data sets on 4 and 8 mm data cartridge and CD-ROM. These digital data include the USGS's DLG's (Digital Line Graphs), the US Census

Bureau TIGER Line Files and other Census Bureau statistical data, a variety of full scene Landsat and SPOT digital imagery, plus a growing collection of image subscenes covering North Carolina. Much of the imagery was purchased through grant projects. The satellite image collection will continue to grow now that many summer and winter scenes from Landsat TM are available on the Internet at downloading cost.

The Microcomputer Lab is used primarily for teaching basic computer skills and production cartography, although the Department's full-color Geographic Perspectives map series is produced in this lab as well. The lab contains eleven networked 486 PC's, two A3-size digitizing tablets, two HP Deskjet printers, two Epson printers, one networked HP Laserjet 4 Plus printer, and a Macintosh section with three MAC's, a monochrome scanner, and Epson printer. Software used in the lab include CorelDRAW, AtlasDRAW / AtlasGRAPHICS, and Microsoft Office Programs (Word, Excel, Power Point and Access), and SimCity. Students also learn networking principles on Windows and how to access and download digital cartographic data from the Internet via Kermit.

The Department's research includes nine service projects for counties and development regions. Each project has involved the analysis and classification of either Landsat MSS or TM, or SPOT data using ERDAS, and merging those with ARC/INFO (GIS) vector data for further analysis and mapping. The projects accomplished to date involve land use analysis, water resource inventory, watershed management, industrial siting, new highway siting, and zoning/ land use mapping. The Greenhouse Gas Inventory of North Carolina for 1990 is the major product currently underway within the department. The

project is funded through a grant from the North Carolina Energy Division and the EPA. Greenhouse Gas (GHG) emissions are being calculated and mapped by county, with projections through to the year 2010. Calculations are being carried out in Excel, while mapping is being done on ARC/ INFO and CorelDRAW. The bulk of the project is now complete and provides much of the data needed for the Department's next major research venture, a NASA funded three-university grant entitled Global Climate Change in Local Places. Appalachian's component within this project will provide more detailed analysis of GHG emissions and mitigation strategies for a smaller, twenty-county Blue Ridge/Piedmont region within the state of North Carolina. The analytical work will make extensive use of the Department's digital image processing, GIS, and mapping capabilities.

THE CARTOGRAPHIC SECTION AT THE UNIVERSITY OF WESTERN ONTARIO

by Patricia Chalk Department of Geography The University of Western Ontario

The Cartographic Section is currently marking 26th year of service to the Geography Department at The University of Western Ontario. Through the vision of F.W. Graves and the support of the Geography Department, the Section evolved from a facility housed in a cordoned-off area at the back of a cartographic lab, to a professional cartographic facility. In 1972 it moved to its current premises-a 830 square foot office with an adjacent 8' x 22' darkroom. Today, the Cartographic Section is home to two cartographers:

Patricia Chalk, Director, and David Mercer.

While each cartographer still retains a light table and drafting table, production for over a decade has been enhanced by computer operations. The transition to computerized graphics began in 1985 with the purchase of a Personal Composition System (PCS) through CompuGraphic Canada Ltd. The PCS software was installed on Apple Lisa hardware. Files were output on photographic paper from a high resolution typesetter on campus. Although purchased primarily for the computerized typesetting capabilities provided by Compugraphic's software and the crisp resolution of the output, the PCS also had additional design capabilities beyond that available from Macintosh software at the time. Among the features cited in the request for funds was a "the capability of mixing text with line work, graphs and diagrams without use of pen and ink." It was an exciting step forward!

Since 1985 our computers have been upgraded several times. Our current system includes a Power PC 7200 and a Quadra 650 with 32 mb RAM/1 gigabyte hard drive and 24 mb RAM/1 gigabyte hard drive respectively. Each system has two color monitors (16" and 14") to provide a multi-screened singular desktop. Initially, the two-monitor system was adopted because it was far less costly than one large 21" color monitor (we already had 2-14" monitors). Once installed, however, additional benefits were revealed. The 14" monitor was found to be ideal for holding menus and software icons. The full 8 1/2" x 11 3/4" image area of the larger, 16" monitor was thus rendered entirely free for viewing the work in progress.

The primary mandate of the Cartographic Section is to meet the cartographic needs for a researchintensive program in the Geography Department. For the most

part, this involves the design and production of images for publication which cannot be created using standard computer graphing, mapping, or GIS packages. Production frequently involves compilation of information from several sources (e.g. satellite images, spread sheets, digital boundary files, map sheets, rough sketches, or field notes) into one composite digital product designed to suit presentation in one of an assortment of mediums (e.g., journals, slides/overheads, newspapers, web sites, or large format displays).

The software used in the process of creating final images includes: Adobe Illustrator, Adobe Photoshop, Aldus PageMaker, and Geocart. A familiarity with the DOS world and file formatting options is useful in many undertakings since some files are manipulated in such programs as CorelDraw or IRIS to prepare them for importing to the Macintosh environment. We have benefited from the Geography Department's concerted effort to have all its core facilities connected by ethernet. In so-doing, we developed an efficient network of many peripheral devices required for digital cartography (e.g., scanners, mass storage devices). Hence, our office only contains two computers with the specialized software unique to our responsibilities.

Virtually all images destined for printing are output on a Linotronic imaging system using an offcampus service bureau. Color slides and overheads are sent to an on-campus service bureau for output on either an Imapro Quality Colour Recorder or a Tektronix Phaser Dye Sublimation Printer. Services to the Geography Department are provided at no charge provided that the materials are used for departmental research. Faculty needing graphics for outside contracts are charged on a cost recovery basis.

The diversity of the graphics we create is reflected in the range of journals in which our figures have been published. Over the past year, for example, our graphics accompanied articles submitted to the Journal of Environmental Management, Great Lakes Geographer, Journal of Soil and Water Conservation, International Journal of the Sociology of Language, Annals of the Association of American Geographers, Environment and Planning A, Radiocarbon, Journal of Atmosphere and Ocean, and Earth, Moon and Planets. Our services also include the illustration of books or chapters of books which faculty are editing or authoring. Cartographic consultation is provided to assist graduate and undergraduate students in designing effective graphics, and in the use of mapping programs in the GIS lab. The Director is cartographic editor or consultant for a number of publications each year and gives invited lectures to graduate classes.

In addition to its responsibilities to the Geography Department, the Cartographic Section provides services to non-departmental faculty and staff. Over the past few years, we have developed both a plan view and 3D map of campus. These maps are updated annually. Custom-made maps are provided for publication in conference material, brochures and flyers. The Section does contract work on a cost recovery basis for researchers from throughout the University. Through earnings, the Section is able to fund some of its material, hardware, and software needs. Requests for our services from non-geography sources are fulfilled as time allows.

The Section has experienced excess demand on its services for several years. Responsibilities of the Cartographic Section have increased with the assumption of responsibility for maintaining and updating of the basic University's campus map and specialized

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derivatives. Given the likely increase in publications, necessitated by a more pro-active research stance within the department, greater use of the services of this unit by faculty is anticipated.

New trends in our services include: redesigning maps generated at the conclusion of a GIS operation to meet publication standards; becoming more familiar with the graphics components of particular GIS packages in our department so that we may better advise students and faculty regarding the cartographic capability of the software; and designing maps for web presentation in addition to published form . . . and we'll do it all "without the use of pen and ink!"

ARE YOU COMPATIBLE WITH YOUR PRINTING SERVICE BUREAU?

by Joe Stoll Department of Geography University of Akron

University cartography laboratory managers often utilize printing service bureaus for color proofing and print production. This requires the cartographic laboratory manager to have an intimate knowledge of the service bureau(s) with which he/she works. This knowledge should include both general knowledge of the printing processes, and specific knowledge of the equipment, software, personnel, workflow, and requirements unique to each individual service bureau.

The University of Akron (UA) Cartography Laboratory produces in-house, individual color prints up to 11 inches by 17 inches. Other printing tasks require the use of off-campus service bureaus. The UA Cartography Laboratory

primarily uses two local service bureaus. The first of these is a fullfeatured commercial printing company located near campus. Printing jobs that require press runs and a size of no greater than 30 inches are taken here. The second service bureau is an engineering/CAD oriented service bureau. Printing jobs requiring individual color prints of more than 11 inches by 17 inches on paper or transparencies are taken here. This CAD oriented service bureau also performs mounting and lamination services.

The relationship of the UA Cartographic Laboratory to both of these service bureaus, while often involving a variety of production processes, different software packages, and variations of desired output, revolves around a central issue of "compatibility." Compatibility is critical during the production process, for the choices of file and font formats, for the desired end result, and in the choice of external media used to transport the from one location to another.

Compatibility in the production process is important since methods and procedures used must result in digital files from which the final artwork can be successfully produced. This remains important whether the production is via a press run or printed individually. Requirements for compatibility differ from one service bureau to another. For example, if the UA Cartography Laboratory uses AutoCAD to create digital files for a large wall-size map, it is important that each different color appearing on the map is created on a separate "layer." Since the CAD oriented service bureau uses specialized software to assign colors to objects in the digital file, it is more efficient to assign colors to each of the layers created during the production process.

Another important facet of production process compatibility, regardless of the service bureau, is proper closure of filled polygons. Improperly closed polygons can at best, appear incorrect on the final print and at worst, cause the file to print improperly, if it prints at all. A thorough mastery of polygon creation commands and methods combined with careful editing and checking will result in fewer printing problems.

Compatibility in the exchange of file formats and fonts between the digital prepress files and fonts and those used by the service bureau is important. The fullfeatured printing service bureau used by the UA Cartography Laboratory generally requires conformability to the Adobe standard. This means that graphic files should be compatible with Adobe Illustrator and that fonts used should be Adobe Type 1 fonts. It is possible that other formats will work, however, their use increases the risk of unforeseen problems and delays. If there is any doubt about font compatibility, our service bureaus prefers to eliminate the problem by converting all text to curves or to paths. File formats are also important to the CAD oriented service bureau. They support several versions of AutoCAD, Microstation, and CorelDRAW along with other software in order to directly read client files. If the client has produced files with other software, an import/export file format such as the .DXF format must be used.

Another important form of compatibility relates to the desired final product. What is desired must be compatible with the capabilities of the service bureau. For example, it is important to know early in the planning stages of a map sheet with desirable dimensions of 32 inches by 36 inches that the commercial printer is not able to do a press run of material larger than 30 inches by 30 inches. Parameters such as size, type of paper, type of coating,