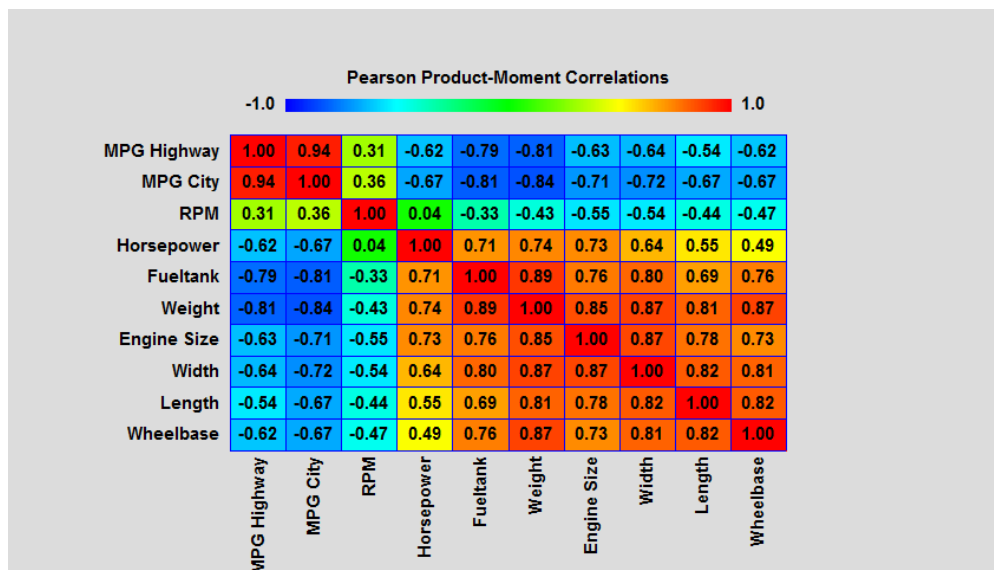


**Statgraphics Centurion XVII** (currently in beta test) is a major upgrade to Statpoint's flagship data analysis and visualization product. It contains 32 new statistical procedures and significant upgrades to 20 other existing procedures. The images below show some of the most significant enhancements. For a description of all Version 17 enhancements, download [Statgraphics Centurion Version 17 Enhancements.pdf](#).

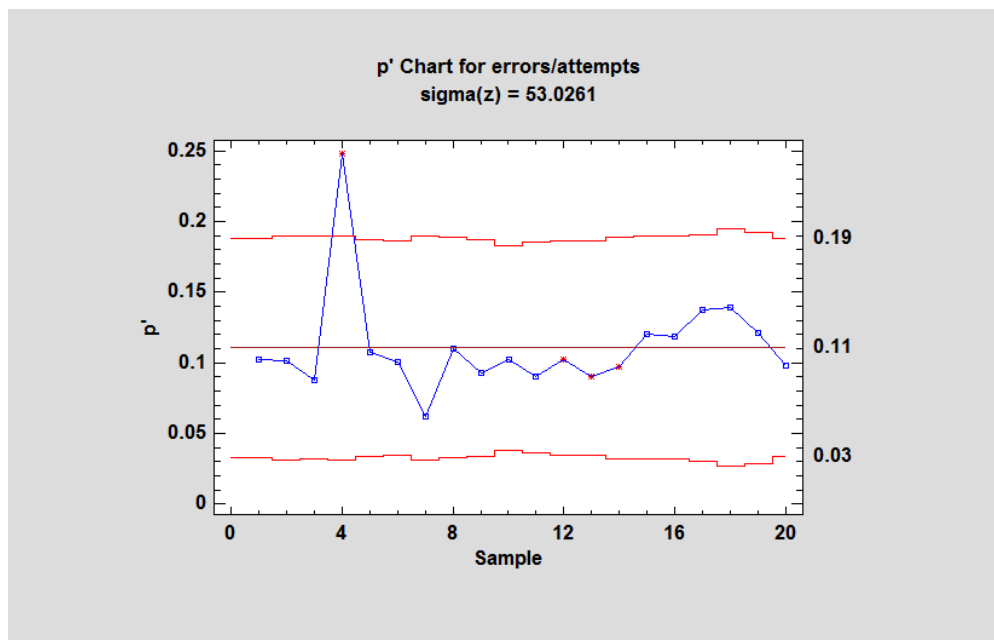
## Correlation Plot

The Correlation Plot (also called a corrgram) displays the estimated correlations or partial correlations for a set of quantitative variables in the form of a matrix with colored cells. If desired, only cells with statistically significant correlations will be displayed.



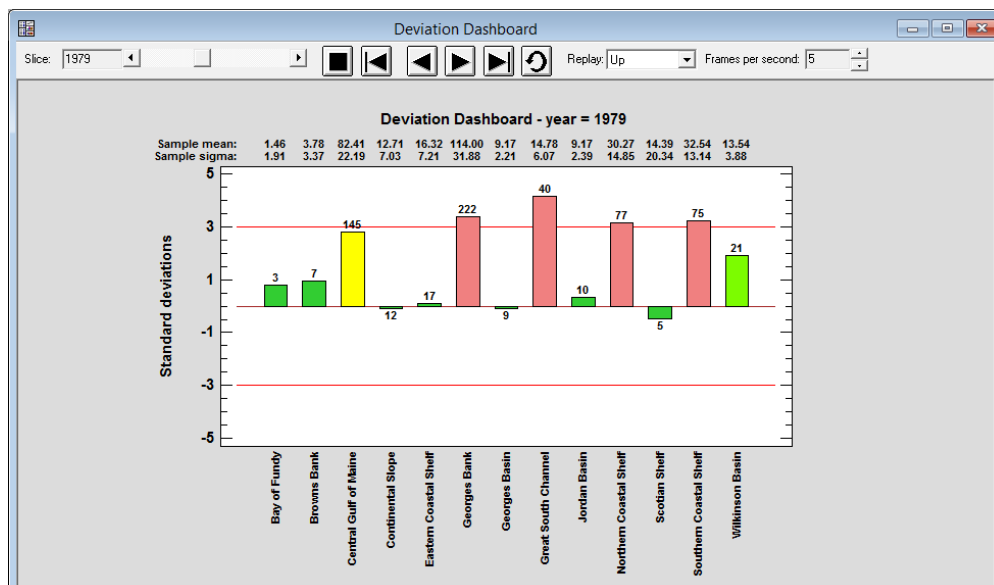
## Laney P' and U' Control Charts

New control charts have been added to monitor overdispersed rates and proportions. Tests have been added to the existing P and U charts to determine when these charts should be used.



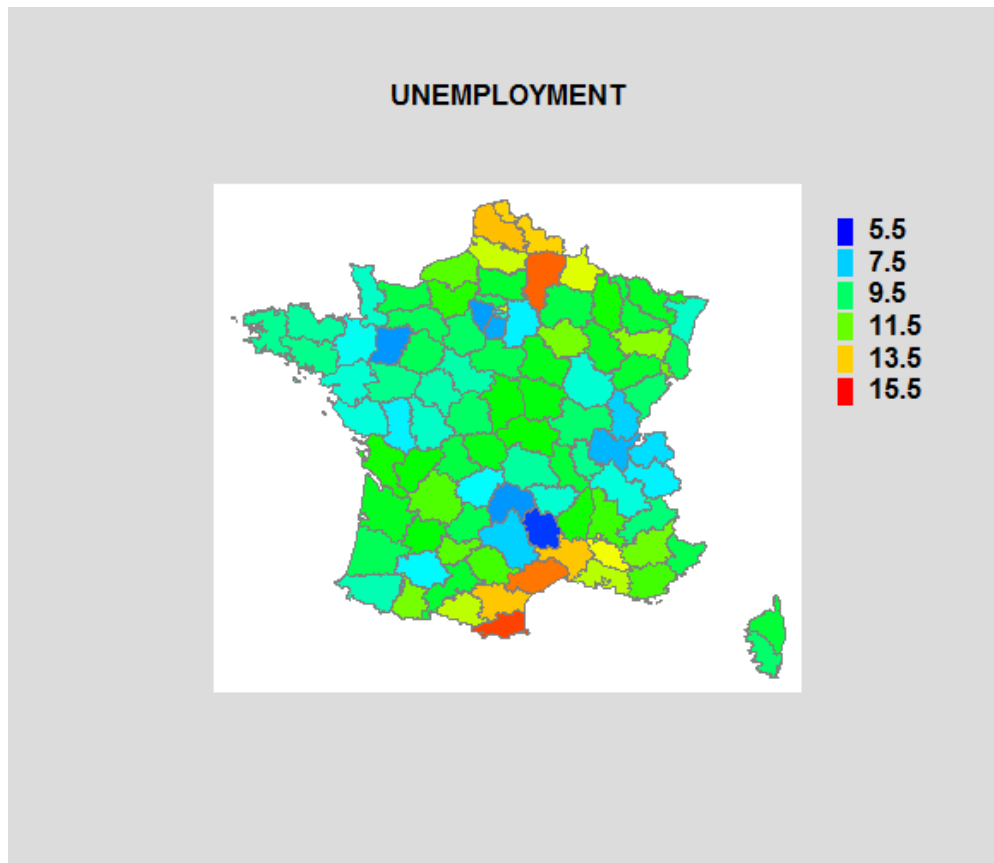
## Deviation Dashboard

This new Statlet indicates the status of multiple variables by displaying how much they deviate from their respective means. The primary format shows each variable using a vertical bar, the color of which indicates how many standard deviations the variable is from its mean. The controls on the Statlet toolbar interactively change the time period for which the data is displayed.



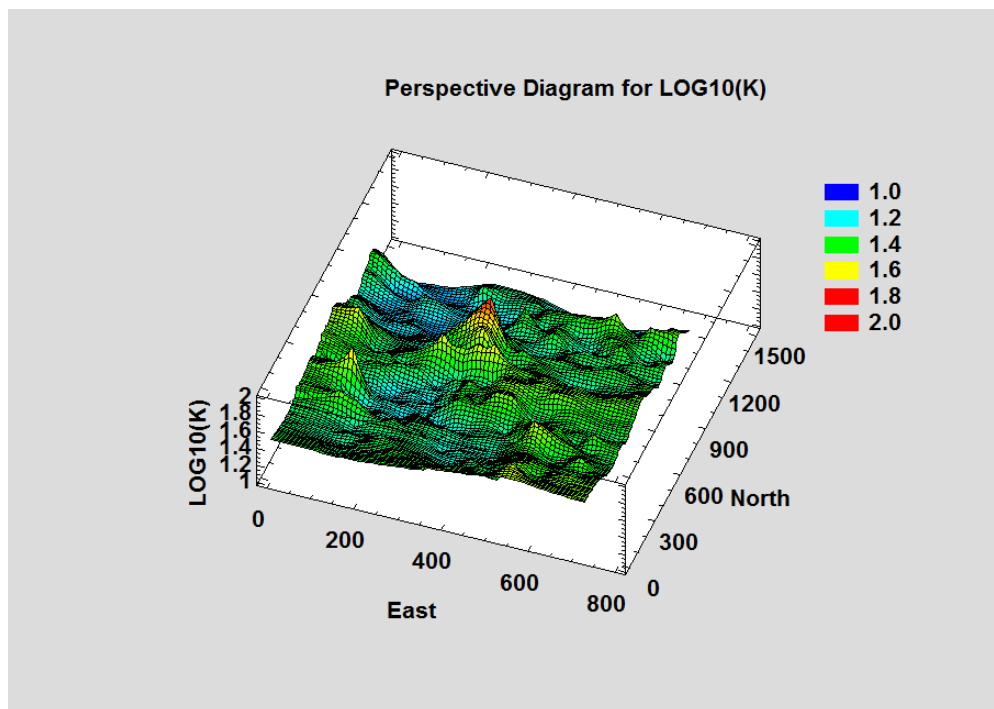
## Demographic Maps

The *Map by State* procedure has been renamed *Demographic Map* and moved to the *Plot* menu. It can now create maps for any regions defined by a BNA boundary file. A new gradient fill may be used to indicate the level of a selected quantitative variable.



## Kriging

A new procedure has been added for estimating the value of a random variable based on measurements made at locations distributed throughout a 2-dimensional region. Called Kriging, the procedure first creates a variogram to estimate the spatial dependence between measurements. Estimates are then made at unmeasured locations throughout the region.



## Computer Generated Designs

*Computer Generated* designs, created by the DOE Wizard, are experimental designs which have optimal properties with respect to the estimation of specific statistical models. Given the definition of an experimental region (including linear factor constraints), a model to be estimated, and the number of experimental runs that can be performed, the program searches for a set of runs that maximize a selected design criteria (A, D, G or I optimality).

Computer Generated Designs

	BLOCK	temperature degrees C	pressure bar	speed cpm	supplier
1	1	211.5	3.2	41.0	1
2	1	211.5	3.2	41.0	2
3	1	211.5	2.45	50.0	3
4	1	193.0	2.7	41.0	1
5	1	193.0	3.2	50.0	2
6	1	211.5	2.7	41.0	3
7	1	230.0	3.2	50.0	2
8	1	193.0	2.2	50.0	1
9	1	211.5	2.7	41.0	3
10	1	193.0	3.2	32.0	3
11	1	230.0	2.95	32.0	2
12	1	230.0	2.2	41.0	2
13	1	202.25	2.2	32.0	3
14					
15					
16					
17					
18					
19					
20					
21					
22					

Optimize  
☒ I-efficiency  
☐ D-efficiency  
☐ A-efficiency  
☐ G-efficiency

Display  
☒ Original units  
☐ Coded units  
☒ Randomize run order

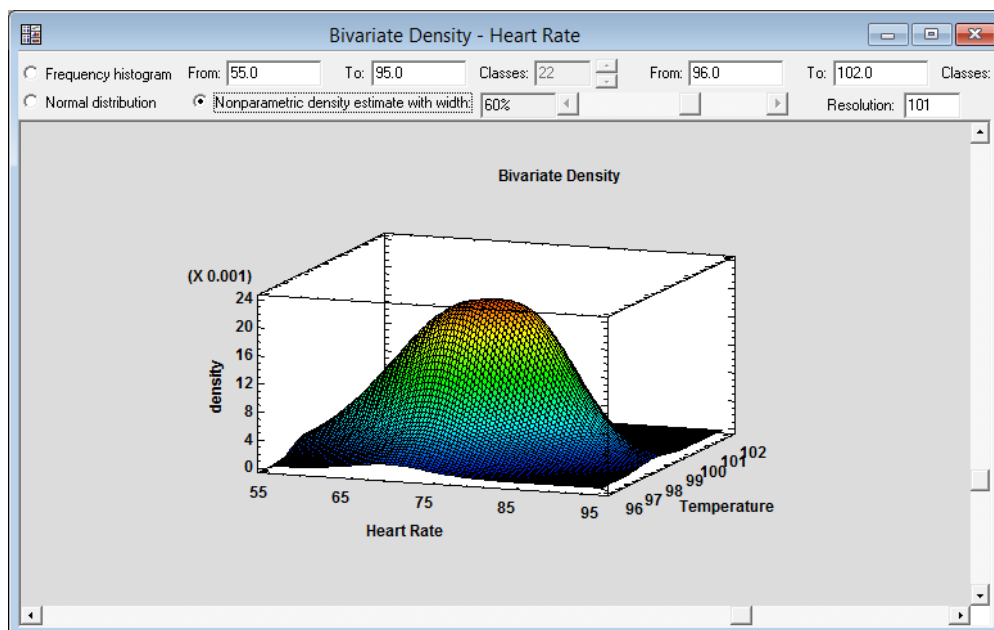
Number of coefficients: 10  
 Number of base runs: 13  
 Number of replicates: 0  
 Number of centerpoints: 0  
☒ Group runs in blocks of size: 1000

Average prediction variance: 0.581279  
 D-efficiency: 37.55%  
 A-efficiency: 26.68%

OK  
 Cancel  
 Help  
 Create  
 Advanced

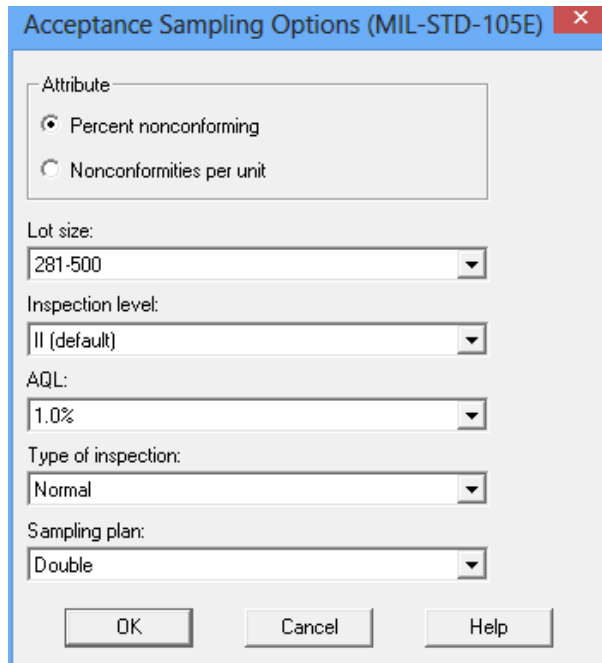
## Bivariate Density Estimation

A new Statlet has been added to display the joint distribution of 2 random variables. The estimated density function may be displayed using a bivariate frequency histogram, a bivariate normal distribution, or a nonparametric density estimate.



## MIL-STD-105E, 414, and 1916 Acceptance Sampling Plans for Attributes and Variables

New procedures calculate the required sample sizes for implementing standard acceptance sampling plans. The plans include "zero acceptance number" sampling plans in which a lot of  $N$  items is accepted if a sample of  $n$  items has no nonconforming members. Single, double and multiple sampling plans are included.



Acceptance Sampling Options (MIL-STD-105E)

Attribute

☒ Percent nonconforming  
☐ Nonconformities per unit

Lot size:  
281-500

Inspection level:  
II (default)

AQL:  
1.0%

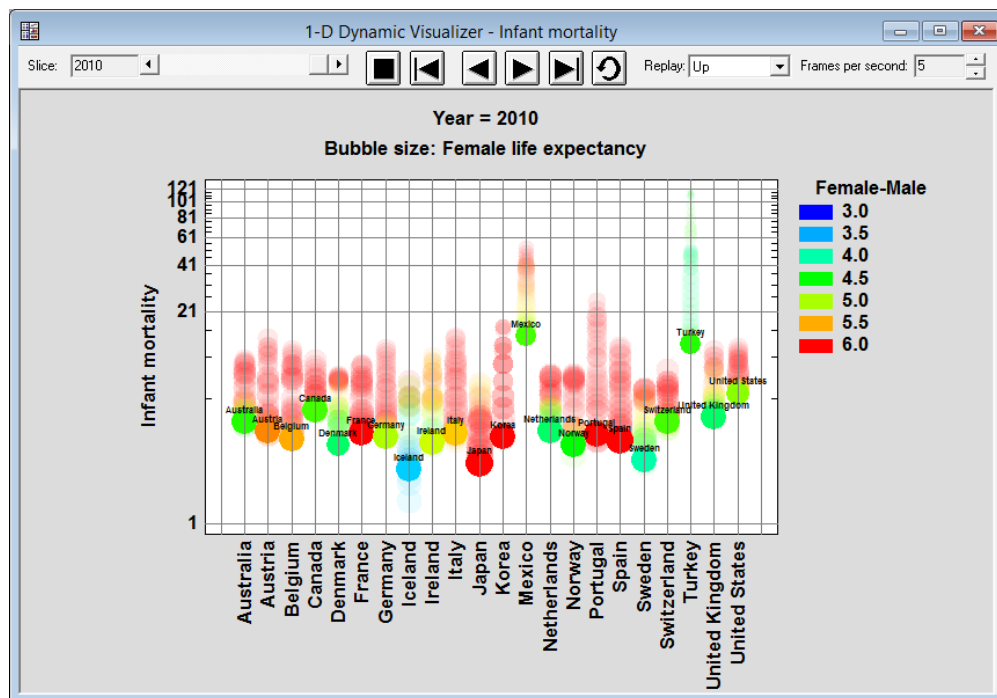
Type of inspection:  
Normal

Sampling plan:  
Double

OK Cancel Help

## Dynamic Visualizers for Multiple Time Series

Three new Statlets have been developed to help users visualize the changes in multiple variables over time. Given  $n$  time series observed over  $p$  time periods, the program generates a dynamic display that illustrates how each of the variables has changed over time. The controls on the Statlet toolbar let the user change the period for which the data are displayed.



## Repeated Measures ANOVA

New procedures have been added to facilitate the analysis of oneway and twoway repeated measures designs. Included in the procedures is Mauchley's test for *sphericity*, which is a condition requiring that the variance between any two estimated treatment means be the same. Corrections to the standard F-test are included for cases when sphericity is not present. Alternative MANOVA tests are also included.

## Sphericity Tests and Adjustments

### Mauchly's Sphericity Test

W	Chi-square	Df	P-value
0.712325	1.9411	5.0	0.857233

### Epsilon

Huynh-Feldt	Greenhouse-Geisser	Lower-bound
1.0	0.804865	0.333333

### Tests of Within-Patient Effects

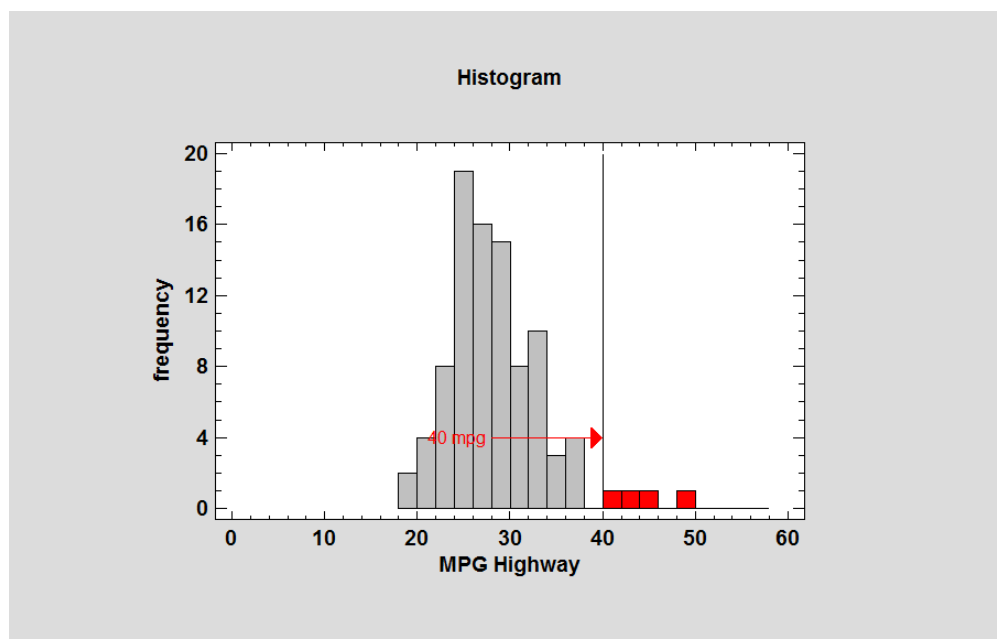
Source	Sphericity Correction	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Time	None	667.594	3.0	222.531	39.05	0.0000
	Huynh-Feldt	667.594	3.0	222.531	39.05	0.0000
	Greenhouse-Geisser	667.594	2.41459	276.483	39.05	0.0000
	Lower-bound	667.594	1.0	667.594	39.05	0.0004
Error(Time)	None	119.656	21.0	5.69792		
	Huynh-Feldt	119.656	21.0	5.69792		
	Greenhouse-Geisser	119.656	16.9022	7.07935		
	Lower-bound	119.656	7.0	17.0937		

### Multivariate Tests

Test	Value	F	Hypothesis D.F.	Error D.F.	P-Value
Wilks' lambda	0.0387258	41.371	3.0	5.0	0.0006
Pillai trace	0.961274	41.371	3.0	5.0	0.0006
Hotelling-Lawley trace	24.8226	41.371	3.0	5.0	0.0006
Roy's largest root	24.8226	41.371	3.0	5.0	0.0006

## Graphics - Object Editing

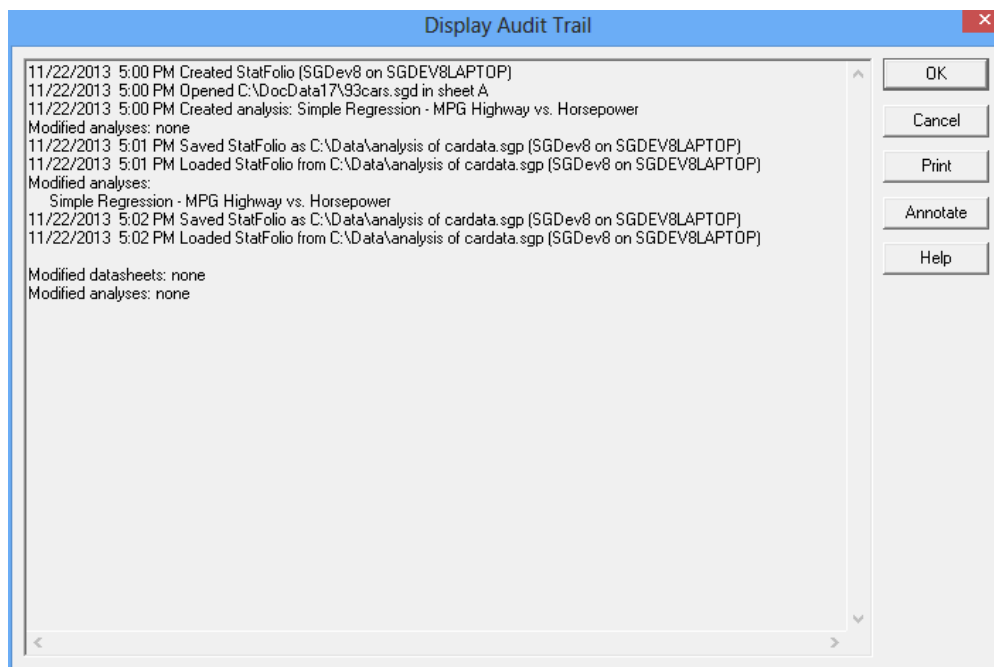
New features available in all graphs include: addition of objects such as arrows, lines and rectangles; highlighting selected objects such as selected bars in a histogram; interactive manipulation of text font sizes; improved recording of videos; enhanced zoom and pan; highlighting of points by a secondary variable.





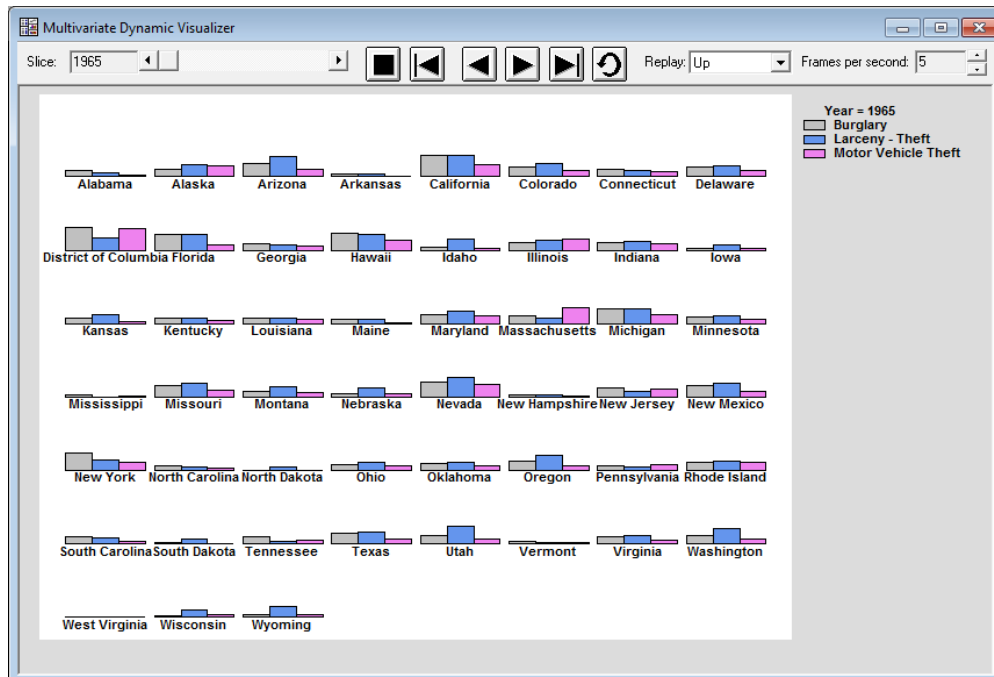
## Audit Trails and Electronic Signatures

Beginning with Version 16.2, Statgraphics Centurion saved as part of a StatFolio an audit trail that tracks important events in the life of a StatFolio (the main Statgraphics document). Version 17 adds an electronic signature to the audit trail, created from the username and computer name of the active Windows session.



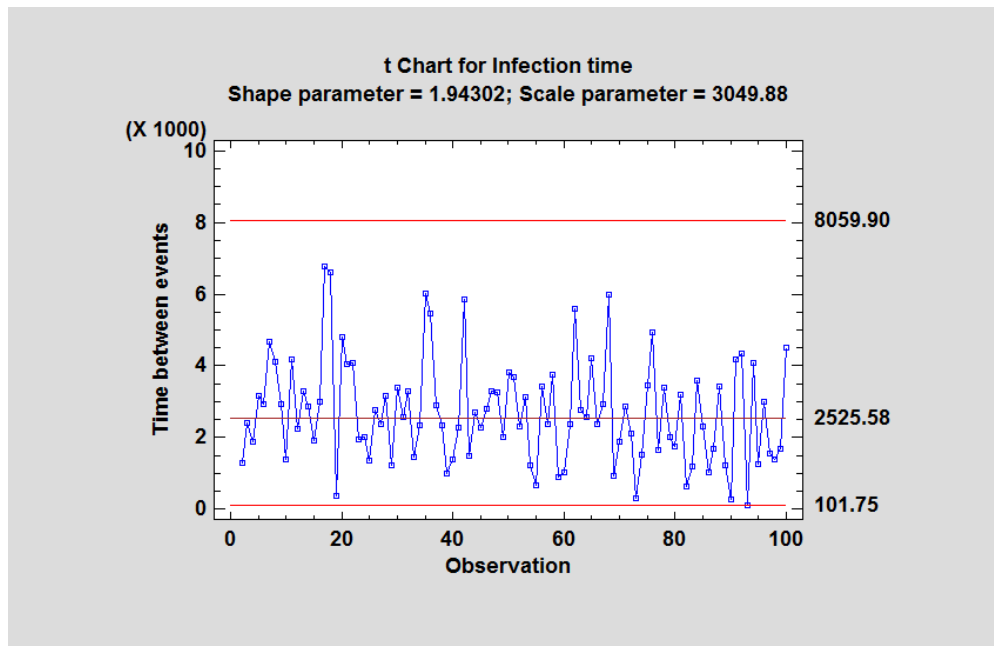
## Multivariate Visualizer

This new Statlet is designed to plot multiple time series in a manner that helps users visualize the changes in multiple variables over time. Given  $n$  samples for each of  $m$  variables observed over  $p$  time periods, the program generates a dynamic display that illustrates how each of the variables has changed over time. Several different types of plots may be created, including barcharts, piecharts, profile plots, strip plots, starplots, and Chernoff faces. As time evolves, the analyst can follow changes in all of the variables and all of the samples simultaneously.



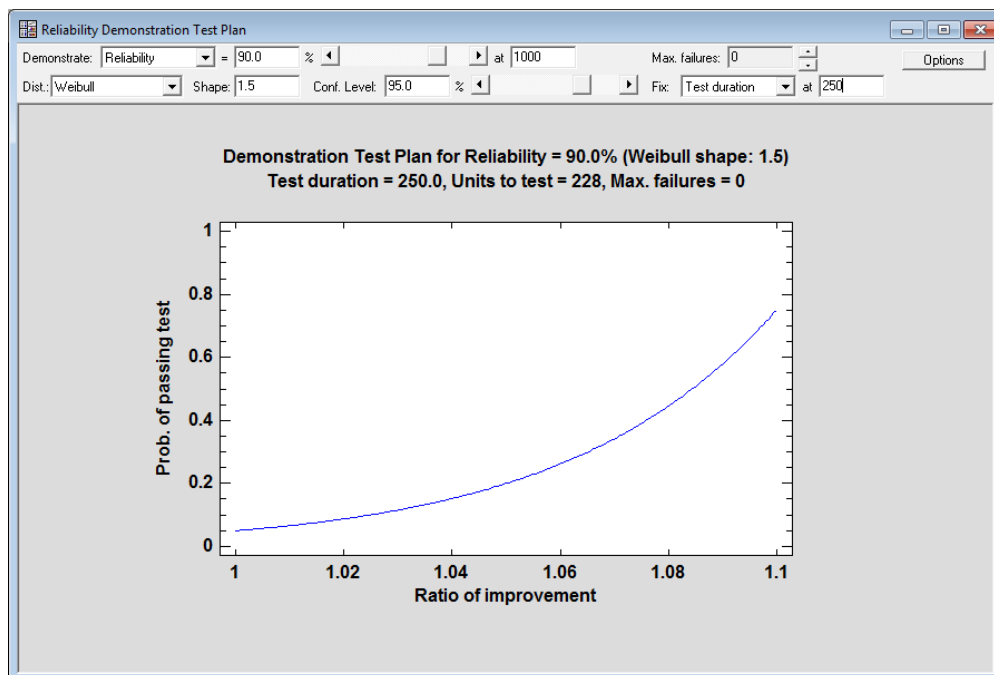
## G and T Control Charts

These new procedures create control charts for the length of time between the occurrence of rare events. They are based on the geometric and Weibull distributions, respectively. These type of charts are used frequently in the health sciences to monitor the occurrence of events such as post-surgical infections. Input data may consist of either the times at which events occurred or the length of time between events.



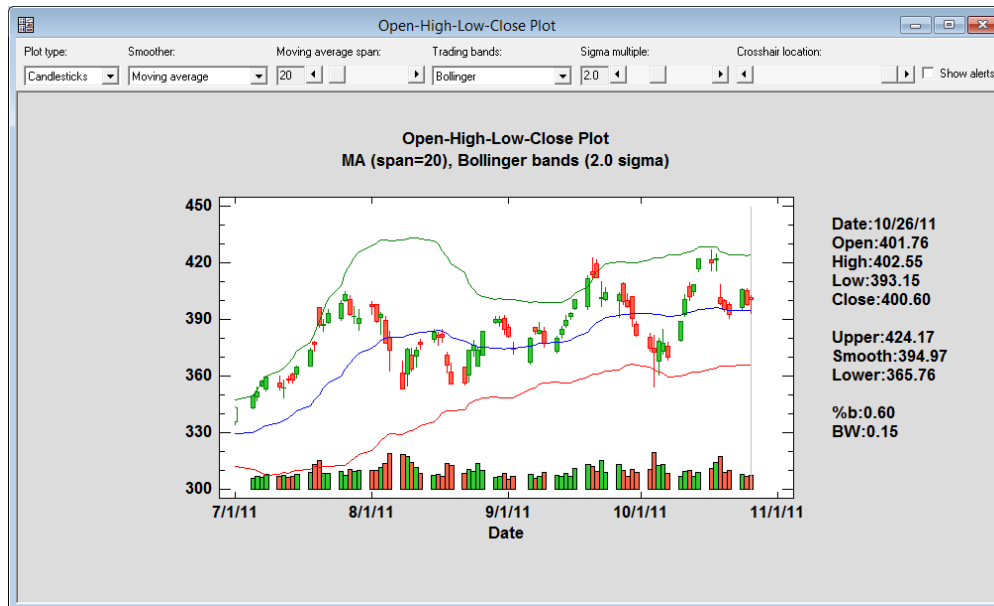
## Reliability Demonstration Test Plans

This new Statlet creates test plans to demonstrate that a failure time distribution satisfies stated conditions. For example, it may be desired to show with 95% confidence that the reliability of a product equals or exceeds 90% at the end of the warranty period. During the demonstration,  $n$  units will be tested for a duration equal to  $t$ . The demonstration will be considered successful if no more than  $f$  units fail during the test. The user specifies either the number of units to be tested or the duration of the test. The procedure solves for the other quantity.



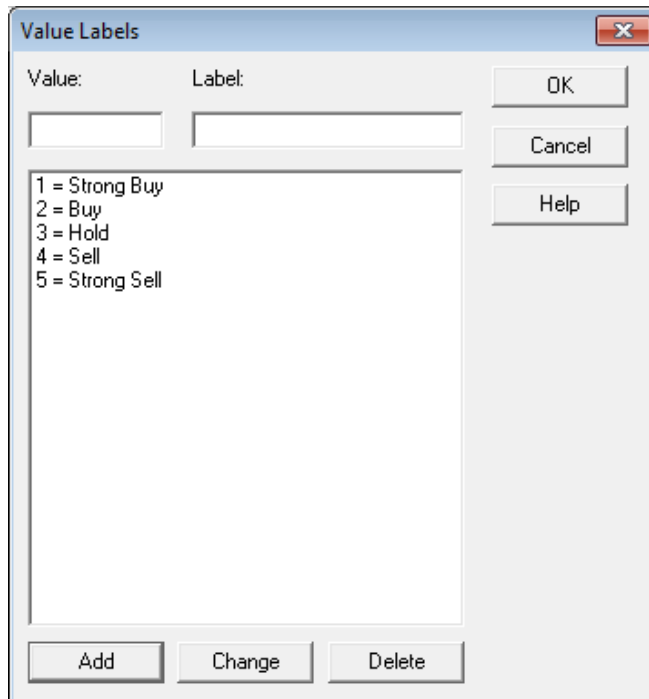
## Open-High-Low-Close Candlestick Plot

This new Statlet is designed to plot security prices in a manner often used by stock traders. It shows the opening price for each trading session, high and low prices during the session, and the closing price using a graphical image often referred to as a candlestick. Trading bands may be plotted around the smoothed line at either a fixed percentage or using the method developed by Bollinger. Trading volumes may also be displayed as bars along the bottom of the plot.



## Value Labels

Value labels may now be associated with numeric columns. Value labels are character strings that replace specific values in the column when output for that column is displayed. For example, stock analysts sometimes classify individual securities as "Strong Buy", "Buy", "Hold", "Sell", or "Strong Sell". Rather than entering those strings in a character column, it is often easier to enter numbers such as 1, 2, 3, 4 or 5 in a numeric column. By creating value labels that correspond to each of those numbers, you can have the strings appear in all output in place of the corresponding numbers.



## Increased Data Capacity

Version 17 has been enhanced so that it can handle larger data sets than earlier versions. Rather than loading all of the data into the databook, only a limited number of records are loaded at any time for viewing. The algorithms for calculating various statistics have also been reworked to handle more data.

### Simple Regression - Y vs. X

Dependent variable: Y  
Independent variable: X  
Linear model:  $Y = a + b \cdot X$   
Number of observations: 1000000

#### Coefficients

	Least Squares	Standard	T	
Parameter	Estimate	Error	Statistic	P-Value
Intercept	10.0023	0.00198327	5043.34	0.0000
Slope	-3.70724E-8	9.46085E-8	-0.391851	0.6952

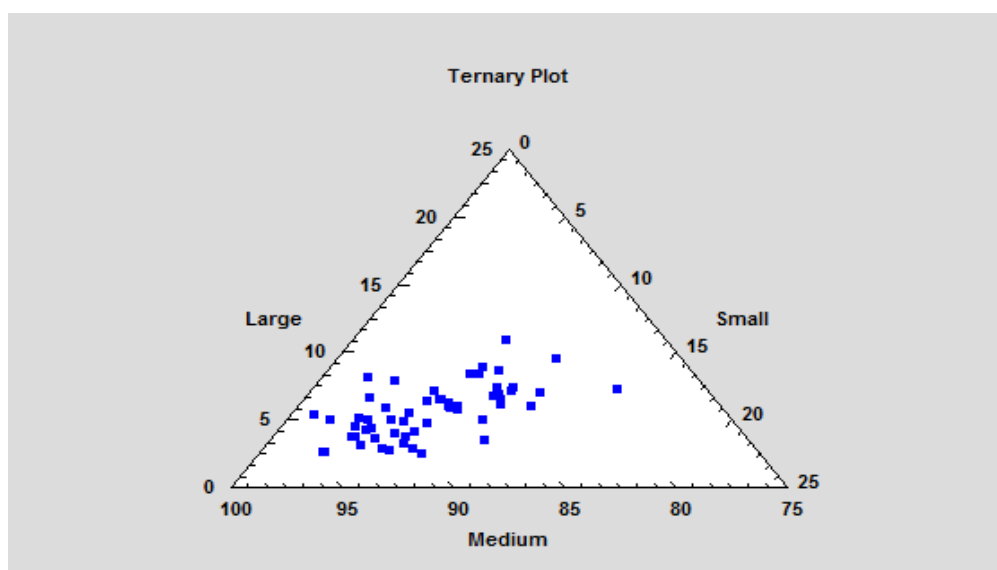
#### Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	P-Value
Model	0.153396	1	0.153396	0.15	0.6952
Residual	999017.	999998	0.999019		
Total (Corr.)	999017.	999999			

Correlation Coefficient = -0.000391851  
R-squared = 0.0000153547 percent  
R-squared (adjusted for d.f.) = -0.0000846455 percent  
Standard Error of Est. = 0.999509  
Mean absolute error = 0.797787  
Durbin-Watson statistic = 2.00036 (P=0.4279)  
Lag 1 residual autocorrelation = -0.00018414

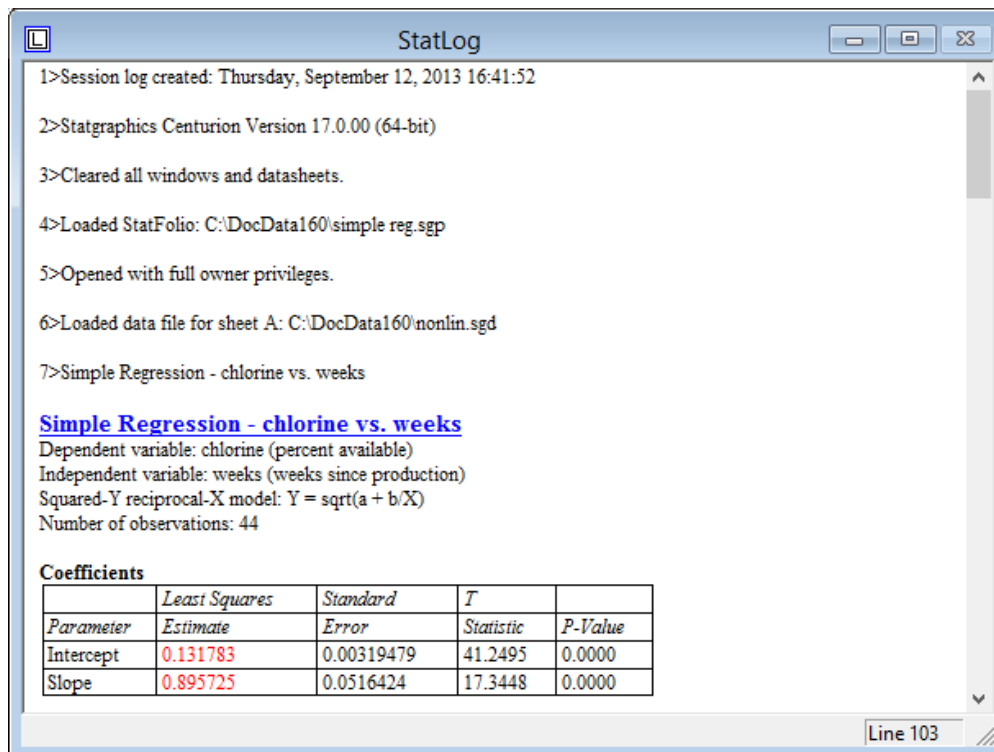
## Ternary Plots

This new procedure may be used to create a scatterplot of 3 variables which always sum to a constant value. It shows the values of the variables on a plot shaped like an equilateral triangle. It is sometimes called a *simplex plot* or a *de Finetti diagram*.



## Session Log (StatLog)

A new window called the StatLog appears by default whenever Statgraphics is loaded. The StatLog stores information about the current session. Certain information is always included, such as the opening and closing of files and the creation of analysis windows. Other information, such as the contents of statistical tables and graphs, is only included if specified on the *Preferences* dialog box.



StatLog

1>Session log created: Thursday, September 12, 2013 16:41:52

2>Statgraphics Centurion Version 17.0.00 (64-bit)

3>Cleared all windows and datasheets.

4>Loaded StatFolio: C:\DocData160\simple reg.sgp

5>Opened with full owner privileges.

6>Loaded data file for sheet A: C:\DocData160\nonlin.sgd

7>Simple Regression - chlorine vs. weeks

**Simple Regression - chlorine vs. weeks**

Dependent variable: chlorine (percent available)  
Independent variable: weeks (weeks since production)  
Squared-Y reciprocal-X model:  $Y = \sqrt{a + b/X}$   
Number of observations: 44

**Coefficients**

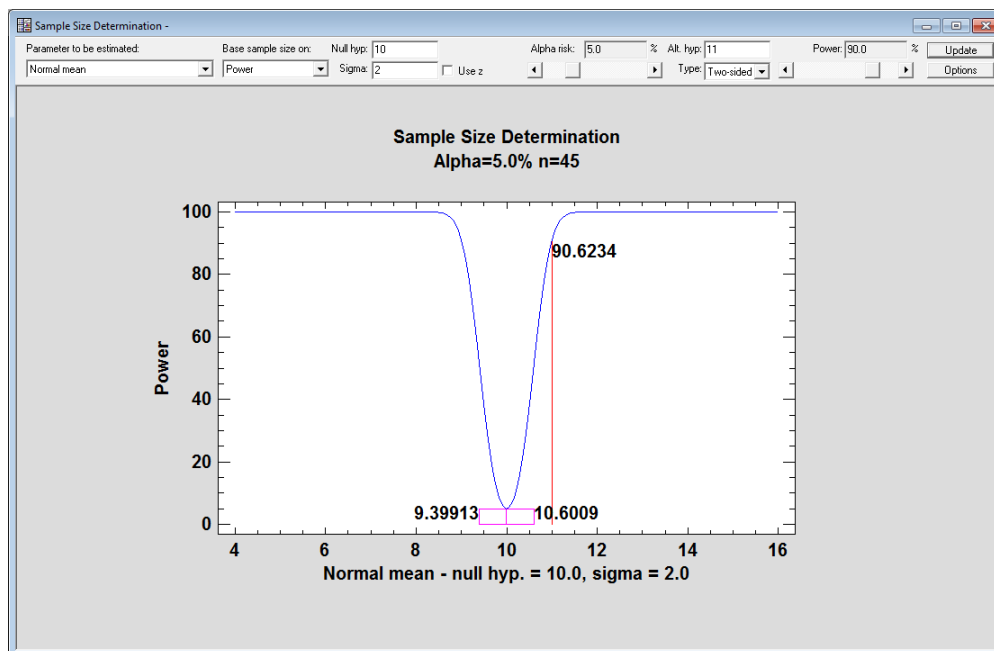
	<i>Least Squares</i>	<i>Standard</i>	<i>T</i>	
<i>Parameter</i>	<i>Estimate</i>	<i>Error</i>	<i>Statistic</i>	<i>P-Value</i>
Intercept	0.131783	0.00319479	41.2495	0.0000
Slope	0.895725	0.0516424	17.3448	0.0000

Line 103

## Sample Size Determination Statlet

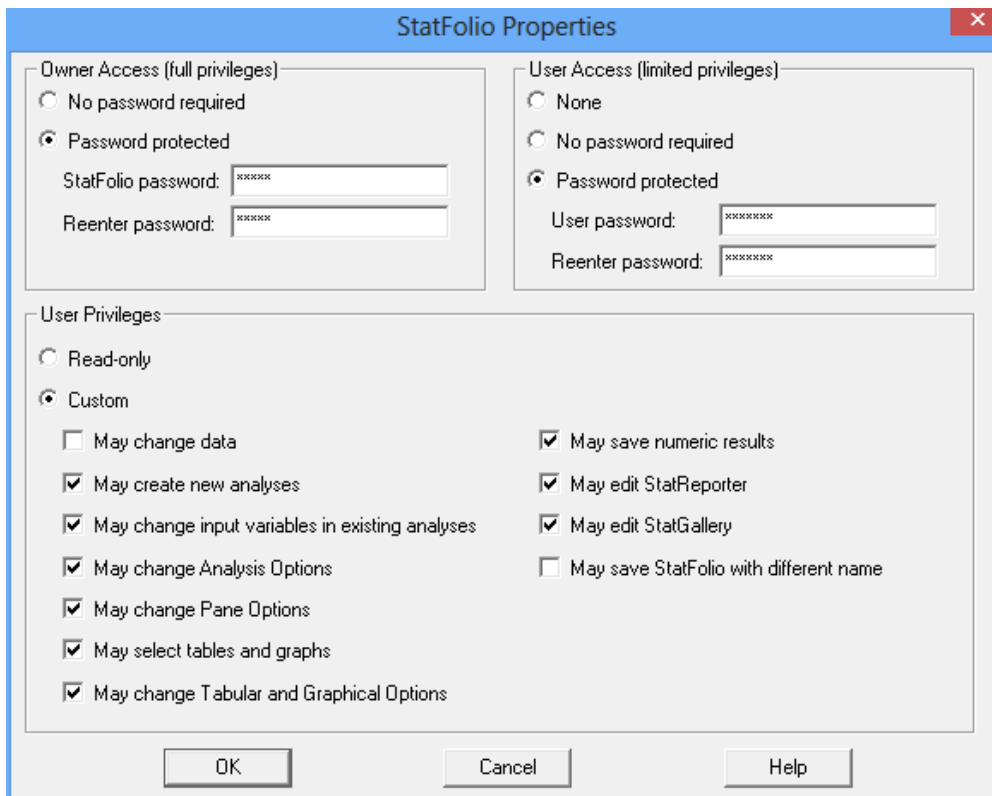
This new Statlet determines the sample size needed to estimate or test values of various parameters. The size may be based on either the width of a confidence interval or the power of a hypothesis test. Parameters for which sample sizes may be determined include means, standard deviations, proportions, rates, capability indices, and correlation coefficients.





## StatFolio Passwords

Both owner and user passwords may now be added to a StatFolio. Owners have unlimited privileges and may change a StatFolio in any manner. Users are limited to the privileges specified on the dialog box.



**StatFolio Properties**

**Owner Access (full privileges)**

- ☐ No password required
- ☒ Password protected
  - StatFolio password: [XXXXXXXXXX]
  - Reenter password: [XXXXXXXXXX]

**User Access (limited privileges)**

- ☐ None
- ☐ No password required
- ☒ Password protected
  - User password: [XXXXXXXXXX]
  - Reenter password: [XXXXXXXXXX]

**User Privileges**

- ☐ Read-only
- ☒ Custom
  - ☐ May change data
  - ☒ May create new analyses
  - ☒ May change input variables in existing analyses
  - ☒ May change Analysis Options
  - ☒ May change Pane Options
  - ☒ May select tables and graphs
  - ☒ May change Tabular and Graphical Options
  - ☒ May save numeric results
  - ☒ May edit StatReporter
  - ☒ May edit StatGallery
  - ☐ May save StatFolio with different name

OK Cancel Help