

RELEASE ANNOTATIONS

This document describes additions and enhancements to Version XVI of STATGRAPHICS Centurion. Comparisons are to version 15.2. There are 5 sections:

1. New statistical procedures
2. Enhancements to existing statistical procedures
3. Data handling
4. User interface
5. Graphics

NEW STATISTICAL PROCEDURES

Design of Experiments Wizard

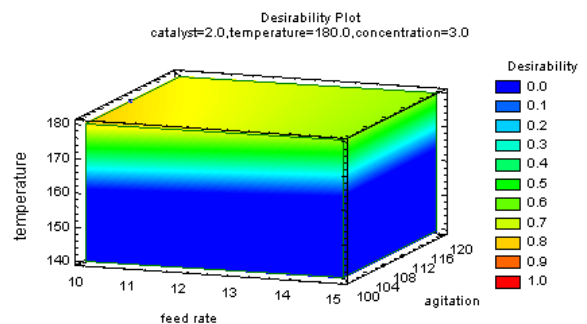
The *Experimental Design* section of STATGRAPHICS contains a new wizard that assists users in constructing and analyzing designed experiments. It guides the user through twelve important steps in the creation of the design:

- Step 1: Define responses
- Step 2: Define exp. factors
- Step 3: Select design
- Step 4: Select model
- Step 5: Select runs
- Step 6: Evaluate design
- Step 7: Save experiment
- Step 8: Analyze data
- Step 9: Optimize responses
- Step 10: Save results
- Step 11: Augment design
- Step 12: Extrapolate

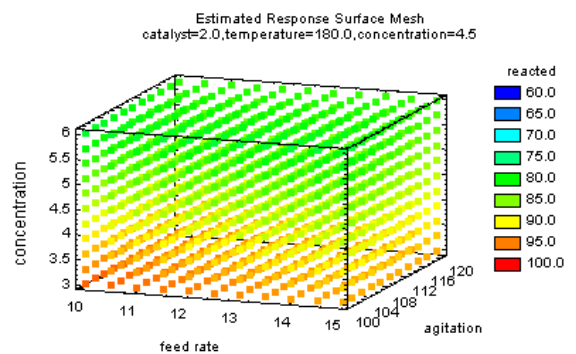
It also includes:

1. New diagnostic plots such as Prediction Variance Plots, Prediction Profiles, Variance Dispersion Plots, and Fraction of Design Space plots.
2. The ability to include both process and mixture

3-D Contour Plot



3-D Mesh Plot



variables in a single design.

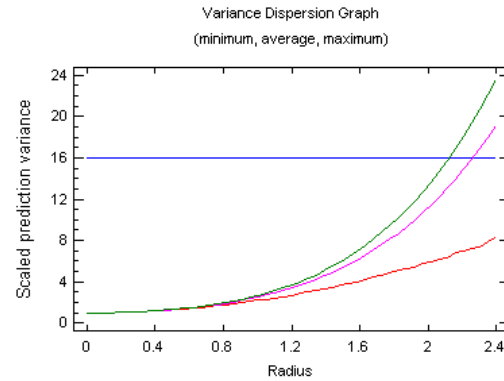
3. Integrated facilities for multiple response optimization based on desirability functions.

4. An option for interactively exploring multiple dimensions using either response surface or contour plots.

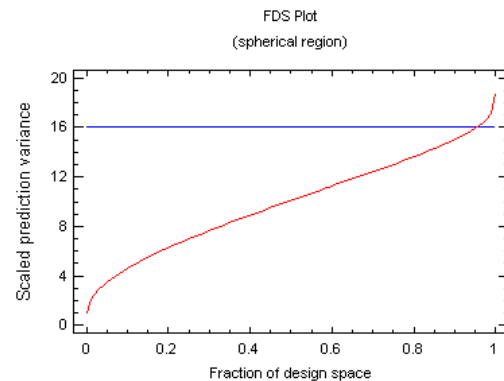
5. Easier extrapolation of fitted models, including path of steepest ascent identification.

6. New facilities for creating robust parameter design using either crossed factors or Montgomery's combined approach.

Variance Dispersion Graph



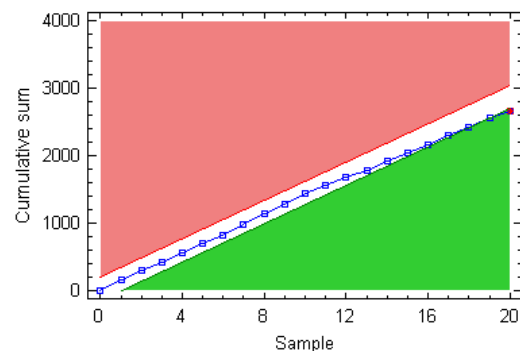
Fraction of Design Space Plot



Sequential Sampling

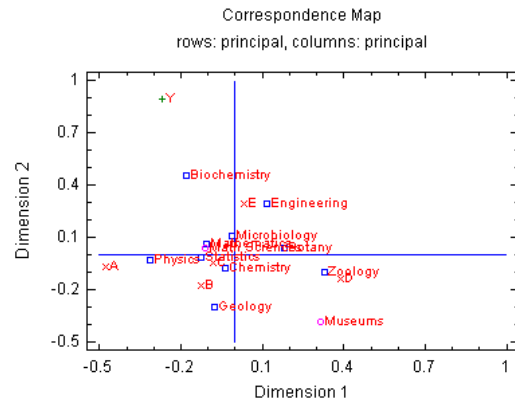
Sequential probability ratio tests can be constructed for testing the mean or standard deviation of a normal distribution, the probability parameter of a binomial distribution, or the rate parameter of a Poisson distribution. Unlike tests with a predetermined sample size, sequential tests obtain samples one at a time. After each sample is obtained, one of three decisions is made: accept the null hypothesis, reject the null hypothesis, or continue sampling. In many cases, a decision will be reached more quickly than from a fixed size hypothesis test. In addition to the test, operating characteristic (OC) and average sample number (ASN) curves are provided.

Sequential Sampling Plot - Measurement



Correspondence Analysis

This procedure creates a map of the rows and columns in a two-way contingency table for the purpose of providing insights into the relationships amongst the categories of the row and/or column variables. Often, no more than two or three dimensions are needed to display most of the variability or "inertia" in the table. An important part of the output is a correspondence map on which the distance between two categories is a measure of their similarity.



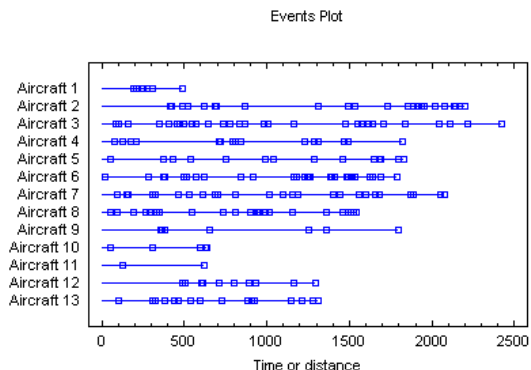
Multiple Correspondence Analysis

This procedure creates a map of the associations among categories of two or more variables. It generates a map similar to that of the *Correspondence Analysis* procedure. However, unlike that procedure which compares categories of each variable separately, this procedure is concerned with interrelationships amongst the variables.



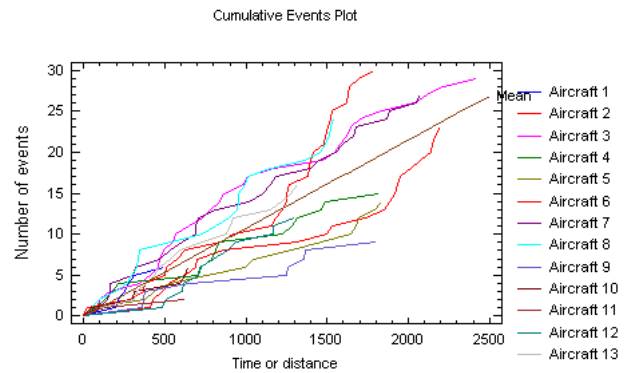
Reliability of Repairable Systems

Two procedures have been added to analyze data consisting of failure times from systems that can be repaired, one for continuous times and one for interval data. It is assumed that when the system fails, it is immediately repaired and placed in service again. The goal of the analysis is to develop a model that can be used to estimate failure rates or quantities such as the MTBF (mean time between failures).



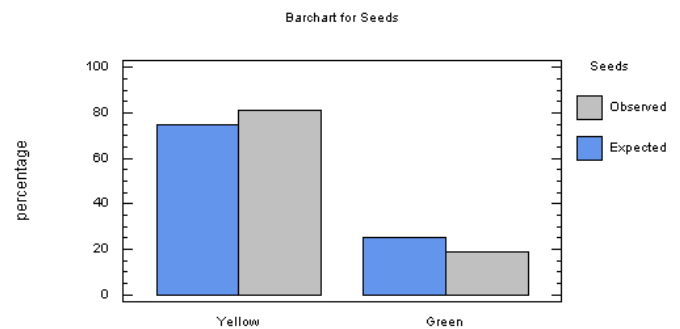
One-Dimensional Point Process Models

Constructs models for events occurring in one dimension (usually time or space). Includes homogeneous and non-homogeneous Poisson process and renewal models with various interevent time distributions.



Frequency Tables

This procedure analyzes a single column containing previously tabulated counts. It displays the counts using either a barchart or piechart. Statistical tests may also be performed to determine whether the data conform to a set of multinomial probabilities.



Sampling Distributions

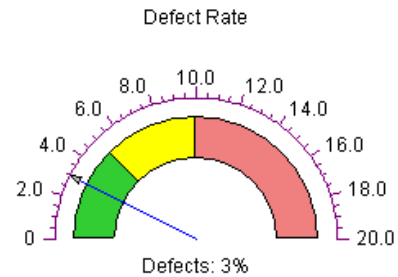
The **Sampling Distributions** procedure calculates tail areas and critical values for four common sampling distributions. It also plots the calculated results.

A screenshot of a software dialog box titled "Sampling Distributions Options". The dialog has a blue title bar with a close button (X) in the top right corner. It contains the following fields and options:

- Lower limit: 8
- Upper limit: 11
- Area: 0.05
- Buttons: OK, Cancel, Help
- Calculate section with radio buttons:
 - Area below lower limit
 - Area above upper limit
 - Area between limits
 - Area beyond limits
 - Lower critical value for specified area
 - Upper critical value for specified area
 - Critical values containing specified area
 - Critical values excluding specified area

Dashboard Gage

Create gages to display the status of critical quality statistics.



MODIFICATIONS TO EXISTING PROCEDURES

Simple Regression	The <i>Simple Regression</i> procedure now permits fitting models without a constant term.
Multiple Variable Analysis	The <i>Multiple Variable Analysis</i> procedure now permits drawing box-and-whisker plots in the diagonal positions of the <i>Matrix Plot</i> .
Multiple Sample Comparison and Oneway ANOVA	The <i>Variance Check</i> pane now conducts F-tests for all pairs of samples, in addition to performing the overall test for equality of variances.
Multiple Regression	The <i>Analysis Options</i> dialog box has been modified to make the Box-Cox and Cochrane-Orcutt procedures more accessible.
Polynomial Regression	The <i>Analysis Options</i> dialog box has been modified to allow an offset value to be specified.
Distribution Fitting (Censored and Uncensored)	Calculated tail areas and critical values may now be saved.
Probability Distributions	If only one distribution is plotted, users may elect to shade an area of the pdf.
Six Sigma Calculator	The <i>Six Sigma Calculator</i> has been converted from a single dialog box to a full procedure.
Time Series Procedures	The data input dialog boxes have been modified to accept a second column containing the times associated with each data value.
Automatic Forecasting	<ol style="list-style-type: none">1. The model list has been reworked so that <i>Random Walk</i> and <i>Random Walk with Drift</i> are separate models.2. The option of estimating or specifying parameters has been structured to be on a model-by-model basis, as is the choice to optimize parameters.3. Additional <i>Model Selection Criteria</i> have been added.4. An <i>Adjustments</i> button has been added to allow adjustments to be applied before the models are fit:

Control Charts

1. The data input dialog boxes now have a field for specifying the date or time associated with each observation or subgroup.
2. Certain control charts now give the option of plotting specification limits in addition to control limits.
3. Alerts can be automatically generated whenever points fall beyond the control limits, runs rules are violated, or selected capability indices fall below specified limits.

DATA HANDLING

Data Viewer

The new STATGRAPHICS *Data Viewer* allows the user to create a table showing all or part of the currently loaded data. The data may be sorted based on up to 3 columns. The *Select* field may also be used to display only a subset of the rows.

DataViewer (MPG City >= 25)

Selection variable: MPG City >= 25

Number of columns: 6

Number of rows: 24

Number of complete cases: 24

Column	Column	Nonmissing	Unique		
Name	Type	Values	Values	Minimum	Maximum
Make	Character	24	17		
Model	Character	24	24		
Type	Character	24	3		
Passengers	Numeric	24	2	4.0	5.0
Mid Price	Numeric	24	23	7.4	18.4
MPG City	Numeric	24	11	25.0	46.0

Variable Names

All restrictions on special characters in variable names have been removed.

DataBook

The maximum number of sheets in the DataBook has been increased from 10 to 26.

Data Files

The primary STATGRAPHICS data file format has been changed from a proprietary binary format to human-readable XML. This enables users to edit the files outside of STATGRAPHICS using any text editor.

```
<?xml version="1.0"?>
<statgraphics_data>
<COLUMNS>
<C1 Name="Make" Comment="" Type="C" Width="13"/>
<C2 Name="Model" Comment="" Type="C" Width="14"/>
<C3 Name="Price" Comment="" Type="N" Width="13"/>
</COLUMNS>
<ROW>
<C1>Acura</C1>
<C2>Integra</C2>
<C3>35000</C3>
</ROW>
</statgraphics_data>
```

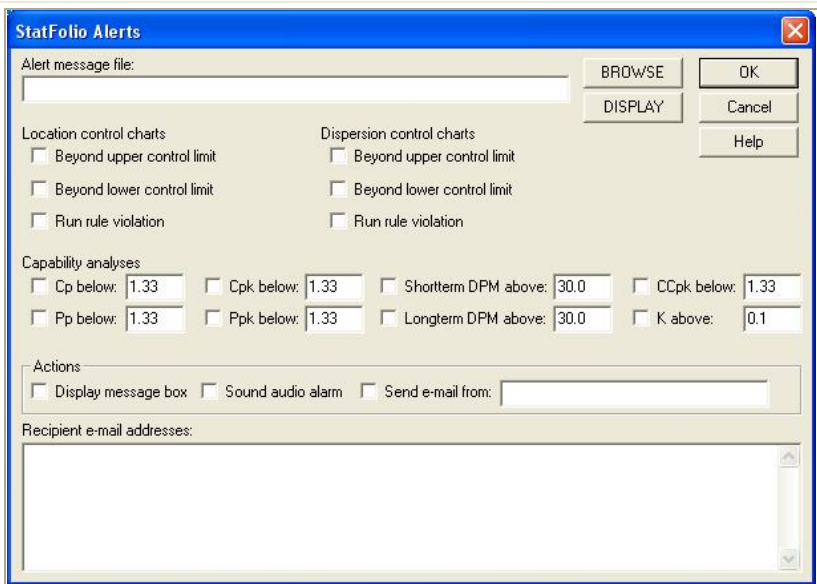
Excel Import

Workbook created in Excel 2007 format can now be imported directly into the STATGRAPHICS DataBook.

USER INTERFACE

StatFolio Alerts

StatFolios may be set to automatically generate alerts whenever certain conditions occur. Message boxes, audio alarms, and automatic e-mail notification are available options.

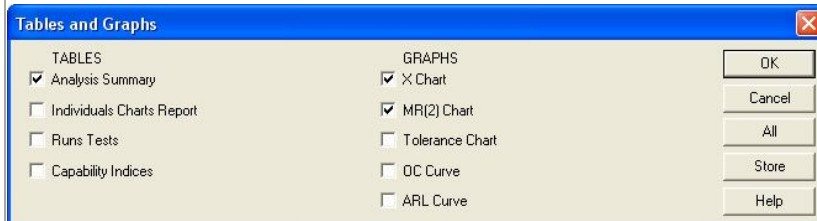


Executing Procedures

The sequence of steps for executing procedures has been modified as follows:

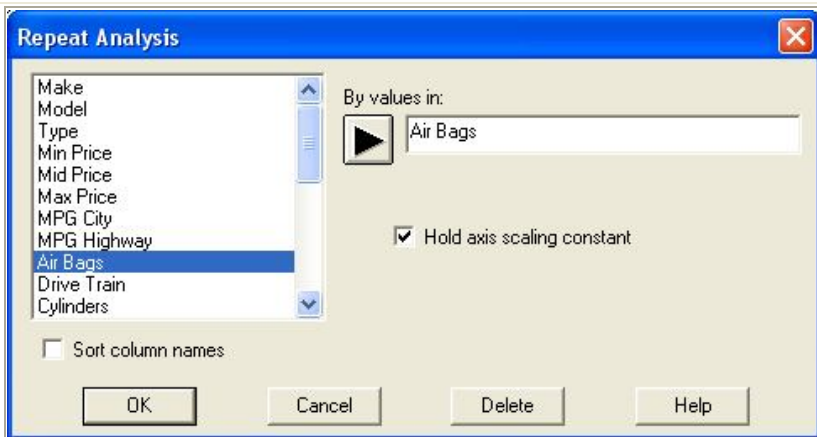
1. A data input dialog box is displayed.
2. If the analysis has an Analysis Options dialog box, it is displayed so that the user can select options before the analysis is run.
3. A combined Tables and Graphs dialog box is displayed so that the user can select the desired tables and graphs.
4. An analysis window opens with the selected tables and graphs.

The *Tables and Graphs* dialog box contains a button labeled *Store*. When pressed, the current selection of tables and graphs becomes the default selection for the current analysis.



Repeat Analysis "BY"

A new option has been added to the Edit menu that allows users to run an analysis for each unique value contained in a "BY" variable.



File Menu MRU List

The MRU (most recently used file) list has been extended to 6 files each for StatFolios, data files, and XML scripts.

System Preferences

Users may now exchange system preferences by exporting them to an XML file and importing them into another copy of the program.



XML Scripts

The File menu has two new additions: *Execute XML Script* and *Create XML Script*. XML scripts are an alternative to StatFolios that allow users to read data and create analyses through a scripting language. This same scripting language is understood by the new STATGRAPHICS .NET Web Services.

```
<?xml version="1.0"?>
<statgraphics>
  <Data Sheet="A" Source="stresstest.sgd"/>
  <Proc Name="ANOVA">
    <Input>
      <Y Value="minutes"/>
      <Factor Value="body fat"/>
      <Factor Value="gender"/>
      <Factor Value="smoking"/>
    </Input>
    <Options>
      <MaxInteraction Value="2"/>
    </Options>
    <Output>
      <Table Name="Summary"/>
      <Table Name="ANOVATable"/>
      <Graph Name="Scatterplot">
```

```

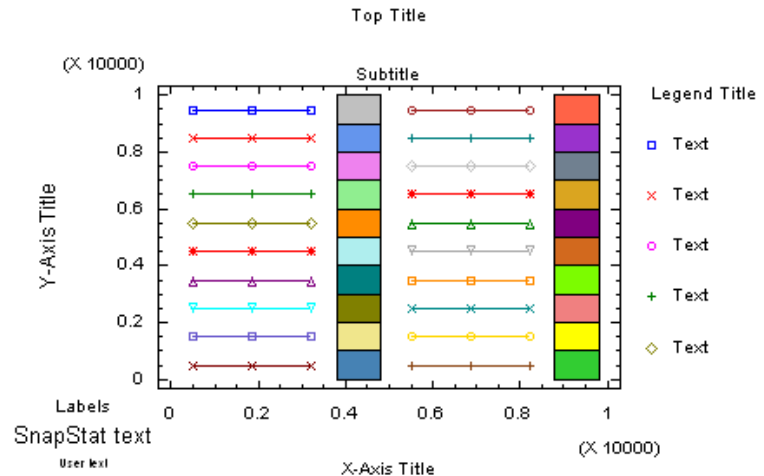
<Factor Value="2"/>
</Graph>
<Graph Name="GraphANOVA">
  <YaxisTickmarkSize Value="9"/>
</Graph>
</Output>
</Proc>
</statgraphics>

```

GRAPHICS

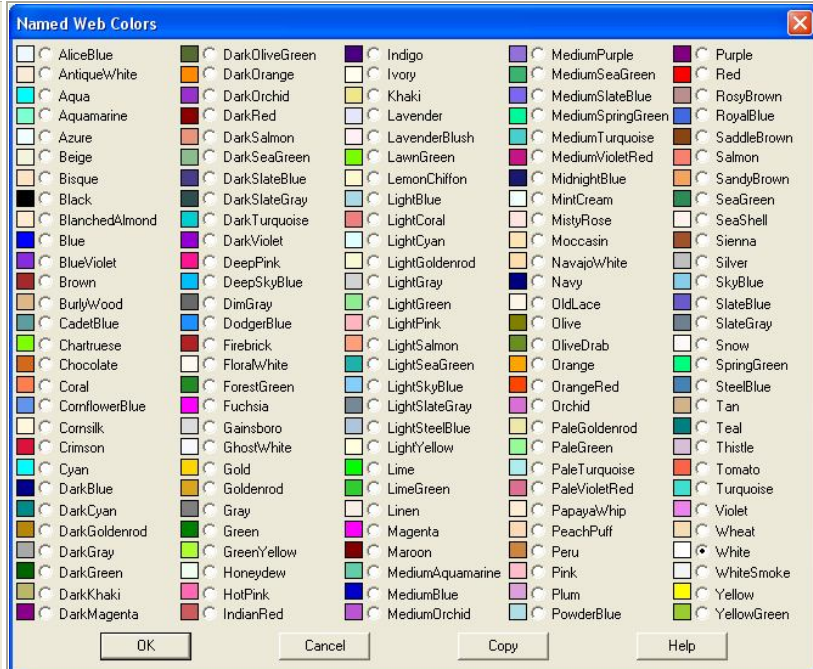
Graphics Profile Designer

A new procedure has been added to assist user in setting graphics profiles. It displays sample 2D and 3D plots that use all of the STATGRAPHICS graphics attributes so that they may be easily set and saved in user profiles.




Named Web Colors

Colors may now be selected based on common web names, in addition to the interactive color selection dialog boxes.



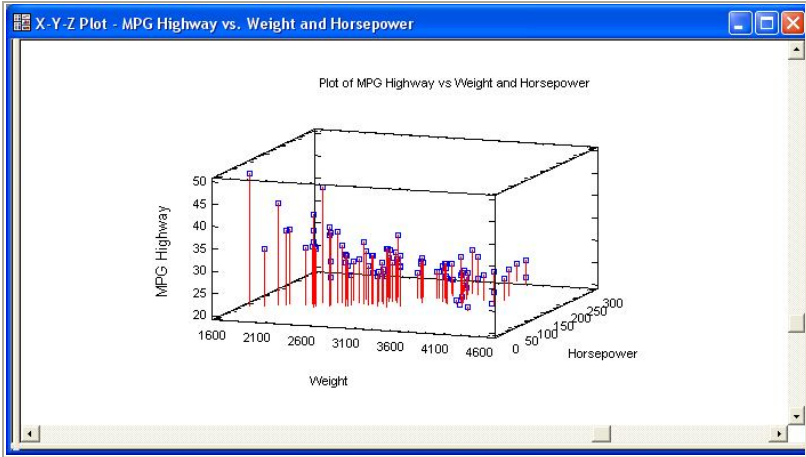
Pan and Scroll

A new icon has been added to the toolbar in the shape of a magnifying glass  that allows users to zoom in on a graph and then scroll and pan. This is particularly helpful when displaying a large number of data points.



Interactive 3D Rotation

When a 3D graph is maximized, scrollbars are now placed below and to the right of the graph. The scrollbar at the bottom allows the user to interactively rotate the graph left or right. The scrollbar at the right rotates the graph up or down.



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