Production of Large-Format Interpretation Materials In-House; Using Existing Engineering-type Plotters

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Abstract: Recent technological changes in computers, architectural and CAD/CAM plotters and paper availability make it possible to produce professional interpretive panels in-house, at greatly reduced costs. Many organizations already own the necessary equipment in their Geographic Information Systems (GIS) and/or Engineering shops. Lower equipment costs and increased availability of quality plotters makes it reasonable to purchase plotters for those who don't have them already. Quality interpretive materials can now be readily produced by educators as needed.

Introduction:

For those engaged in educational activities and events, there is always a need for interpretive signage. Trails, vehicle pull-outs, boat ramps, fairs, exhibits, shows, fishing events and any other place where people congregate are all opportunities to educate with good interpretive messages. Until recently, however, costs of producing signs using embedded fiberglass or porcelain enamel steel technologies have been prohibitive for volume or niche production, with costs of over $3,000 per panel not uncommon. While there are good reasons to use these technologies in certain areas, there are many other locations and activities that warrant a lower-cost solution.

For many organizations, the answer already exists in-house, but is used for other purposes. Engineers, architects, planners and Geographic Information Systems (GIS) staff all use some form of a large-format plotter to produce the products that they create. These same plotters are also capable of creating extremely high-quality graphics, with photographic quality.

Until recently, most plotters have been driven primarily by UNIX operating systems on high-powered mid-sized computers and workstations. This is not an environment that is friendly to educators and graphics personnel. But recent improvements in personal computer power and in plotter technology using PostScript®, enables Windows-based and Mac-based software to utilize wide-format plotters.

Also speeding the change are declining costs for powerful personal computers and for wide-format plotters. Wide-format plotters with PostScript® (required for printing Postscript files from software such as PageMaker® and Photoshop®) now are available for as low as $4,500 for 24-inch wide paper. Of course, costs go up from here, but even the standard plotters being purchased by many GIS shops range from $9,000 to $11,000. PostScript® compatibility adds roughly $2,000-$4,000 to a plotters cost, and can be

installed on many existing plotters if it is missing. Plotter quality is improving, with resolutions of 600 dpi standard, and 1200 by 600 dots per inch being readily available. There are also plotters designed specifically for design-shop work, with fast through-put and multiple inks instead of the standard four for CMYK printing (which is fine for most needs.). Plotter widths extend to 54 inches, with 42 inches becoming more and more popular.

But once all the hardware is installed, the costs for producing high-quality posters is reduced to the cost of paper, ink and lamination. A 3-foot by 150-foot roll of coated paper costs less than $30. That can make a lot of posters!

The options of paper to print on are remarkable. In addition to the standard coated stock, these are some of the other papers that are available: photo-based and photo-realistic in gloss and luster; banners made from waterproof vinyl, polyethylene, Tyvek® and cloth; back-print and clear display films; and artist's canvas. Most of these papers are also available with adhesive backing to make them easy to apply to any smooth surface.

For most outdoor use, one needs to be concerned about ultra-violet damage to the inked surface. Options are also available to address this issue. The standard dye-based inks can be replaced with pigment-based inks, greatly enhancing the UV-resistance. UV-resistant inks cost $.69 per ft^2 compared to $.34 per ft^2 for conventional inks, but this is still an economical price. New UV-resistant laminating material also assists in protecting your masterpiece from the ravages of the sun.

In-House Production:
Cost Savings
Why spend all the effort that may be required to horn in on your GIS or Engineering shop's plotters? Wouldn't it be easier to take your file to a commercial production house? It may well be easier, but the trade-off is cost.

To produce your own posters in-house, these are the costs you can expect:
Paper - $.06 to $.75 per ft^2
Ink - $.25 to $.60 per ft^2
Laminate - $.34 per ft^2
Total - $.65 to $1.69 per ft^2

Commercial Graphics Firms - $8 to $15 per ft^2 for printing only. Laminate $5 per ft^2. Total $13 to $20 per ft^2.

For a 3-foot by 4-foot poster, the in-house costs range from $7.80 to $20.28; commercial graphics firms would charge $156 to $240.

In-House Production:
How

The ideal situation is to have your plotter hooked directly to your computer, using standard (USB and parallel port) connections. Then you would simply print to it like you would to any regular printer–it just uses lots-bigger paper!

The 2nd best, and probably the most likely, is to connected to the plotter over your agency's network. The plotter must be Post Script®-enabled for you to print directly from most Windows and Mac graphic programs.

In some instances, you may have to print directly through the UNIX box. This requires several additional steps that are not intuitive to people accustomed to using Windows software. You will need to get a UNIX account and password (this will vary by organization), activate some sort of software that enables your computer to talk to the UNIX computer (telnet to the Internet Protocol address of the UNIX computer, for instance), and use MS-DOS-like commands to navigate and print. This is one way, however, to print PostScript® files on non-PostScript® printers. The PostScript® file can be converted to a .rtl file that the plotter can understand and print. Some plot and printer management software programs allow jobs to be submitted via Internet Explorer or Netscape, converting the PostScript® file to a format that can be printed by most plotters as it is submitted, and avoiding the command-line interface.

Other government agencies may be available locally to provide wide-format printing. For instance, departments of transportation often have print shops to handle production of road and bridge design documents, which are two-feet by three feet, or larger. In addition to being able to print interpretive panels, they probably also have in-house laminating equipment. Costs for these services should be significantly lower than those of commercial houses.

In-House Production:
Issues

Recruit mentors to work through technical issues. All office situations are different but one thing that seems to be common is that there are UNIX specialists, Windows specialists and network specialists. But there are few who can work across all three disciplines. You may find yourself being the one having to bridge the gap. Cultivate co-workers to help. Be patient and persistent, and share your ultimate successes with them.

Get a fast computer with lots of RAM. Graphic files can get very large–up to 200 megabytes for one panel! The faster your computer's CPU and graphics card are, the happier you will be. Maximize the amount of RAM in you system.

Invest in new software. If you are not already familiar with software programs like Photoshop®, PaintShop Pro® , PageMaker®, InDesign® and their counterparts, you will need to make the plunge. These programs require a serious investment in money and in training time. Microsoft Publisher® is a good program to start with when learning the basics of page layout.

Or, partner with a graphics artist who is fluent in these programs and has excellent design skills. Enlarging layouts to display panel size also enlarges the flaws as well as the good stuff. If it starts out ugly, and you make it big, it will be embarrassingly big and ugly.

One item to pay particular attention to is "type". It is tempting to use a program like Microsoft PowerPoint® to design a sign and then save it as a graphic image (.jpg or .tif.) The result, however, when enlarged on a plotter will be unsatisfactory, as the type will be jagged. This is because the type is bitmapped (or rasterized.) To get satisfactory results, the type must be vector-based, which is resolution-independent, and requires that the poster be assembled in a program that supports vector graphics and type.

For more information on using large-format plotters:
//www.wide-format-printers.org
//dmoz.org/computers/hardware/peripherals/plotters
//maya-archeology.org

There are significant rewards to those who venture into the realm of printing interpretive materials in-house using plotters. As a final piece of advice, experiment. Experiment with different papers, different software programs and using different file types. Keep good notes on what works and what doesn't work, and admire the fruits of your efforts as they grace the exhibits of your organization.