

Evaluation of Graphics Packages for PCs

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Abstract

This report is a modification of an internal report produced for the Computing Services Department at The University of Liverpool. The report is being modified for external consumption and published by AGOCG since it has relevance to many sites in the HE community.

The report contains the results of an evaluation of some technical graphing packages available for Windows NT. The packages considered were Deltagraph, Origin, Sigmaplot and Grapher. Our intention in carrying out the evaluation was to provide a quality 32-bit package for our new NT service.

From the study, we concluded that Origin was the best choice overall for our purposes but we note that, presently, its educational price is almost prohibitively high for supporting large numbers on a network.

We found that Deltagraph, although rich in features, had several serious drawbacks in the NT environment and that Sigmaplot and Grapher were limited in certain areas of functionality.

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Background to Evaluation

The University of Liverpool has been running Stanford Graphics on the PC Managed Network Service since 1994. This package had been recommended by the IUSC Graphics Working Party in the AGOCCG Technical Report 22. Unfortunately, the suppliers of Stanford Graphics, Visual Numerics, decided in 1996 that it would no longer support or develop the package. Therefore, there will be no 32-bit version of Stanford Graphics for our NT service. [Note that Stanford Graphics does run on the current NT service in 16 bit mode but there is no guarantee that it will continue to run on future versions of NT.]

An evaluation of Graphics Packages for PCs and the Apple Macintosh was undertaken by the Graphics and Multimedia Group at Edinburgh Computing Services on behalf of AGOCCG. Their findings were published in AGOCCG Technical Report 34 in August 1997. It was recommended in this report that Deltagraph should be adopted as the approved graphics package, with the rider that Origin would be a contender if a suitable competitive pricing agreement could be reached.

A favourable CHEST deal for Deltagraph has been made available [£500 to join the SPSS Academic Partners Scheme and thereafter £40 a copy] but, in spite of that, we decided it was necessary to perform an evaluation even though the AGOCCG report was only published last August. We had some misgivings about the technical capabilities of Deltagraph, its integration in the NT environment and especially its long term future after the recent takeover by SPSS. We also noted that a new version of Origin has been released since the report was published.

After a close examination of the tables of features in each package, given by the Edinburgh report, we still did not feel absolutely confident that the technical capabilities of Deltagraph would satisfy the scientists and engineers in our community. We therefore decided we would extend the tables so that they were more comprehensive and had more technical entries, thus giving us a better basis for making our decision.

Although the products under evaluation at Edinburgh were all tested using Windows 3.1, Windows 95 and Windows NT, we were specifically interested in seeing how they performed in the Windows NT 4.0 environment.

Deltagraph was recommended by Edinburgh as a suitable solution for both the PC and the Apple Macintosh. Since we were not necessarily interested in a cross platform solution, we needed to assess how this factor may have influenced their evaluation.

We were very concerned about the intentions of SPSS, regarding future support of Deltagraph for several reasons. We have now had two previous experiences where a well-established technical graphics package (Cricket Graph and Stanford Graphics) has been taken over by a large company and there has been no further development of the product. Also, SPSS own Sigmaplot which is another candidate in our evaluation. This fact has led to some speculation in the HE community that the two products may be merged.

After some correspondence in the Chest-Uniras list on the intentions of SPSS, the Educational Sales consultant at SPSS, in a recent mailing on the future of Deltagraph, forwarded to the list, said "We would like to reassure you that SPSS will be continuing to support this product. However there are no immediate plans to develop Deltagraph and I cannot give you any guaranteed answer as to whether it will eventually be incorporated into another product."

On one SPSS web page, <http://www.spss.com/newsletters/current> (March 1998), it is claimed that "Sigmaplot for Windows and Deltagraph for the Macintosh are the premier graphing tools on the market today". This seems to indicate that SPSS considers Deltagraph to be more of a Macintosh product than a Windows product. It is therefore possible that SPSS will develop Sigmaplot for Windows in preference to Deltagraph for Windows. Thus, bearing in mind both statements from SPSS, we are uncertain about the long-term future of Deltagraph on the Windows NT platform.

One of the main contenders in the evaluation, Origin, has just been released in a new version which is specifically written for and is only available for Windows 95 and Windows NT. Origin has a well-established reputation amongst the scientific community and was chosen in preference to Stanford Graphics in 1994 by some academic institutions, despite an existing CHEST deal for Stanford Graphics

Due to the aforementioned uncertainties regarding Deltagraph and the new version of Origin which has appeared only recently, we felt it would be worthwhile carrying out an evaluation focussed on our specific needs. Clearly, there will be many other HE sites with similar problems to ours and therefore we have offered our report to the community via AGOCCG.

Note that, since no further development is planned for our Windows 3.1 service, we have decided to continue with Stanford Graphics on that service and not to replace it.

Candidates for Evaluation

The recent evaluation by Edinburgh for AGOCC (Technical Report 34) looked at the following products for PCs:

Microsoft Office (Excel and Powerpoint combined)

Microsoft Works

Kaleidagraph

Deltagraph

SigmaPlot

Origin

We immediately rejected the first three packages since they obviously did not cover the range of facilities required in a technical graphics package, according to the AGOCC report.

We decided to add a package, not previously considered, to our list. This is Grapher, which has been developed by Golden Software who are the makers of Surfer and MapViewer. Surfer has excellent facilities for creating 3D surfaces and contour maps - we purchased 10 copies of this package for running on the PCMNS in 1996. We have also been involved with MapViewer at the request of the Geography Department and we have established a good relationship with Geomem who are the UK agents for Golden Software.

Deltagraph

We obtained Deltagraph for less than a month on a sale or return basis from Clecom. We were sent the manual as well, which was very helpful for the purpose of evaluating the software. The software was stored on 7 floppy disks.

Deltagraph has an impressive range of chart types. There is a Chart Advisor which, when the datasets that are to be plotted have been selected, suggests suitable chart types. The package has comprehensive facilities for the editing of a graph or chart and it allows the effects of any change to be previewed before they are applied - this was seen as a useful feature. There is a wide range of file formats for import/export.

Deltagraph also has slide-show facilities but these are limited and we think that users would continue to use Powerpoint for presentations.

Deltagraph does not have a very impressive range of curve fitters or mathematical functions and does not include the ability to make statistical comparisons, easily.

We noticed that Deltagraph allows a double y and double x axis but it does not have the facility to add more axes. Also, it is not possible to add more than one graph type to the original graph.

We are rejecting Deltagraph outright for three good reasons. Firstly, there are no tooltips, when running on Windows NT and this is an acknowledged feature of their NT version. Secondly, we found that various parts of the picture changed colour, for no obvious reason, and it was a cumbersome procedure to rebuild the picture. Thirdly, there seemed to be no consistency in the way the package chose colours, line thicknesses etc for different graph types. The initial picture, with default values selected for the chart items was frequently disappointing. We also found it difficult sometimes to pick items on a graph. All of these features would immediately alienate a large proportion of our graphics users.

SigmaPlot

A demo version of SigmaPlot was downloaded from the SPSS web site - this prevented us from creating any print outs, export files, graph templates so we were not able to test the package completely.

SigmaPlot has been a popular package for a number of years and it was easy to see why. It is a simple, intuitive, friendly package, with excellent help facilities and tutorial, but, at the same time, it does not take long to find out there are many features to satisfy most of our requirements. The fact that its interface is not dissimilar to Stanford Graphics, when creating a graph or chart, is in its favour.

SigmaPlot has a good range of statistical features, curve fitters and mathematical functions. It also has good facilities for editing a graph. It has an algorithm to generate a 3D mesh from a set of random (X,Y,Z) points and so it would be possible to quickly generate a contour map from such data, if necessary. We already possess Surfer which has more sophisticated meshing algorithms so this feature in SigmaPlot is not considered to be very important.

Sigmaplot does not have the full range of chart types that some of the other packages have but most of the ones that are missing are the more esoteric types.

When starting Sigmaplot, a notebook consisting of a worksheet and a graph page is opened. This structure can be inflexible - for instance, it is not possible to associate two worksheets with the same graph. Another poor feature of Sigmaplot is that there are no facilities for importing images.

Origin

A demo version of Origin was downloaded from the Microcal web site. All the features of Origin were present in the demo version but it expired after 7 days which meant it had to be recreated for further testing.

Origin has an excellent range of graphs and charts and has by far the best range of curve fitters, statistical reporting and mathematical functions. It has two algorithms for creating 3D meshes.

Origin has no slide show facilities and there are few formats for importing images.

The main drawback of Origin is that it is expensive. Also, it is not as easy to use as some of the other packages. The Help pages often give unnecessary details and consequently are difficult to follow.

Grapher

On contacting Geomem, we were sent two floppy disks which contained a demo version of Grapher. Although it appeared to cover most of the functions required and it was fairly easy to use and had good help facilities, it was reluctantly decided not to consider this package for a proper evaluation since it had a very limited range of chart types.

Introduction to the tables

The tables are provided under the following general headings so that quantitative comparisons can be made:

General Information

Two Dimensional Plotting

More Business and Technical Charting

Three Dimensional Plotting

Plotting Options

Data Handling

Data Transformation Functions

Data Reporting Functions

Axis and Scaling Options

Graph Formatting Options

Drawing Objects

Text Handling

Output Options

Notes about the tables

We have included Stanford Graphics as a column in the tables since we require any new package to be an adequate replacement for Stanford Graphics, at least.

Some entries are marked as having Unlimited extent. This means that the number is so large that it is hard to imagine anyone wanting to exceed that number!

In the limited time available to us, it was impossible to do an exhaustive check on all the features. If an entry which is crucial to requirements is marked as being 'not available' in the table, then the suppliers of DeltaGraph (SPSS), Sigmaplot (SPSS) or of Origin (Microcal) should be contacted to check that the feature is indeed not currently available.

? Means information is not available/ can not be determined/ do not understand category.

Evaluation of Graphics Packages for PCs

General Information

Feature	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
Version	3.0b	4.04	5.03	4.00
Interface type	Win 3.1	Win NT	Win NT	Win NT
Disk requirements	14+ MB	13+ MB	7+ MB	20 MB
Memory Requirements	4+ MB	8+ MB	16+ MB	24 MB
Batch or script language	No	Yes	Yes	No
Reference Manual	Yes	Yes	Yes	Yes
Self Teach Manual	No	No	Yes	No?
Online Help	Yes	Yes	Yes	Yes
Online Tutorial	Yes	No	No	Yes
Online Demo	No	No	No	No
Graph Wizard/Advisor	No	Yes	No	Yes
Tooltips	No	Don't work	Yes	Yes
Cue Cards	No	No	Yes	No

Web Sites

<http://www.vni.com/stanford.dir/stghome.html> Stanford Graphics

<http://www.spss.com/software/DeltaGraph> Deltagraph

<http://www.microcal.com/www/origin50/index.html> Origin

<http://www.astonsci.co.uk/html/origin.html> Origin

<http://www.spss.com/software/science/sigmaplot/index.html> Sigmaplot

Educational Prices for Deltagraph £500 up front + (£40 rent or £80 purchase) per copy

Sigmaplot £500 up front + (£50 rent or £100 purchase) per copy

Origin 1 to 4 licenses £330 per copy

5 to 9 licenses £290 per copy

10 to 14 licenses £275 per copy

15 to 19 licenses £250 per copy

Evaluation of Graphics Packages for PCs

Two Dimensional Plotting

Feature	Stanford Graphics	DeltaGraph	Origin	SigmaPlot
Scatter plot	Yes	Yes	Yes	Yes
Jointed line	Yes	Yes	Yes	Yes
Smooth (spline)	Yes	Yes	Yes	Yes
Smooth (Bezier)	No	No	Yes	No
Stepped	No	Yes	Yes	Yes
Hi-lo plot	Yes	Yes	Yes	No
Hi-lo-open-close plot	Yes	Yes	Yes	No
Candlestick plot	Yes	Yes	No	No
Box Whisker plot	Yes	Yes	Yes	Yes
Bubble plot	Yes	Yes	No	Yes
Time-line plot	Yes	Yes	Yes	Yes
Area plot	Yes	Yes	Yes	No
Table plot	Yes	Yes	No	No
Organisation chart	No	Yes	No	No
Ternary plot	No	Yes	Yes	Yes
Spider Plot	Yes	Yes	No	No
Ogive plot	No	Yes	No	No
Pareto plot	Yes	Yes	No	No
Star Plot	Yes	No	No	No
Vector plot	Yes	Yes	Yes	No
QC plot	No	Yes	Yes	No
Polar plot	Yes	Yes	Yes	Yes
Waterfall chart	No	No	Yes	No
Cluster plot	Yes	No	No	Yes

Evaluation of Graphics Packages for PCs

More Business and Technical Charting

Feature	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
Bar or column plot (horizontal/ vertical)				
Overlaid	Yes	Yes	No	Yes
Stacked	Yes	Yes	Yes	Yes
Floating bars or columns	Yes	Yes	Yes	No
Variable width bars or columns	No	Yes	No	Yes
Build up to total	No	Yes	No	No
3D bars or columns	Yes	Yes	Yes	Yes
Pie plot				
Exploding segment	Yes	Yes	Yes	Yes
Automatic segments annotation	Yes	Yes	Yes	Yes
Stacked	No	Yes	No	No
Multiple	Yes	Yes	No	No
3D pie plot	Yes	Yes	No	No
Histograms				
One variable	Yes	Yes	Yes	Yes
Two variables (3-d)	Yes	No	No	No
Other plot types				
Combination plots	Yes	Yes	Yes	Yes
Line over bar	Yes	Yes	Yes	Yes
Can overlay any combination	Limited	Limited	Yes	Yes
Maximum number of overlays	No limit	One	50	No limit
Multiple x versus y	Yes	Yes	Yes	Yes
Multiple y versus x	Yes	Yes	Yes	Yes

Evaluation of Graphics Packages for PCs

Three Dimensional Plotting

Feature	Stanford Graphics	DeltaGraph	Origin	SigmaPlot
Line surface plot	Yes	Yes	Yes	Yes
Filled surface plot	Yes	Yes	Yes	Yes
Line contour plot	Yes	Yes	Yes	Yes
Filled contour plot	Yes	Yes	Yes	Yes
Combination surface/contour plot	Yes	No	No	No
Scatter plot	Yes	Yes	Yes	Yes
Scatter plot with drop lines (Horizontal or Vertical)	Yes	Yes	Yes	Yes
Ribbon plot	Yes	Yes	Yes	No
Area plot	Yes	Yes	Yes	No
Trajectories plot	Yes	Yes	Yes	Yes
Polar plot	Yes	No	No	No
Rotates 3-d plots interactively	Yes	Yes	Yes	Yes
Perspective view modification	Yes	Yes	Yes	Yes

Evaluation of Graphics Packages for PCs

Plotting Options

Feature	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
Ignore missing observations	Yes	Yes	Yes	Yes
Extrapolation	No	Yes	Yes	No
Interpolation				
Linear	Yes	Yes	Yes	Yes
Spline	Yes	Yes	Yes	Yes
Parametric	Yes	No	No	Yes
Error Bars				
From data	Yes	Yes	Yes	Yes
Percent errors	No	Yes	Yes	No
Plus/minus constant	No	Yes	No	No
Standard error	Yes	Yes	No	Yes
Standard deviation	Yes	Yes	Yes	Yes
Positive, negative, or both	Yes	Yes	Yes	Yes
Bidirectional error bars	Yes	Yes	Yes	Yes
Asymmetrical error bars	Yes	Yes	Yes	Yes
Curve Fitting				
Linear	Yes	Yes	Yes	Yes
Polynomial (2nd order or higher)	Yes	Yes	Yes	Yes
Exponential	Yes	Yes	Yes	Yes
Logarithmic	Yes	Yes	Yes	Yes
Hyperbolic	Yes	Yes	Yes	Yes
Total fit functions available	7	~20	claims 200	> 100
User Defined Fits	No	Yes	Yes	Yes
Plot directly mathematical functions	Yes	No	Yes	No
Plot confidence intervals for mean y (or y) as 95% and 99% confidence lines	No	No	Yes	Yes
Graph curve data to file	Yes	Indirectly	Yes	Yes

Evaluation of Graphics Packages for PCs

Data Handling

Feature	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
Data Files (import/export)				
ASCII (space-delimited)	Yes	Yes	Yes	Yes
ASCII (comma-delimited)	Yes	Yes	Yes	Yes
ASCII (tab-delimited)	Yes	Yes	Yes	Yes
DIF (Lotus)	Yes	Yes	Yes	Yes
SYLK	No	Yes	No	No
WK1 (Lotus 1-2-3)	Yes	Yes	Yes	Yes
DBF (dBase)	No	Yes	Yes	Yes
XLS (Excel)	Yes	Yes	Yes	Yes
WKQ (Quattro)	No	Yes	No	Yes
Keyboard data entry	Yes	Yes	Yes	Yes
Workstation maximums				
Total data points	Unlimited	256*32K	Unlimited	Unlimited
Total data series	Unlimited	256	425	16,000
Floating point precision				
Number of significant digits	13	15	16	14
User-selectable	Yes	Yes	Yes	Yes
Co-ordinates system				
Rectangular (cartesian)	Yes	Yes	Yes	Yes
Cylindrical	Yes	No	No	No
Spherical	Yes	No	No	No
Editing data and data interpretation				
Selects non-contiguous data	No	Yes	Yes	Yes
Live link to worksheet file	Yes	No	No	No
Link to Excel worksheet	Yes	Yes	Yes	Yes
OLE Export facilities	Yes	Yes	Yes	Yes
Automatic update of graph if worksheet data changed	Yes	No	Yes	Yes

Evaluation of Graphics Packages for PCs

Data Transformation Functions

Feature	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
Work sheet operations				
Logical operators	Yes	Yes	Yes	Yes
Recoding functions	Yes	Yes	Yes	Yes
Data sorting				
Ascending/Descending order	Descending	Both	Both	Both
Swap rows / columns	Yes	Yes	Yes	Yes
Mathematical functions				
Algebraic formulae	Yes	Yes	Yes	Yes
Trigonometric functions	Yes	Yes	Yes	Yes
Inverse trigonometric functions	Yes	Yes	Yes	Yes
Hyperbolic trigonometric functions	Yes	Yes	Yes	Yes
Natural logarithms	Yes	Yes	Yes	Yes
Base 10 logarithms	Yes	Yes	Yes	Yes
Factorials	Yes	No	No	Yes
Error functions	Yes	No	Yes	No
Gamma functions	Yes	No	Yes	No
Bessel functions	Yes	No	Yes	No
Random generator	Yes	No	Yes	Yes
Multiparameter functions	No	No	Yes	Yes
Statistical functions	Yes	Yes	Yes	Yes
Calculus functions	No	No	Yes	No
Histogram functions	No	Yes	Yes	Yes
Data-smoothing functions				
Uniform	No	Yes	Yes	No
FFT	No	No	Yes	Yes
Other methods of smoothing	No	No	Yes	Yes
Re-gridding of 3-d data				
Number of methods	1	None	2	1

Adjustable parameters	Yes	No	Yes	Yes
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Evaluation of Graphics Packages for PCs

Data Reporting Functions

Feature	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
Summary statistics				
Min and Max	Yes	Yes	Yes	Yes
Sum	Yes	Yes	Yes	Yes
Mean	Yes	Yes	Yes	Yes
Median	Yes	Yes	No	No
Variance	Yes	Yes	Yes	Yes
Save summary statistics as data	Yes	Yes	Yes	Yes
Perform FFT	Yes	No	Yes	Yes
Convolution	No	No	Yes	No
Correlation	Yes	No	Yes	No
Multiple Regression	Yes	Yes	Yes	Yes
Save error series as data	Yes	No	Yes	Yes
Save regression coefficients	Yes	Indirectly	Yes	Yes
Goodness-of-fit tests				
CHI-2	No	No	Yes	No
One way ANOVA	No	No	Yes	Yes
t-stat	Yes	No	Yes	Yes
F-stat	Yes	No	Yes	No
P-test	No	No	Yes	Yes
Data Reader				
Read Data Values from plots	Yes	No	Yes	No
Change data on plot	Yes	No	No	No
Select a range of a data plot	No	No	Yes	No
Update data worksheet if plot changed	Yes	No	No	No

Evaluation of Graphics Packages for PCs

Axis and Scaling Options

Feature	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
Axis options				
Top x/Right y	Yes	Yes	Yes	Yes
Double y and x axis	Yes	Yes	Yes	Yes
Multiple scales on one axis	Yes	No	Yes	Yes
Scale axis by constant or other parameter	Yes	No	Yes	Yes
Ticks				
Minor/Major	Yes	Yes	Yes	Yes
In/Out	Yes	Yes	Yes	Yes
Adding text to every Nth ticks	Yes	Yes	Poor	No
Axis breaks / Separated Axes	Yes	Yes	Yes	Yes
Scaling options				
Logarithmic-logarithmic	Yes	Yes	Yes	Yes
Base 10 logarithmic	Yes	Yes	Yes	Yes
Natural logarithmic	No	No	Yes	Yes
Probabilistic scaling	Yes	No	Yes	Yes
Probit Scaling	No	No	Yes	Yes
Range				
Automatic	Yes	Yes	Yes	Yes
Manual	Yes	Yes	Yes	Yes
Notation				
Scientific	Yes	Yes	Yes	Yes
Exponential	Yes	Yes	Yes	Yes
Control of decimal spaces	Yes	Yes	Yes	Yes
Grid lines				
Show grid lines	Yes	Yes	Yes	Yes
Vertical or horizontal lines only	Yes	Yes	Yes	Yes
Background grid on 3-d charts	Yes	Yes	Yes	Yes
Backplanes in 3-d charts	No	Yes	Yes	Yes

Frame around 3-d plot	Yes	No	Yes	No
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Evaluation of Graphics Packages for PCs

Graph Formatting Options

Feature	Stanford Graphics	DeltaGraph	Origin	SigmaPlot
Labels and legends				
Pick up labels from worksheet	Yes	Yes	Yes	No
Add data point labels	Yes	Yes	Yes	No
Add data percentages	Yes	Yes	Pie only	No
Automatic time series labelling	Yes	Yes	Yes	Yes
Edit text directly on chart	Yes	Yes	No	No
Resize legends	Yes	Yes	Yes	Yes
Chart rotation and resizing				
Rotate chart or graph	Yes	No	No	No
Specify a size for chart or graph	Yes	Yes	Yes	Yes
Preserve aspect ratio when resizing	No	No	Yes	No
Lines and point styles:				
Number of line styles	10	15	7	7
Line thickness control	Yes	Yes	Yes	Yes
Number of point symbols	20	Large	14	21
Control of symbol size	Yes	Yes	Yes	Yes
Fill patterns				
Number of fill patterns	20	64	10	27
Use bitmap fill patterns	Yes	Yes	No	No
Import fill patterns	Yes	Yes	No	No
Colours				
Maximum number of colours per chart	117	106	48	64
Pick colours from palette	Yes	Yes	No	No
Pick colours by name or number	Yes	No	Yes	Yes
Custom colour palettes	Yes	Yes	Yes	Yes
Chart Backgrounds				
Solid fill	Yes	Yes	Yes	Yes
Pattern fill	Yes	Yes	No	Yes

Bitmap (imported)	Yes	Yes	No	No
Gradient fill	Yes	Yes	No	No

Evaluation of Graphics Packages for PCs

Drawing Objects

Feature	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
Drawing and annotation tools				
Line/Polyline/Arrow	Yes	Yes	Line/Arr	Line/Arr
Rectangle/Rounded Rectangle	Yes	Yes	Rectangle	Rectangle
Arc/Circle/Ellipse	Yes	Yes	Circle/Ell	Circle/Ell
Bezier curve/ Freehand drawing	Bezier	Yes	No	No
Object manipulation tools				
Align to baseline	Yes	Yes	Yes	Yes
Duplicate objects	Windows	Yes	Windows	Windows
Group/ungroup elements	No	Yes	Yes	Yes
Rotate objects	No	90,180...	No	No
Align objects	No	Yes	Yes	Yes
Snap to grid	Yes	Yes	Yes	No
Give position for objects	Yes	No	No	Yes
Import image or picture				
DXF (AutoCAD)	Yes	Yes	No	No
CGM	Yes	Yes	No	No
EPS	Yes	Yes	No	No
HPGL	Yes	Yes	No	No
DRW (Micrografx Designer)	Yes	Yes	No	No
PCX	Yes	Yes	No	No
TIF	Yes	Yes	No	No
PNG	No	No	No	No
JPEG	No	No	No	No
BMP	Yes	Yes	Yes	No
WMF	Yes	Yes	Yes	No
GIF (Compuserve)	Yes	No	No	No
Workspace control tools				
Redraw	Yes	Poor	Yes	No

Zoom	Yes	Yes	Yes	Yes
Pan	No	No	No	No
Rulers	No	Yes	No	Yes

Evaluation of Graphics Packages for PCs

Text Handling

Feature	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
Number of typefaces supplied	2	1	0	0
Greek characters	Yes	Windows	Yes	Windows
Scientific symbols	Yes	Windows	Windows	Windows
Subscripts and Superscripts	Yes	Yes	Yes	Yes
Date/Time	No	Yes	Yes	Yes
Equation Editor	No	Yes	No	No
Text entry options				
Text editor	Yes	Yes	Yes	Yes
Word-wrap	Yes	Yes	No	No
Shrink text to fit box	No	No	No	No
Text alignment options				
Align text	Yes	Yes	Yes	Yes
Indent text	Yes	Yes	No	No
Justify text	Yes	Yes	No	Yes
Rotate text	Yes	90/180...	45/90.....	Yes
Kerning control	No	No	No	No
Leading control	No	No	No	No
Word charts				
Formatted lists	Yes	Yes	No	No
Outline View	Yes	Yes	No	No
Multicolumn tables	Yes	Yes	No	No
Spell-checker	No	No	No	No
Slide Facilities				
Preview show	Yes	Yes	No	No
Transition/Build	Yes	Yes	No	No
Manual/Timed Advance	Manual	Yes	No	No
Templates/Stylesheets	Yes	Yes	Yes	Yes
Create/Save own stylesheets	Yes	Yes	Yes	Yes

Clipart Library	Limited	Limited	No	No
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Evaluation of Graphics Packages for PCs

Output Options

Feature	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
Output options				
Print preview	No	No	Yes	Yes
Multiple graphs per page	Yes	Yes	Yes	Yes
Print to file	Yes	Yes	Yes	Yes
Graphics file output				
CGM	Yes	No	No	No
DXF	No	No	No	No
EPS	Yes	Yes	Yes	Yes
HPGL	Yes	No	No	No
WMF	Yes	Yes	Yes	Yes
PCX	No	Yes	Yes	No
TIF	No	Yes	No	Yes
PNG	No	No	No	No
JPEG	No	No	Yes	Yes
BMP	Yes	Yes	Yes	Yes
GIF	No	No	No	No

Evaluation of Graphics Packages for PCs

Summary Table

Table	Stanford Graphics	DeltaGraph	Origin	Sigmaplot
General Information	3	4	6	5
Two Dimensional Plotting	17	20	15	10
More Business and Technical Charting	15	16	12	13
Three Dimensional Plotting	13	11	11	9
Plotting Options	17	18	20	19
Data Handling	15	15	14	15
Data Transformation Functions	17	12	22	18
Data Reporting Functions	16	7	18	12
Axis and Scaling Options	20	17	22	21
Graph Formatting Options	19	17	11	9
Drawing Objects	18	20	8	6
Text Handling	17	17	8	8
Output Options	7	7	8	8
Totals	194	181	175	153

Conclusions and Recommendations

One should not read too much from the Summary Table or the final totals since no weights have been added to the more important entries. However, the figures do reinforce some of the conclusions reached in the AGOCG report by the Edinburgh group. Deltagraph has a large range of graphs and charts and has good facilities for enhancing the appearance of graphs and charts and for creating presentations whereas Origin has the widest range of data analysis and transformation functions. If the tables for Data Handling, Data Transformation Functions and Data Reporting were extended to include all of the functions available to Origin users, the gap between Origin and the other packages in those tables would become much greater.

Sigmaplot is not recommended since there are simply too many gaps in the tables. Although the user interface and help pages initially made Sigmaplot an attractive proposition, the facts that it

- has a more limited range of charts and graphs
- it has very poor image import facilities
- it lacks the full range of graph formatting options

mean that Sigmaplot cannot be considered to be the most suitable package for our environment.

If we were just to use the tables for the basis on which to make a recommendation, we would probably choose Deltagraph on the grounds that it does possess most facilities required for producing graphs and charts and for enhancing the appearance and that it is cheaper than Origin. Some of the Data Analysis and Data Reporting functions which are missing in Deltagraph could be accessed indirectly by using Microsoft Excel which is already available on our PC NT Managed Service.

However, unless SPSS quickly solves the particular problems we found when using Deltagraph on our NT Service (see the section **Deltagraph**) and unless SPSS can reassure us that they have a long term commitment to provide support and upgrades for Deltagraph, we are recommending that we approach the suppliers for a suitable deal to use Origin on the PC NT Managed Service for the following reasons:

- We are confident that Origin possesses the more technical facilities that may be required by the Science, Engineering and Economics Departments in the University.
- Admittedly, there are gaps in the range of charts offered, particularly in the statistical type of charts, but most of the missing charts can be created indirectly by manipulating the data. Also, the makers of Origin announced the introduction of some of these statistical charts in the recent update so they are showing awareness of these gaps.
- There are gaps in the drawing facilities, the text facilities and the slide presentation facilities but it is felt these are not very important since it is possible to import the Origin graph into a Powerpoint presentation.

We note that Origin is not as easy to use and that some of the help pages are very detailed. Since we have had a lot of experience in writing self teach guides for various packages, we could explore the possibility of adding a tutorial to the Origin menu. Also, we may find that there are teaching aids available from University sites who already have Origin. In this way, we would satisfy the requirement that the package is usable by students from all faculties in the University.