EXPERIENCES OF A SAS GRAPHICS USER

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Abstract.

GTE Data Services, Inc. has installed SAS 7.6 with the SAS/GRAPH option. This paper shall describe our introduction into color graphics and the creative uses we have developed. Among the topics to be discussed are the following applications:

(1) A current application uses Proc GDALIDE to provide data for presentations. This procedure is very adaptable to providing a variety of instructional foils, where color emphasizes the key points. The cost of reproducing these foils is still expensive and the demand for color reproducing equipment is not as prevalent as we would like.

(2) Another application uses Proc GPLU to provide color plots. The information can be plotted for presentation effectiveness.

(3) A popular use is the Pie chart produced by Proc GCHART. This chart shows the information for multiple applications.

Introduction.

General Telephone & Electronics Corporation (GTE) is a large, multinational company with business enterprises that include telephone operations, communications products, electrical and electronic products, and telecommunications services. GTE is the parent company of more than 60 communications subsidiaries, including: GTE Telephone Operations, GTE Communications Products, GTE Electrical Products, and Telenet and GTE Laboratories. The GTE Telephone Operations group includes 19 telephone companies, comprising the largest independent (non-Bell) telephone system. GTE Data Services provides a variety of data processing services to these telephone companies through a network of strategically located data centers. These centers have access to SAS.

GTE Data Services, Inc. uses SAS to report computer performance with a number of routines. There was a paper written by Rick Nicola on the development of our SAS Corporate Data Base (Reference 1). Another paper was presented last year on the Performance Statistics of the Honeywell L6 (Reference 2). These papers describe the SAS routines which retrieve performance statistics from our SAS data base and job accounting files, to expand our experience in graphical output.

Our Initial Graphics.

Our initial graphics began with the use of Proc EXPLODE.

Over the past year, in management meetings, we used overhead projection foils, made from EXPLODE output. Obviously this initial approach to textual output provided us with only "black" and "white" color formats, for black and white copies. Proc EXPLODE allowed us to vary the height of character text. However, we were restricted to one character font. With SAS/GRAPH, more options were available, including color.

Originally, we had to report to photographic copy for color, primarily for slides. The slides were made from a variety of color schemes, with white text on blue background being most popular. This color scheme was used in our previous SIGI talk. However to develop our slide presentation we required additional planning and file development costs. With SAS/GRAPH we made a quantum leap forward.

What are the Current Uses.

Using SAS/GRAPH we began to use creative expression with text and color.

In SAS/GRAPH a variety of print fonts, gave options of textual displays for terminal and printing, also varying the height of text allowed distinctive emphasis, so that copies can be made by regular "xerox" reproductions. The reviewing of the textual material on a terminal before printing gave one the option to change ideas readily. Incidentally, we have discovered
that the lowercase option (NOMAPONLY) gives a very readable and attractive text.

The choice of colors for management presentations requires additional consideration. In their paper (Reference 3), Beck, Brownston and Kaufman describe the results of their "Human Factors Study of Color". Their results indicate the importance of human factors considerations in software development. Incidentally, they indicate that giving the user a choice from a small set of values (colors) which are carefully chosen and based upon human factors principles is a better choice than a large set. The selection process needs to be studied. We find primary colors, i.e., blue and green, to be preferred for presentations.

Print Specs agree with SAS

We are mentioning this incident to emphasize that your printer specifications should be reviewed before setting the SAS options.

A problem developed with our current remote printer and the JESS system, which we solved working with our DSU group. Originally our SAS GOPTIONS specified an IBM 3287F printer. However, our remote printer was not field upgraded and we actually had an IBM 3287E. Consequently, when we submitted Proc CHART or G3D we only received a 1/2 page of print with an accompanying I/O error interrupt. Whereas using Proc G3D produced a full page of text. We tested our SAS procedures on another printer and had no problem as it was a fully designated 3287F. We retested these routines on our printer and reviewed its installation specifications. Noting the discrepancy, GOPTIONS were changed to agree with the specifications.

Application Use 1.

Currently Proc GSLIDE is being used to develop training materials and foils for internal management sessions.

These training aids are designed to highlight specific points. We have discovered that font height 3 or 4 is not appropriate for foils. Italic or italic is preferred over Script for readability. The primary colors seem to be favored.

For internal management sessions, a larger font height (4 or 5) makes a flip chart display suitable for small conference rooms. We have found that meeting agendas and separator pages can use this height size. Overhead projection foils can use a variety of font heights, depending on the size of the room and audience size. Regarding colors, blue or green seem to be favorites.

Application Use 2.

Proc GPLOT has been used to describe data in color plots.

We are using Proc GPLOT to denote Response Time statistics in a color format. With the use of the SAS "spLine" option we can connect the points. This option is not currently available with the regular Proc PLOT.

We provide overlay plots of a variety of computer performance categories to be issued to every department on a regular schedule basis. For mass distribution multiple copies are reproduced as black and white, for a small distribution, we get color copies at a local vendor.

Application Use 3.

Proc GCHART has the greatest application in "pie" and "bar" formats.

Normally, we use Proc GCHART as a "pie" chart with option fill = shaded. Interestingly this fill option doesn't reproduce in color as well as fill = solid does. If you reproduce in black and white, fill = shaded is preferred.

Proc GCHART is also used to develop bar charts for management presentations. These charts give management immediate projection of facts and figures.

Comparison SASS/GP/GRAPH vs. GDDM.

Along with our own research, we have customers who are running graphics with SASS/GP/GRAPH and IBM's GDDM (Graphical Data Display Manager) routines.

SASS/GP/GRAPH is syntax oriented while GDDM is screen driven. Changes are made easier in GDDM but are not retained as they are in SASS/GP/GRAPH. Both software products produce the same bar chart and 2.
dimensional plots, with minor changes in the way each package handles headings, etc. GDBM can change these chart and plots quicker (due to being screen driven) and has the on-line 'help' instructions available to users. Only SAS/GRAPH produces geographic maps; 3-dimensional plots and contour graphics. And SAS/GRAPH has more variety in textual representation with PROC GMAP.

Presently we show our customers both products and let them choose the one they prefer.

What is the Future.

We shall present some of our ideas on the future research.

Graphics will take a quantum leap in the near future due to the increasing interest in Graphics activity. According to Carol Tel (Reference 4) the price of hardware, ie computers, terminals, plotting devices has come down. At the price of color reproduction each very reduces, more color graphic reproduction will appear.

As the hardware is in place, we need good software. SAS/GRAPH is very good software. According to Tel, software packages need to be more device independent. SAS/GRAPH has progressed along device independence, due to its simplicity of use and flexibility, SAS/GRAPH is easy to learn. As more of our users catch on we anticipate demand will grow for graphics.

Demand is the last barrier to acceptance in graphics. Outside demand and areas of interest in graphics is expanding in many areas of industry. This is evident by the establishment of standardized terminology (Reference 5). Recently, IBM has devoted an entire research journal (Reference 6) to this subject. Actually the last issue dedicated to graphics was back in 1980. And manufacturing graphics uses CAD/CAM (Computer-Aided-Manufacturing) technology (Reference 7). More computer articles and publications talk about graphics, with interest groups like ACM and other computer societies promoting graphics (Reference 8).

In many applications, the demand for computer graphics shall increase (Reference 9). To satisfy our users' demands, we shall use the potential of SAS/GRAPH and IBM's GDBM software.

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Bibliography.