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Principal Author's Signature X Thomas A. Donnelly		Principle Author E-mail tom.donnelly@jmp.com	
MORS Event 89th MORSS		Date 3 June 2021	Event Date(s) 21-24 June 2021
Presentation Type <input type="checkbox"/> Plenary <input type="checkbox"/> Course <input type="checkbox"/> Tutorial <input type="checkbox"/> Special Session <input type="checkbox"/> Poster <input checked="" type="checkbox"/> Demonstration <input type="checkbox"/> Working/Composite/Distributed or Focus Group List All <input type="checkbox"/> Other			
Title of Presentation JMP® 16 Software for Data Visualization & Discovery		Presentation ID (if assigned) 56986	
Classification <input type="checkbox"/> SECRET <input type="checkbox"/> SECRET//REL TO FVEY <input type="checkbox"/> CONFIDENTIAL <input type="checkbox"/> CONFIDENTIAL//REL TO FVEY <input checked="" type="checkbox"/> UNCLASSIFIED <input type="checkbox"/> UNCLASSIFIED W/FOUO <input type="checkbox"/> Other			
Distribution Statement <input checked="" type="checkbox"/> A (Publicly Releasable) <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E (see side 2 for definitions)			
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B. This presentation is based on material developed by the author as part of company/organization approved research e.g. IR&D and was NOT done under a government contract.		<input type="checkbox"/> YES (Complete Parts I, II & III)	
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Statistical Discovery™ From SAS.

DEMO OF JMP® 16 CAPABILITIES FOR DATA VISUALIZATION & DISCOVERY

**89TH MORSS
WEBCAST DEMO 56986
JUNE 22, 2021**

Tom Donnelly, PhD, CAP
Principal Systems Engineer
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Principal Systems Engineer & Co-Insurrectionist

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YOUR SITUATION?



Statistical Discovery™ From SAS.

JOB TITLE:

DIR. OR MGR. / ANALYST, SCIENTIST, OR ENGINEER

CRITICAL BUSINESS ISSUE:

**IMPROVE PROCESS PERFORMANCE –
DELIVER ANALYSES TO LEADERS – QUICKER,
USING FEWER RESOURCES – WORK SMARTER!**

PROBLEMS/REASONS:

**NEED TO DO SAME WORK WITH FEWER PEOPLE,
BUDGETS SHRINKING, SHORTER DEADLINES**

SPECIFIC CAPABILITIES:

**EFFICIENT ANALYTICAL, MACHINE LEARNING,
AND DYNAMIC DATA VISUALIZATION METHODS**

DELTA:

REPLACING ONE “FTE” SAVES ≈ \$250K

EXPLORATORY DATA ANALYSIS

DYNAMIC LINKING AMONG ALL GRAPHS AND DATA TABLE ALLOWS SELECTION OF SUSPICIOUS DATA IN ONE GRAPH, AND SEE POSSIBLE CORRELATIONS IN ALL!

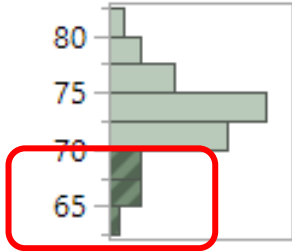


EXPLORATORY DATA ANALYSIS

DYNAMIC LINKING AMONG ALL GRAPHS AND DATA TABLE ALLOWS SELECTION OF SUSPICIOUS DATA IN ONE GRAPH, AND SEE POSSIBLE CORRELATIONS IN ALL!

Distributions

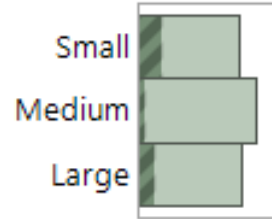
Disso



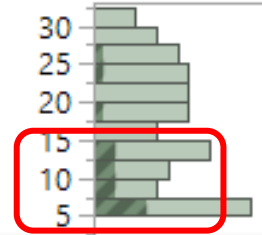
Lot Acceptance



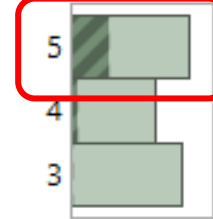
API Particle Size



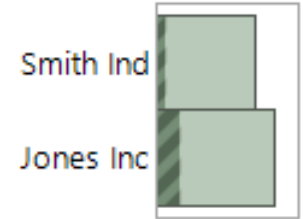
Mill Time



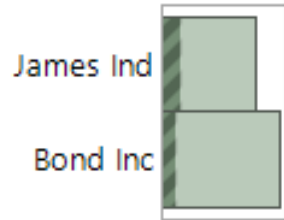
Screen Size



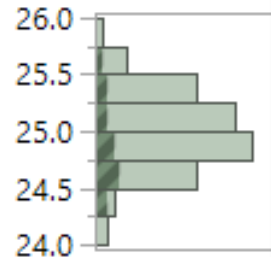
MgSt Supplier



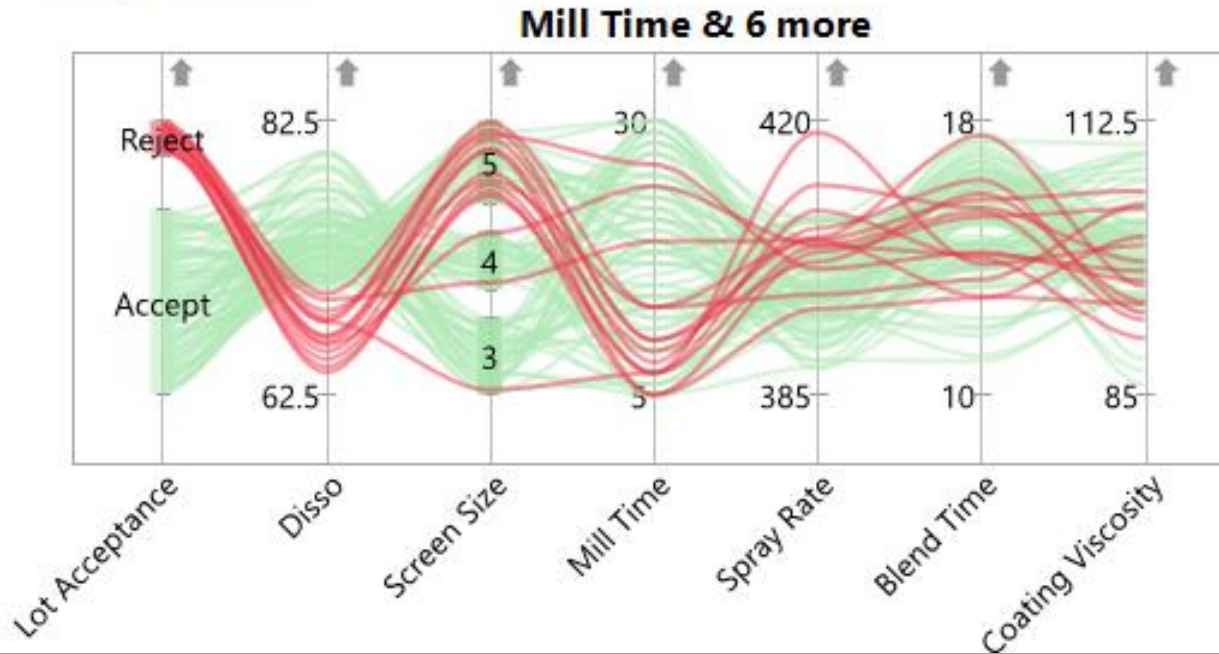
Lactose Supplier



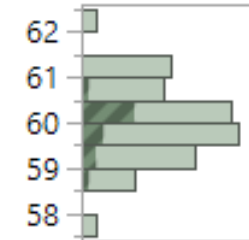
Force



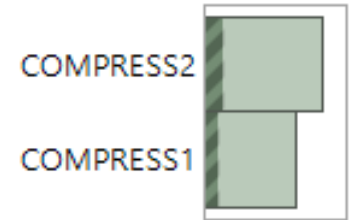
Graph Builder



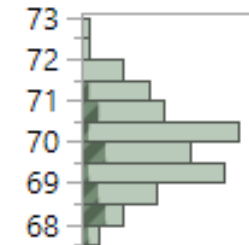
Blend Speed



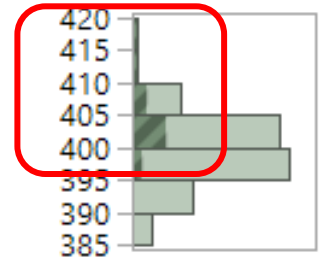
Compressor



Exhaust Temp



Spray Rate



HIGHLY INTERACTIVE GRAPH BUILDER

DRAG AND DROP VARIABLES TO **DROP ZONES** TO EXPLORE RELATIONSHIPS
FILTER DATA TO DRILL DOWN TO FIND INSIGHTS, MORE THAN A DOZEN "GRAPHS"

FAA Case Study for Explorers Event - Graph Builder - JMP Pro [2]

The screenshot displays the JMP Pro Graph Builder interface. On the left, the **Local Data Filter** shows two filter sections: **Facility (21)** with 'ZAB (2618)' and 'ZJX (2618)' selected, and **Fiscal Year (9)** with '2009 (7665)' selected. The **Graph Builder** panel on the right shows a list of 42 columns, with 'Total' selected for the Y-axis. The chart area is titled **Mean(Total) & Total vs. Weekday & Month** and displays two data series: 'ZAB' (blue line) and 'ZJX' (red line). The X-axis is split into **Weekday** (Monday-Sunday) and **Month** (October-September). Annotations include 'Group X' on the Y-axis, 'Group Y' on the X-axis, and 'Map Shape' on the Weekday labels. A legend on the right shows 'Facility' with 'ZAB' in blue and 'ZJX' in red. The bottom of the chart includes the filter expression: `Where((Facility = ZAB, ZJX) and (Fiscal Year = 2009))` and a note: 'Each error bar is constructed using 1 standard deviation from the mean.'

HIGHLY INTERACTIVE GRAPH BUILDER

DRAG AND DROP VARIABLES TO **DROP ZONES** TO EXPLORE RELATIONSHIPS
FILTER DATA TO DRILL DOWN TO FIND INSIGHTS, MORE THAN A DOZEN "GRAPHS"

The interface is divided into several sections:

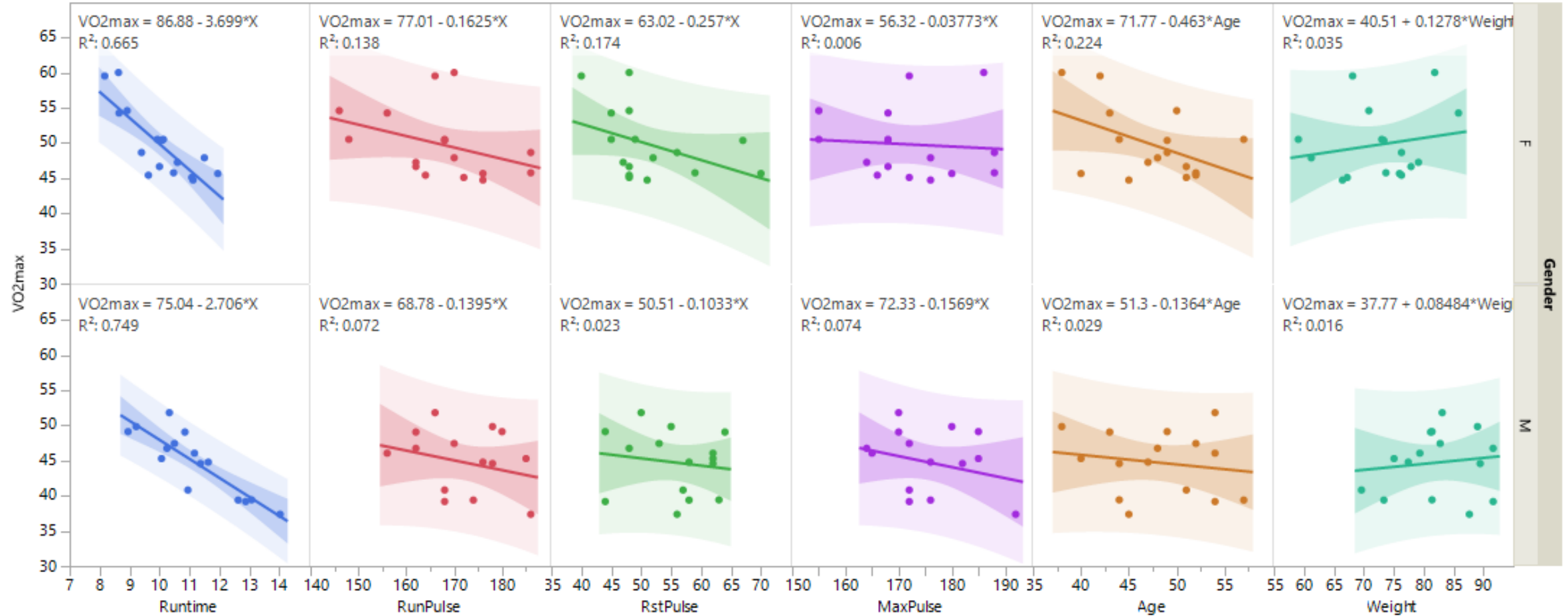
- Local Data Filter:** Includes 'Clear', 'Favorites', 'Show', 'Include', and 'Inverse' options. It lists two data sources: 'Facility (21)' with columns ZAB through ZLA, and 'Fiscal Year (9)' with columns 2005 through 2012. 'AND' and 'OR' operators are at the bottom.
- Graph Builder:** Contains 'Recall', 'Dialog', and 'Done' buttons. A '42 Columns' list includes Weekday, Month, Month Number, Year, Year Number, Fiscal Year, Holiday, Week of Year, Corrected Week of Year, and Holdback. Below is a 'Points' configuration panel with dropdowns for Summary Statistic (None), Error Interval (Auto), Interval Style (Error Bar), and Jitter (Auto), plus a Jitter Limit slider and a Variables dropdown.
- Canvas:** A large central area with a grid. The top is labeled 'Title' and 'Group X'. The left and right sides are labeled 'Y' and 'Group Y' respectively. The bottom is labeled 'Map Shape' and 'X'. A large text overlay reads 'Drag variables into drop zones'.
- Properties Panel:** On the right, it includes 'Wrap', 'Overlay', 'Color', 'Size', 'Interval', and 'Count' (with a bullet point).

MULTIVARIATE VISUAL MODELING

DRAG & DROP INDIVIDUAL FITS OF EACH CONTINUOUS FACTOR BY GENDER

Graph Builder

VO2max vs. Runtime & 5 more



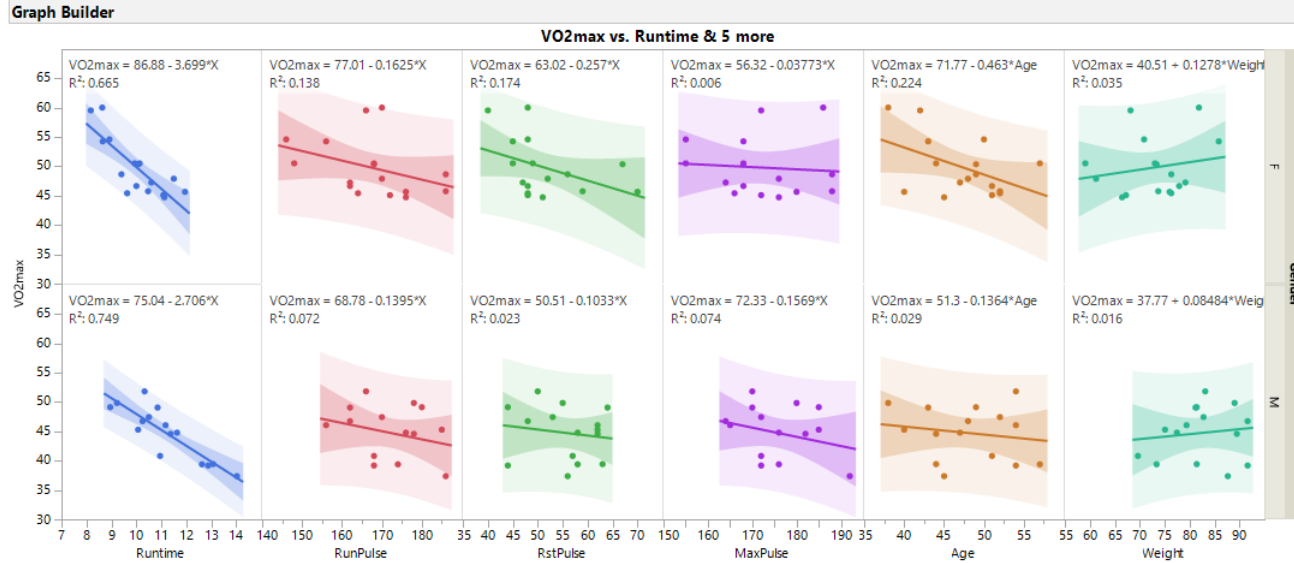
MULTIVARIATE VISUAL MODELING

DRAG & DROP INDIVIDUAL FITS OF EACH CONTINUOUS FACTOR BY GENDER

The screenshot displays the JMP Graph Builder interface. On the left, the '10 Columns' list includes Name, V12max, Runtime, RunPulse, RstPulse, MaxPulse, Age, Weight, Gender, and Weight in LBS. The 'Points' section is expanded, showing settings for Summary Statistic (None), Error Interval (Auto), Interval Style (Error Bar), Jitter (Auto), and Jitter Limit. The main workspace is a large empty area with a central text prompt: 'Drag variables into drop zones'. The workspace is divided into four quadrants by a vertical 'Y' axis and a horizontal 'X' axis. The top-right quadrant is labeled 'Group X' and contains a 'Wrap' button. The bottom-right quadrant is labeled 'Group Y' and contains an 'Overlay' button. The bottom-left quadrant is labeled 'Map Shape' and contains an 'X' label. The bottom-right quadrant is labeled 'Freq' and contains a 'Page' button. The right side of the workspace has a vertical toolbar with buttons for Color, Size, Interval, and Count.

MULTIVARIATE VISUAL MODELING

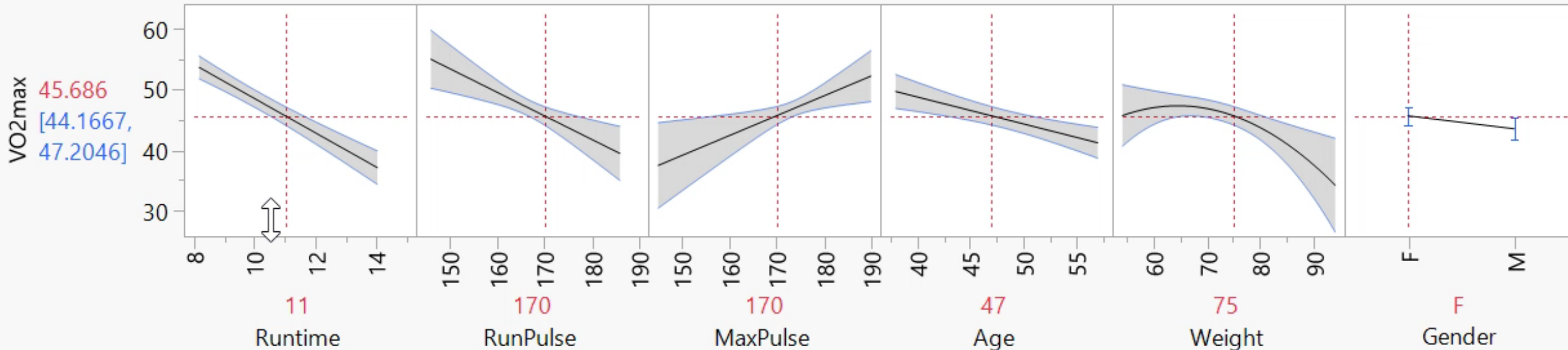
VISUALLY IDENTIFY MOST LIKELY TERMS IN FINAL MODEL



Effect Summary

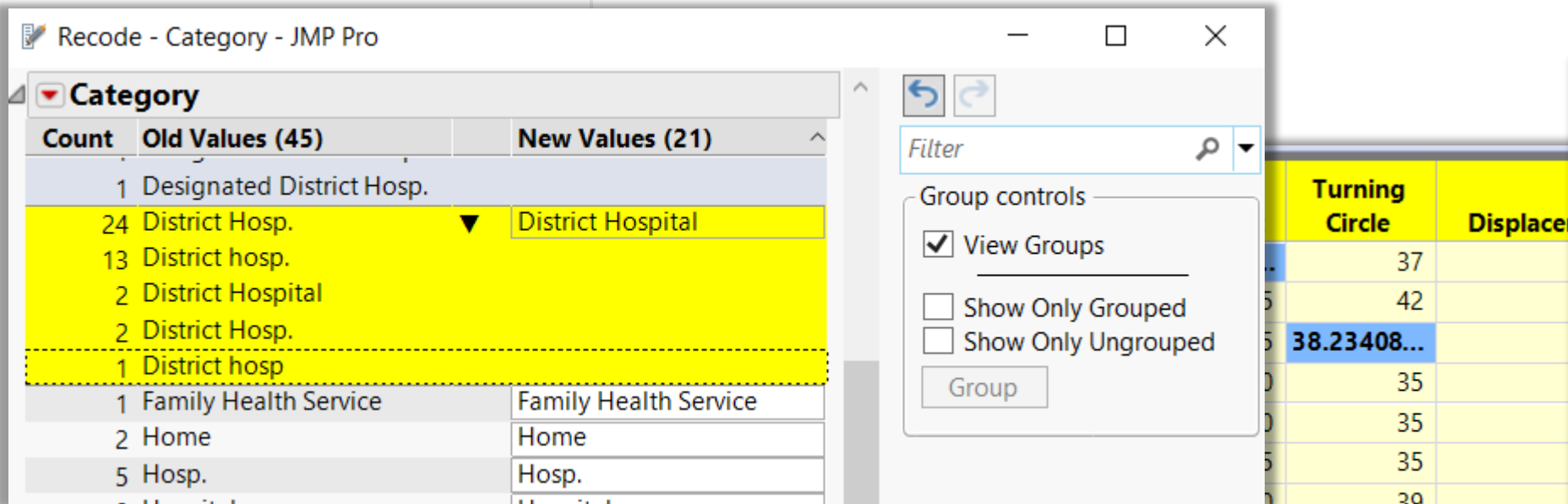
Source	LogWorth	PValue
Runtime	8.405	0.00000
RunPulse	2.823	0.00150
Weight*Gender	2.741	0.00181
Age	2.198	0.00634
Age*Gender	2.179	0.00663
MaxPulse	1.963	0.01088
Weight*Weight	1.392	0.04056
Weight	0.865	0.13652 ^
Gender	0.161	0.69039 ^

Prediction Profiler



DATA WRANGLING

RECODE, OUTLIER DETECTION, AND IMPUTE MISSING VALUES, STACK, SPLIT, ETC.
“WHAT YOU JUST DID IN MINUTES TAKES ME HOURS (DAYS!) IN EXCEL...”



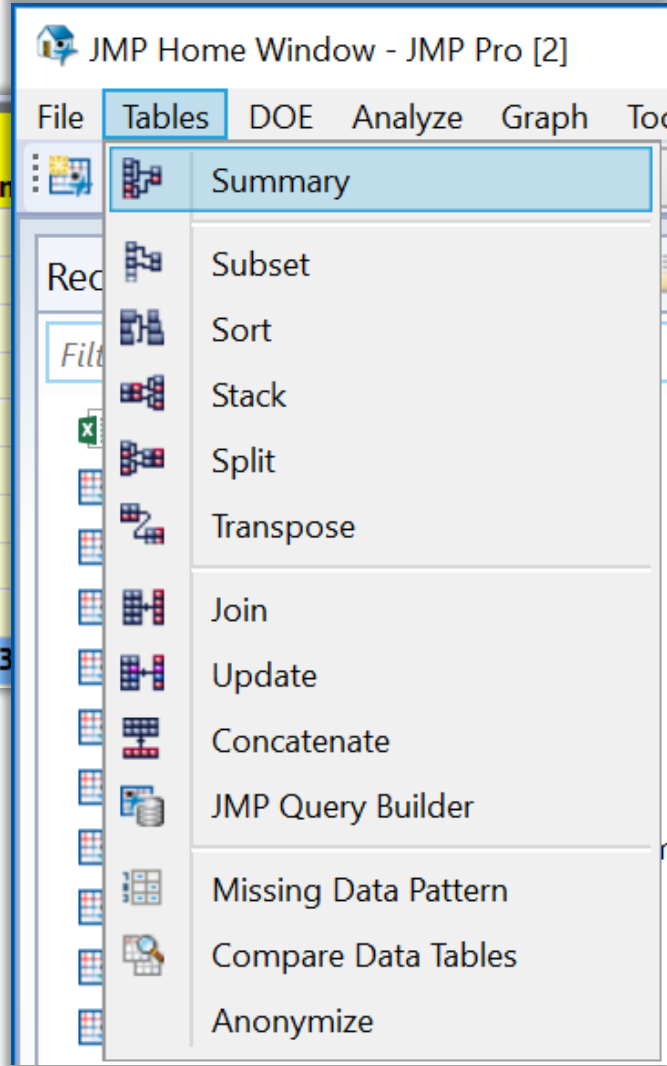
Recode - Category - JMP Pro

Count	Old Values (45)	New Values (21)
1	Designated District Hosp.	
24	District Hosp.	District Hospital
13	District hosp.	
2	District Hospital	
2	District Hosp.	
1	District hosp	
1	Family Health Service	Family Health Service
2	Home	Home
5	Hosp.	Hosp.

Group controls

- View Groups
- Show Only Grouped
- Show Only Ungrouped

Group

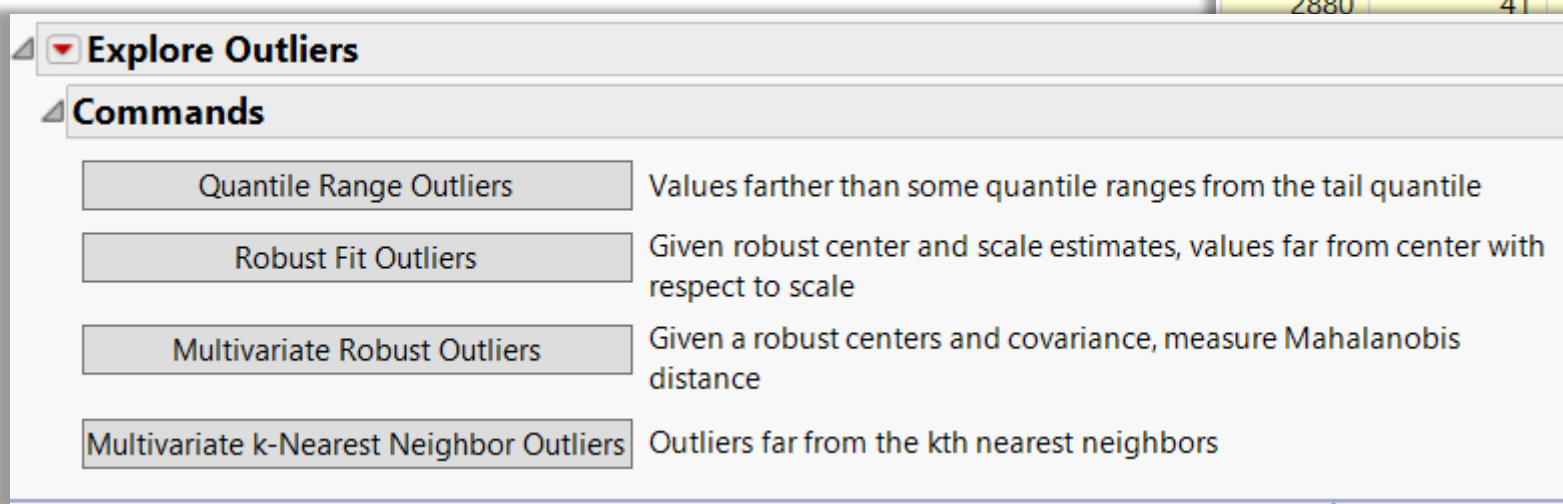


JMP Home Window - JMP Pro [2]

- File
- Tables
- DOE
- Analyze
- Graph
- Tools

Summary

- Subset
- Sort
- Stack
- Split
- Transpose
- Join
- Update
- Concatenate
- JMP Query Builder
- Missing Data Pattern
- Compare Data Tables
- Anonymize



Explore Outliers

Commands

- Quantile Range Outliers: Values farther than some quantile ranges from the tail quantile
- Robust Fit Outliers: Given robust center and scale estimates, values far from center with respect to scale
- Multivariate Robust Outliers: Given a robust centers and covariance, measure Mahalanobis distance
- Multivariate k-Nearest Neighbor Outliers: Outliers far from the kth nearest neighbors

DESIGN OF EXPERIMENTS

DERIVE MAXIMUM INFORMATION FROM FEWEST TESTS – YIELDING “INTERACTIVE” TRADE-OFF AND OPTIMIZATION

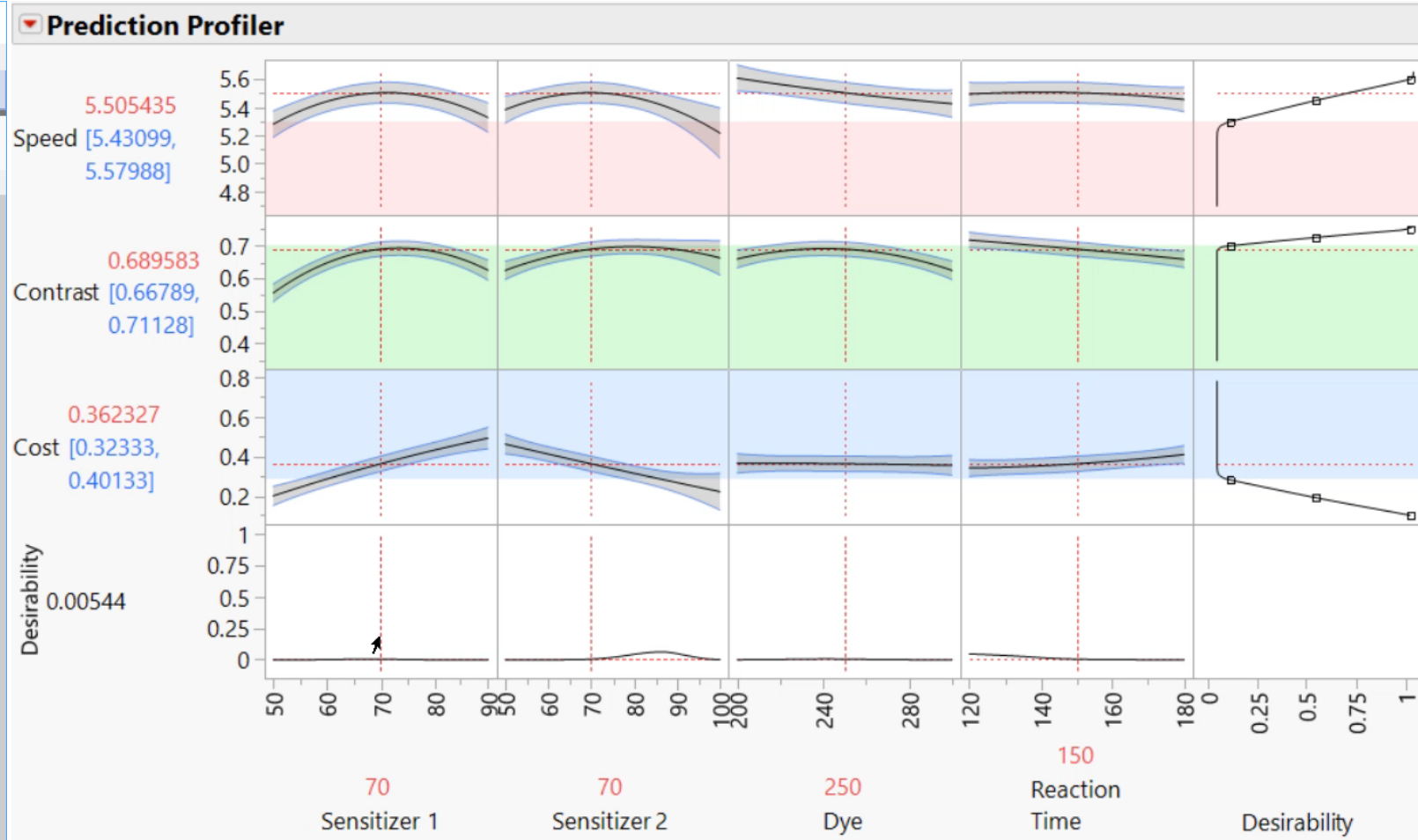
Photo_Cost27 - JMP Pro [3]

File Edit Tables Rows Cols DOE Analyze Graph Tools Add-Ins View Window Help

7/4 Cols

27/0

	Sensitizer 1	Sensitizer 2	Dye	Reaction Time	Speed	Contrast	Cost
1	50	50	250	120	5.36	0.616	0.198
2	50	50	200	180	5.39	0.537	0.175
3	90	70	200	120	5.31	0.623	0.447
4	50	90	200	150	5.13	0.431	0.177
5	70	70	250	180	5.37	0.643	0.445
6	50	90	300	120	4.79	0.375	0.231
7	90	90	200	180	5.45	0.626	0.471
8	90	50	250	150	5.00	0.470	0.670
9	50	50	300	150	5.22	0.478	0.283
10	70	90	200	120	5.41	0.668	0.226
11	90	90	250	120	5.33	0.734	0.310
12	50	50	250	120	5.32	0.574	0.257
13	70	50	200	150	5.49	0.596	0.456
14	50	70	250	180	5.22	0.558	0.166
15	70	70	250	150	5.57	0.689	0.390
16	90	90	300	150	5.26	0.653	0.226
17	70	70	250	150	5.47	0.688	0.356
18	70	70	300	120	5.42	0.657	0.337
19	50	70	200	120	5.43	0.518	0.222
20	50	50	300	150	5.15	0.505	0.287
21	90	70	200	120	5.33	0.661	0.457
22	50	90	300	120	4.97	0.411	0.191
23	90	50	300	120	5.09	0.492	0.588
24	90	50	300	180	5.03	0.358	0.733
25	70	70	250	150	5.59	0.707	0.318
26	70	90	300	180	5.25	0.605	0.290
27	50	90	200	150	5.24	0.476	0.177



Remembered Settings

Setting	Sensitizer 1	Sensitizer 2	Dye	Reaction Time	Speed	Contrast	Cost	Desirability
<input type="radio"/> Equal Importance Opt	80.753574	91.269729	250.57625	120	5.3542877	0.7466933	0.2504014	0.347702
<input type="radio"/> Mid Point Settings	70	70	250	150	5.5054353	0.6895831	0.3623274	0.004875
<input type="radio"/> Cost 6X Speed & Contrast	84.016038	93.725925	283.02514	120	5.2902084	0.72549	0.1991539	0.214425
<input type="radio"/> Opt Spd3X-Cntr1X-Cost6X	81.958309	90.706277	286.82246	120	5.3269582	0.7177857	0.2211116	0.264298

SHARE RESULTS ON JMP PUBLIC OR JMP LIVE

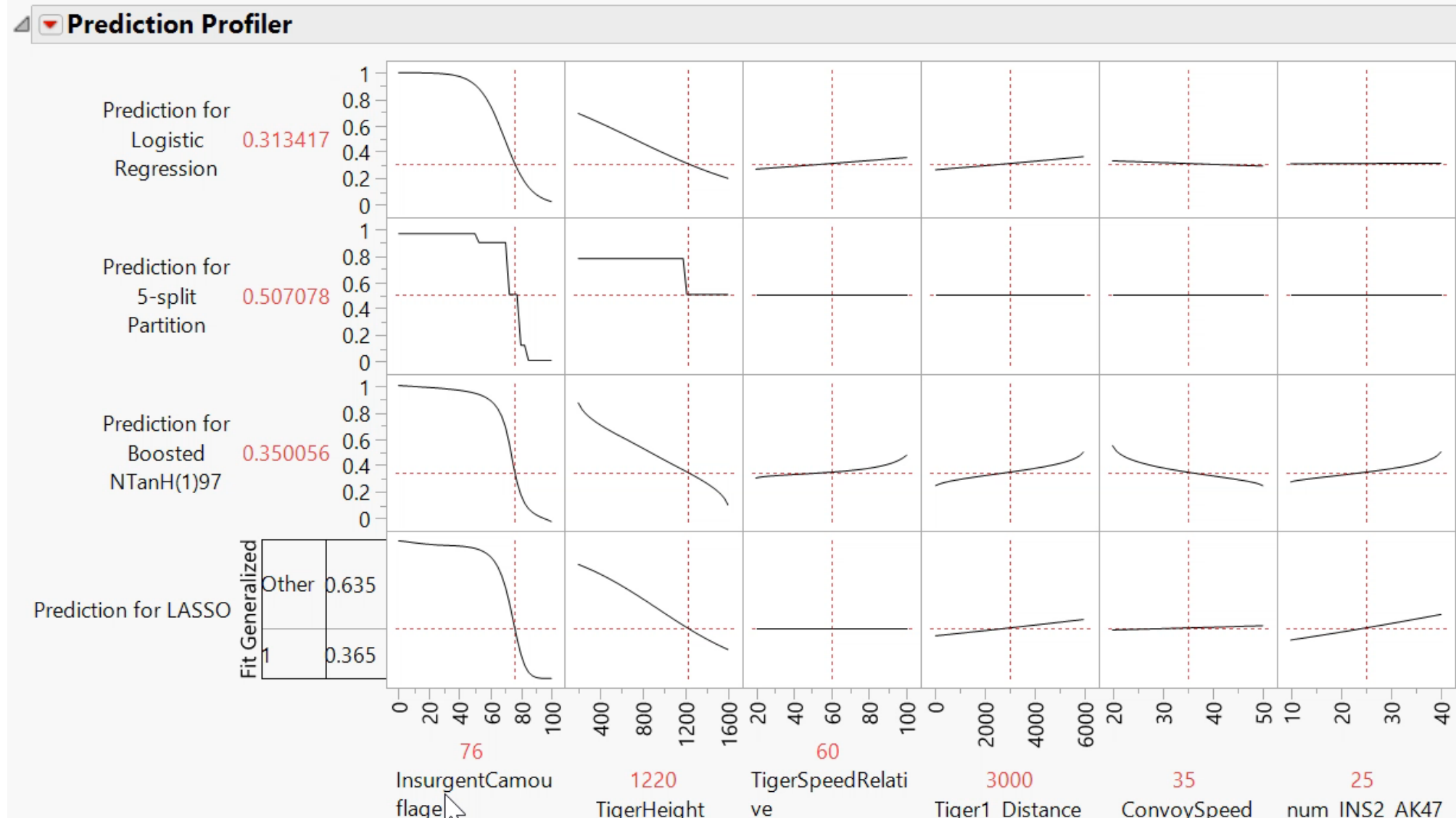


View optimizations on your phone. Scan the QR code to launch browser, then use finger to interact with the Prediction Profiler and to “Apply” saved settings.



COMPARE SEVERAL MACHINE LEARNING MODELS

Logistic Regression, Partition with 5-Splits, Neural Network, & LASSO Binomial



R²

0.876

0.909

0.912

0.916

ACTUAL (SIMULATION) VS. SURROGATE PREDICTION PLOTS FOR TEST DATA ONLY

Column Switcher

4 Columns

- ▲ Prediction for Logistic Regression
- ▲ Prediction for 5-split Partition Model
- ▲ Prediction for Boosted NTanH(1)97
- ▲ Prediction for LASSO complex Logistic



Local Data Filter

Show Include

1292 matching rows

Inverse

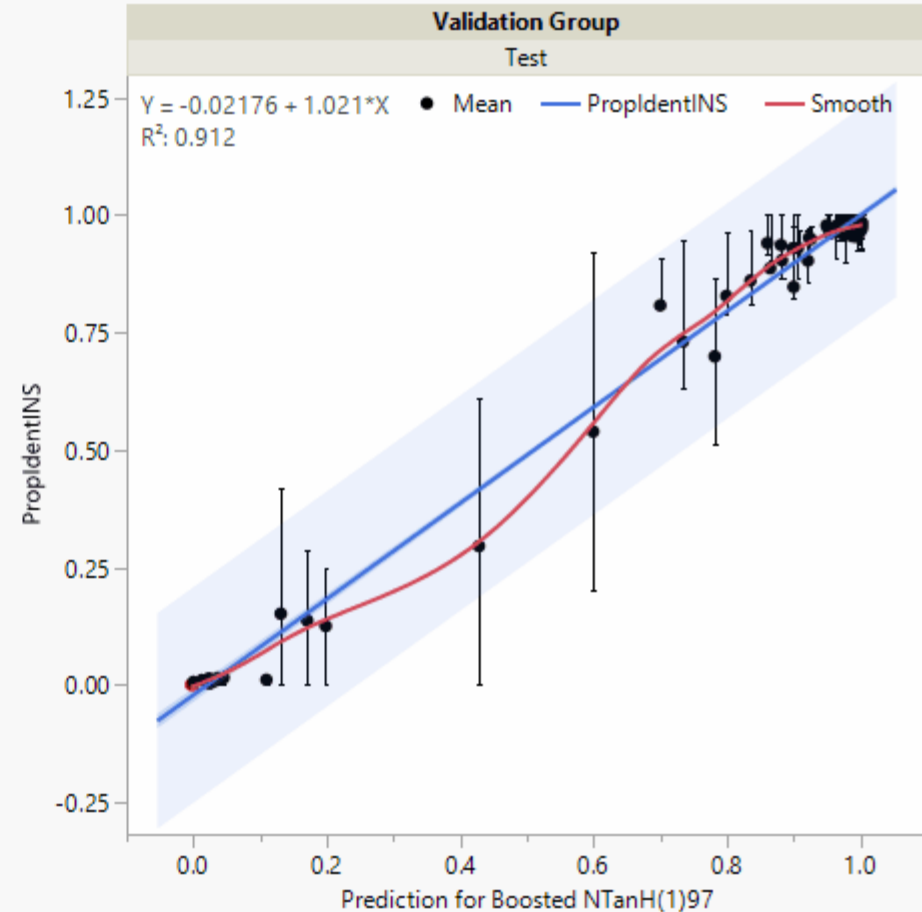
Validation Group (3)

Test	1292
Validate (Tune)	1292
Train	3874

Four Models

1. Logistic Regression
2. Partition with 5-Splits
3. Neural Network
4. LASSO Binomial

Mean(PropldentINS) & PropldentINS vs. Prediction for Boosted NTanH(1)97



Where(Validation Group = Test)

Each error bar is constructed using the upper and lower quartiles.

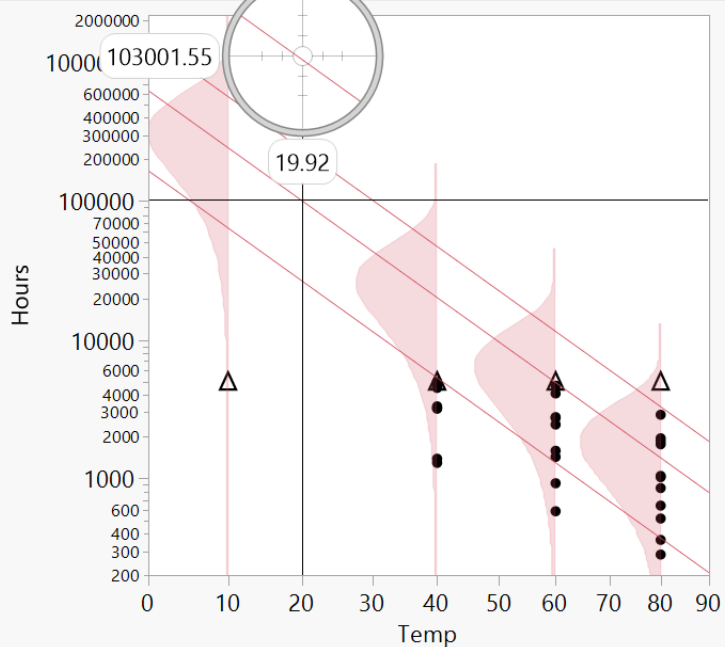
RELIABILITY PROBABILITY OF FAILURE, ACCELERATED LIFE TEST, RELIABILITY GROWTH

Fit Life by X - Hours BY Arrhenius Celsius (Temp) Regression

Censored By: Censor
Freq Column: Weight

Summary of Data

Scatterplot



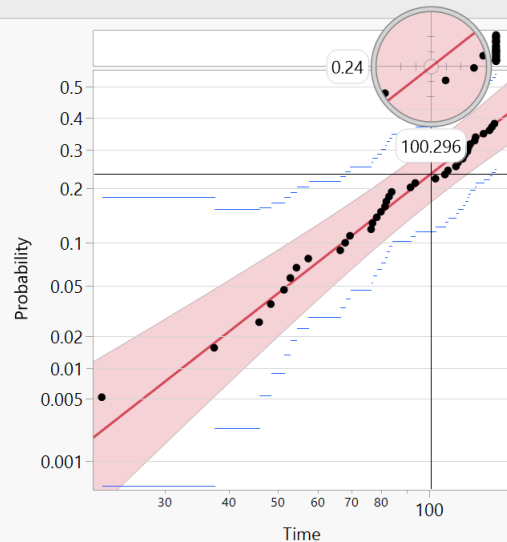
- Weibull
- Lognormal
- Loglogistic
- Frechet
- Exponential
- SEV
- Normal
- Logistic
- LEV

Life Distribution

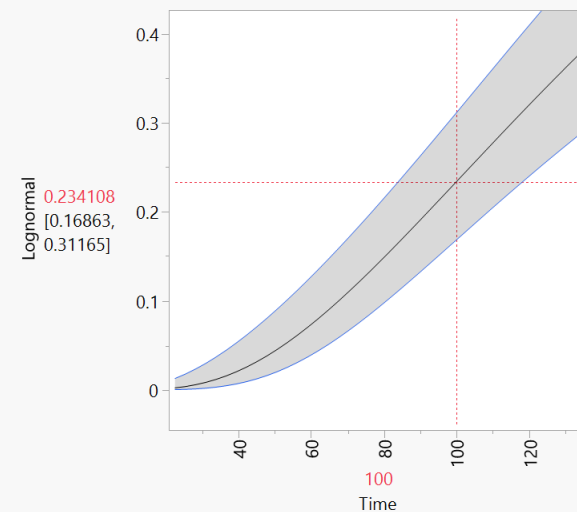
Event Plot

Compare Distributions

- | Distribution | Scale |
|---|----------------------------------|
| <input checked="" type="checkbox"/> Nonparametric | <input type="radio"/> |
| <input checked="" type="checkbox"/> Lognormal | <input checked="" type="radio"/> |
| <input type="checkbox"/> Weibull | <input type="radio"/> |
| <input type="checkbox"/> Loglogistic | <input type="radio"/> |
| <input type="checkbox"/> Frechet | <input type="radio"/> |
| <input type="checkbox"/> Normal | <input type="radio"/> |
| <input type="checkbox"/> SEV | <input type="radio"/> |
| <input type="checkbox"/> Logistic | <input type="radio"/> |

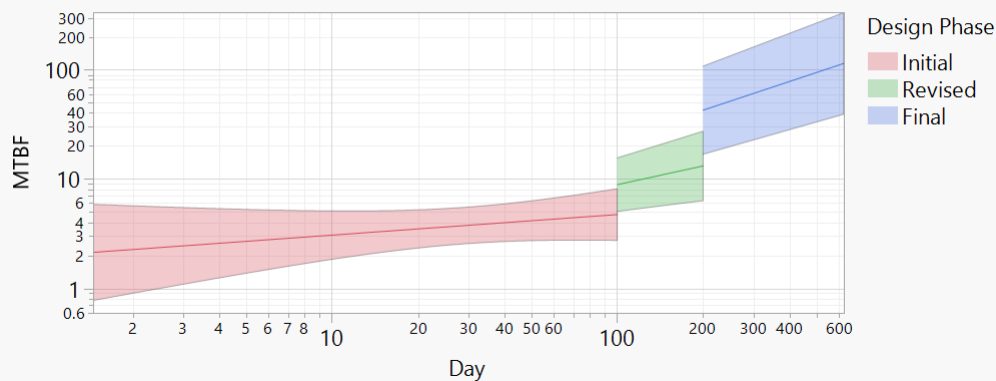


Distribution Profiler



Piecewise Weibull NHPP

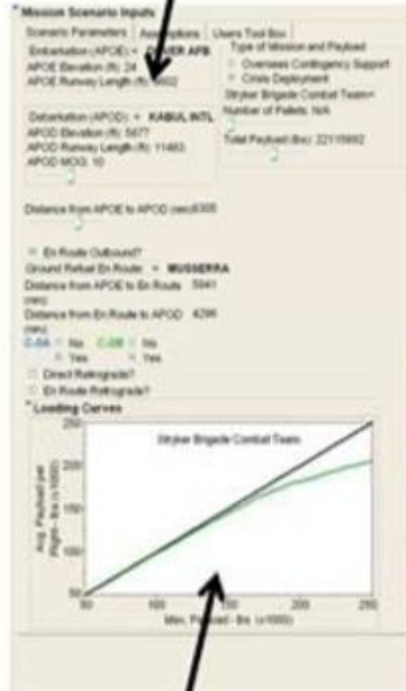
MTBF



FAST SURROGATE MODELING

BY MODELING THE “RIGHT NUMBER” OF LONG RUNNING SIMULATIONS, AN ACCURATE & INSTANTANEOUS PREDICTION CAN BE MADE FOR NEW SCENARIOS!

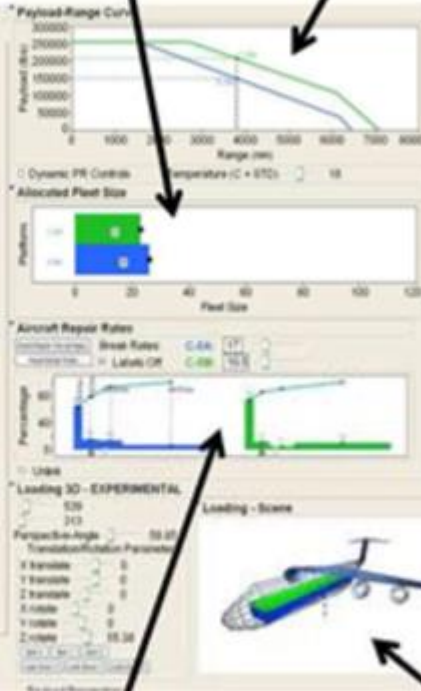
Mission Scenario Inputs



Loading Curve

Payload-Range Curve

Fleet Size

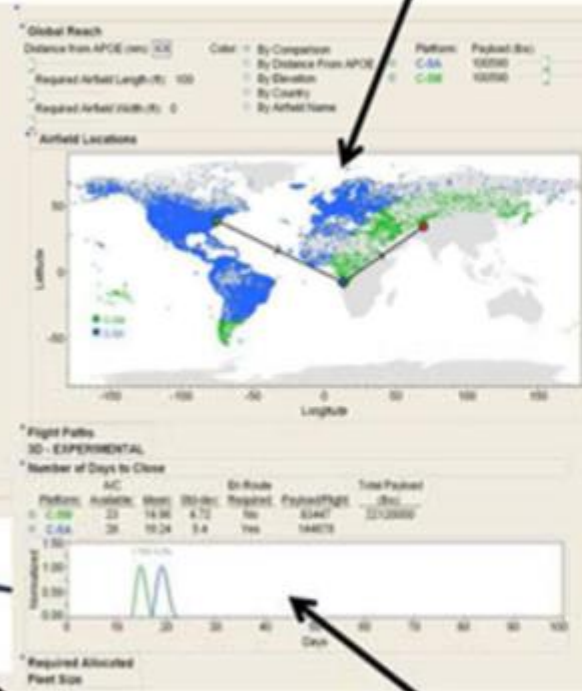


Break and Repair Rates



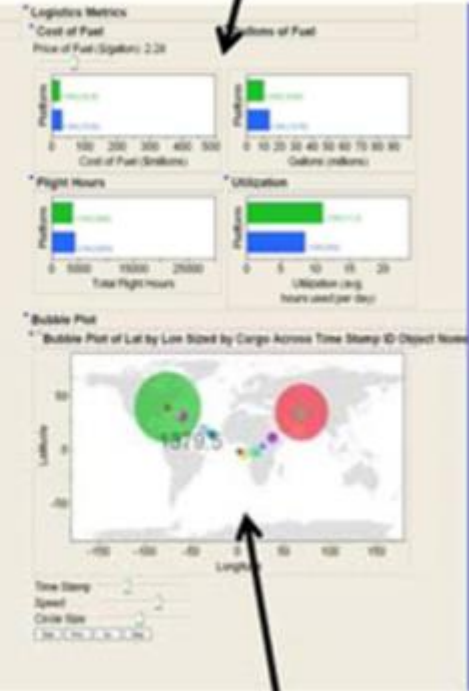
C-5 Loading Volume

Global Reach and Airfield Locations



Time to Close

Logistic Metrics



Bubble Plot

DOWNLOAD & RECORDING

- 16 Factors
- 50,000 unique cases
- Each 1,000 times
- 50 Million Simulations
- Neural Network for Surrogate Models

1.6 Comparative Assessment and Decision Support System for Strategic Military Airlift Capability

Comparative Assessment and Decision Support System for Strategic Military Airlift Capability

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ABSTRACT

The Lockheed Martin Aeronautics Company has been awarded several programs to modernize the aging C-5 military transport fleet. In order to ensure its continuation amidst budget cuts, it was important to engage the decision makers by providing an environment to analyze the benefits of the modernization program. This paper describes an interface that allows the user to change inputs such as the scenario airfields, take-off conditions, and reliability characteristics. The underlying logistics surrogate model was generated using data from a discrete-event simulation. Various visualizations, such as intercontinental flight paths illustrated in 3D, have been created to aid the user in analyzing scenarios and performing comparative assessments for various output logistics metrics. The capability to rapidly and dynamically evaluate and compare scenarios was developed enabling real-time strategy exploration and trade-offs.

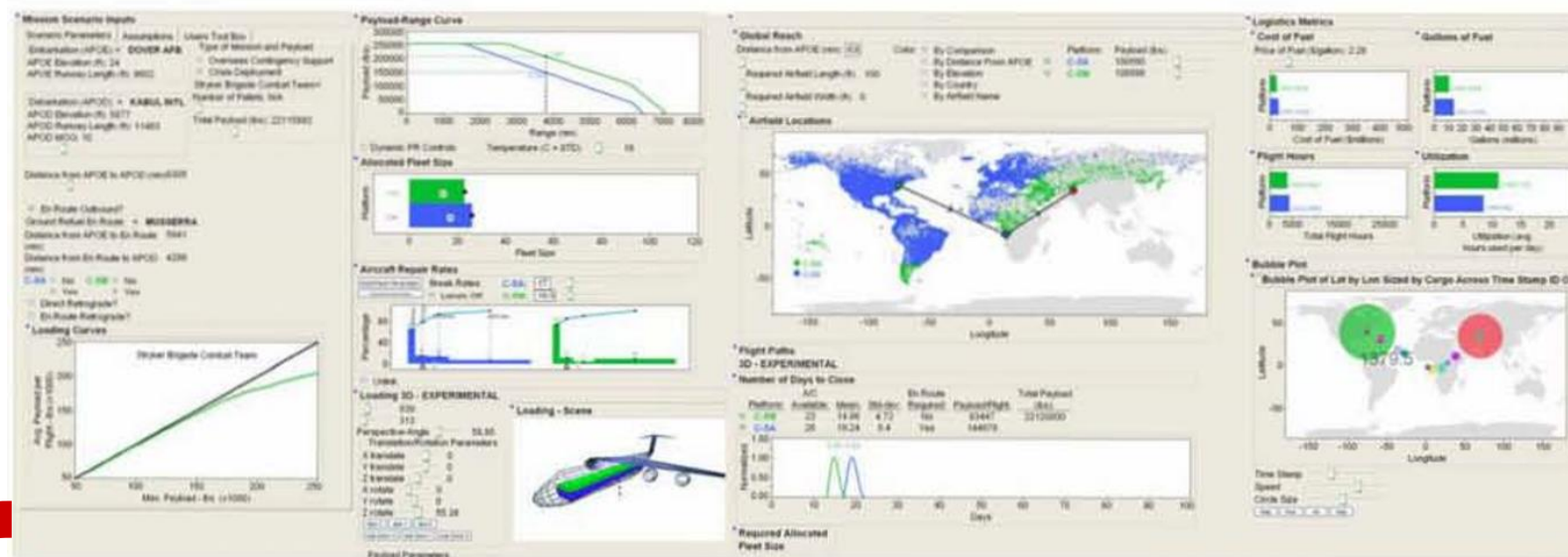


Figure 2. Strategic Airlift Comparison Tool Layout

Download Document

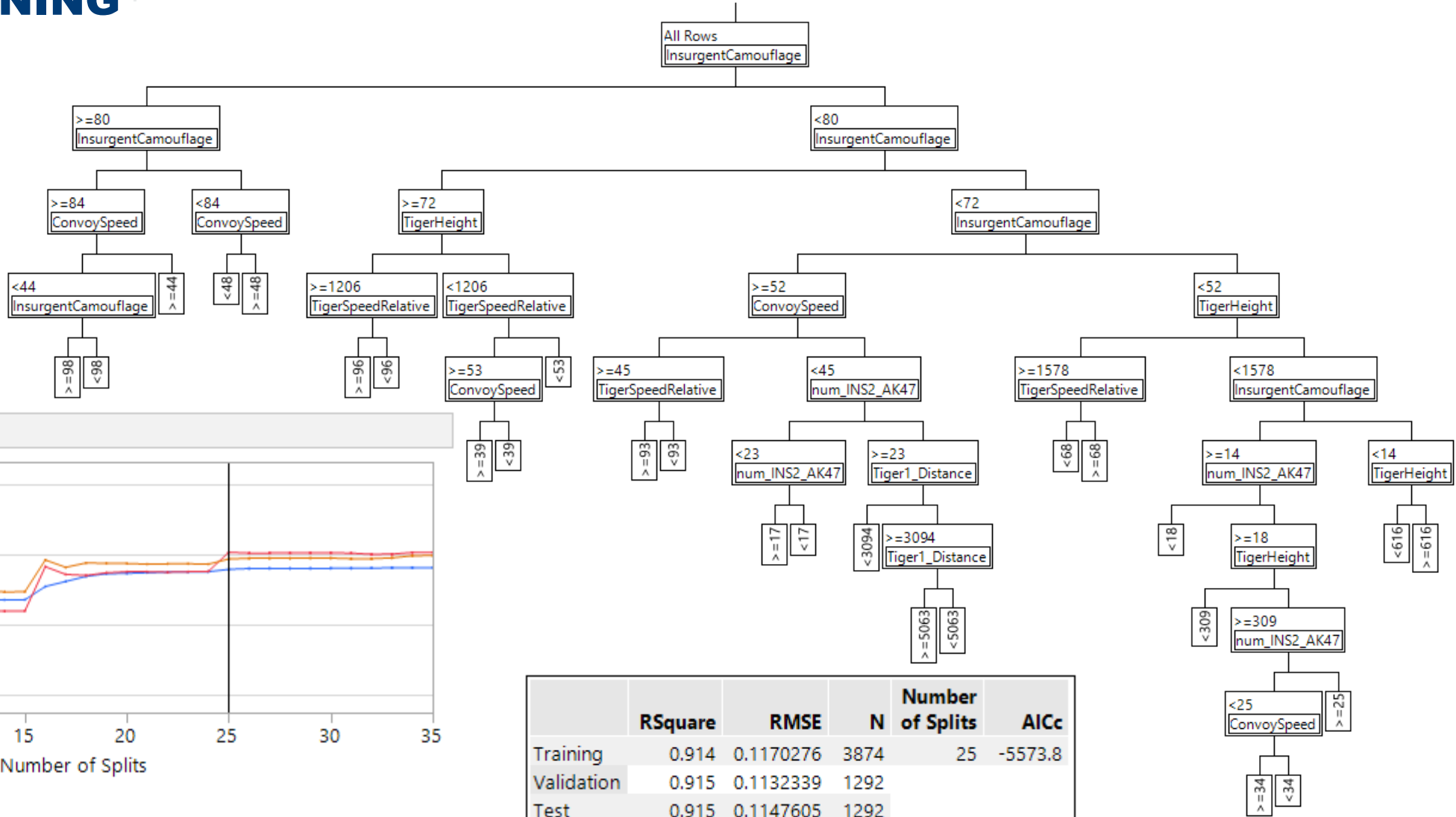
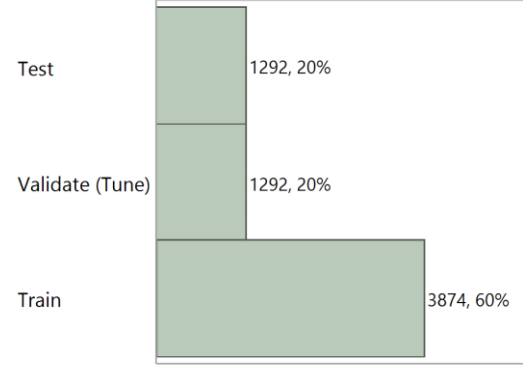
<https://ntrs.nasa.gov/search.jsp?R=20110012110>

Recording

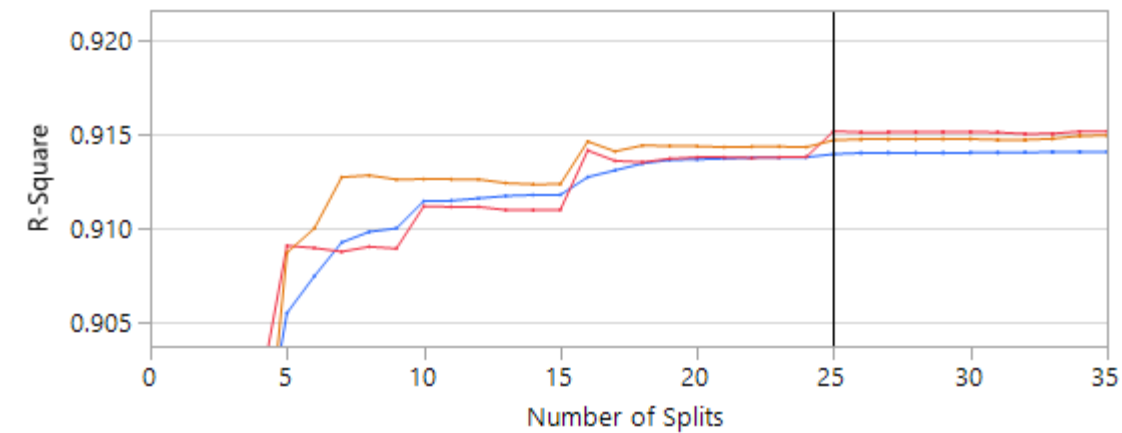
HONEST ASSESSMENT WHEN DATA MINING

SUBSET DATA TO CREATE *TRAIN*, *VALIDATE(TUNE)*, & *TEST* GROUPS
 USE *VALIDATE(TUNE)* GROUP TO PREVENT OVER-FITTING DATA MINING MODELS

Validation Group



Split History

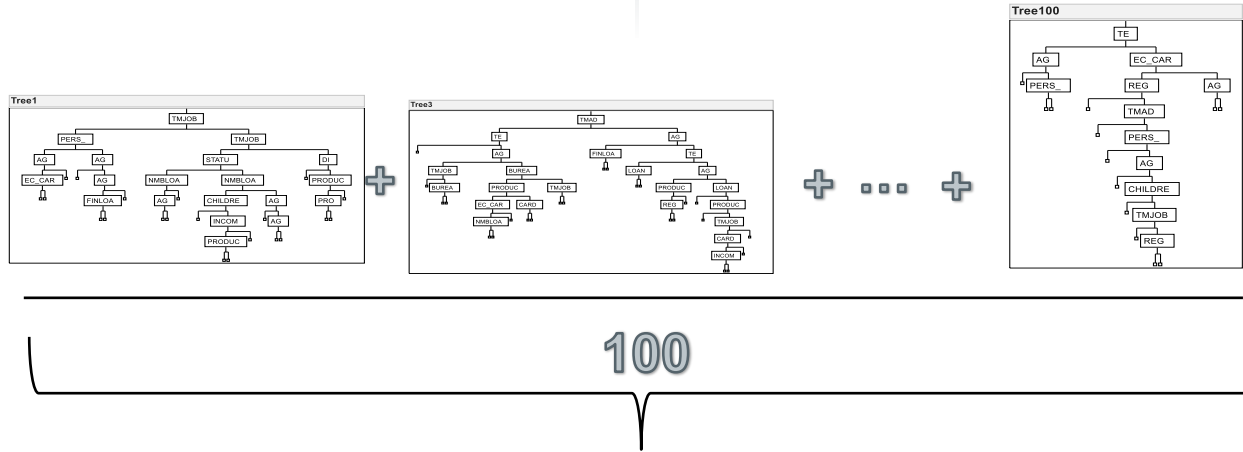


Validation Data in Red
 Test Data in Orange

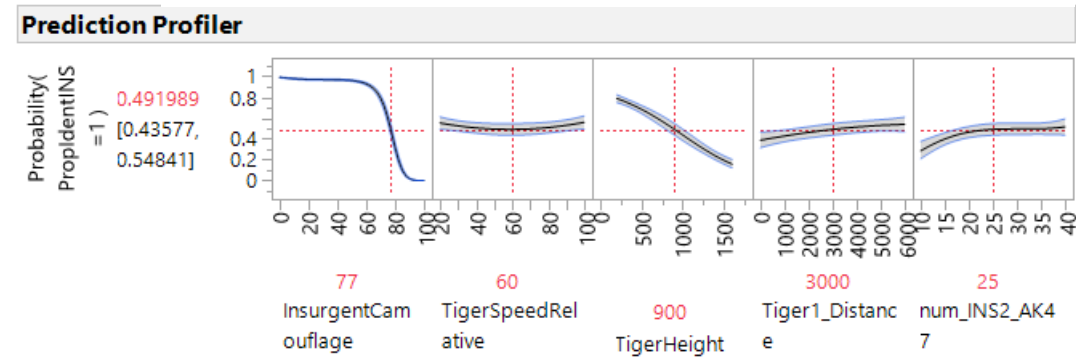
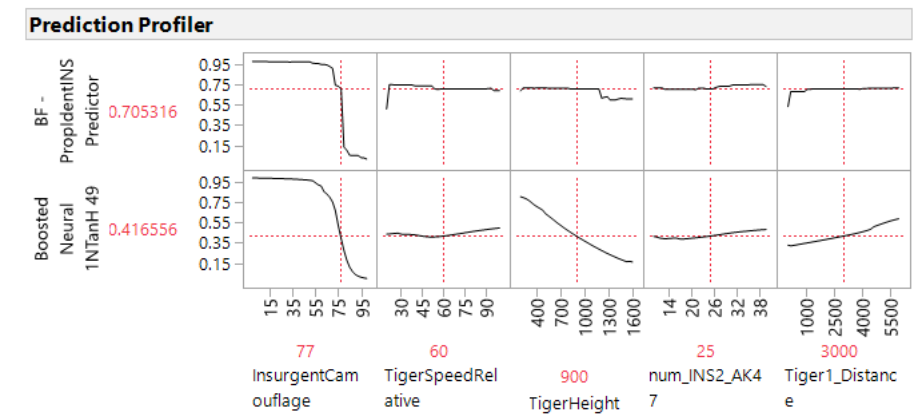
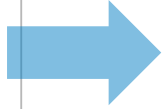
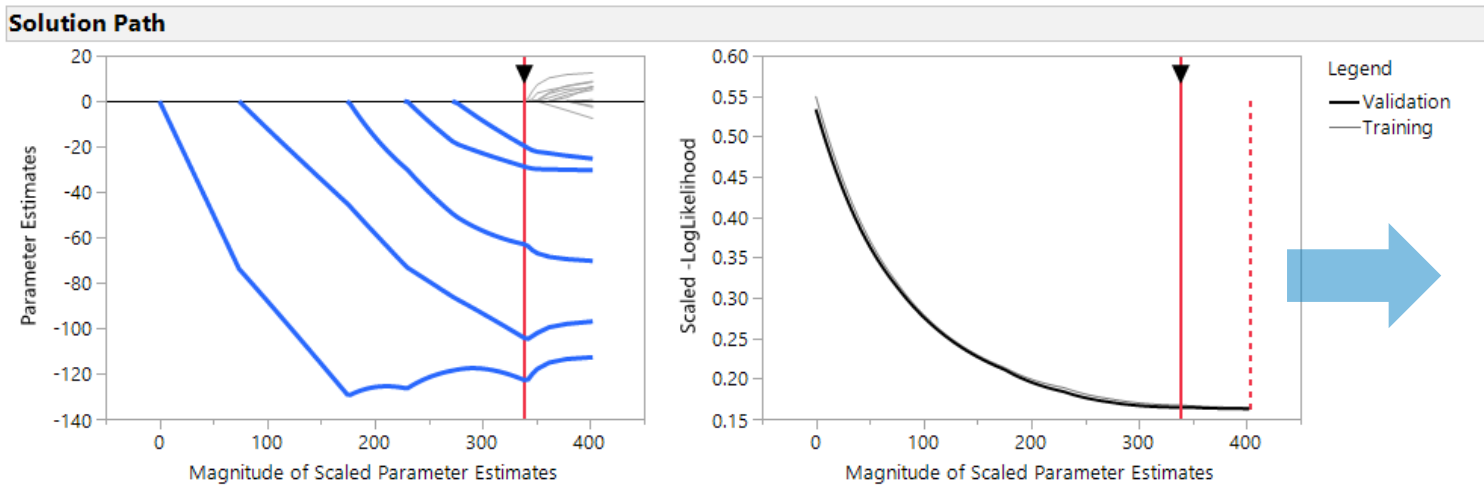
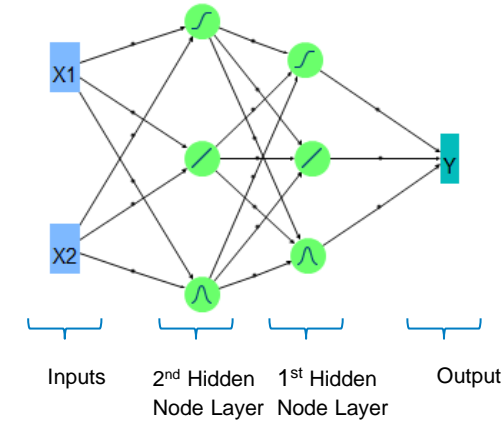
	RSquare	RMSE	N	Number of Splits	AICc
Training	0.914	0.1170276	3874	25	-5573.8
Validation	0.915	0.1132339	1292		
Test	0.915	0.1147605	1292		

MACHINE LEARNING ROBUST STRATEGY

- 1) BOOTSTRAP FOREST DECISION TREE – DON'T MISS AN IMPORTANT VARIABLE
- 2) NEURAL NETWORK – OFTEN MOST FLEXIBLE & BEST PREDICTING MODEL
- 3) PENALIZED REGRESSION – MORE INTERPRETABLE MODEL + CONF. INTERVALS



Bootstrap Forest Model



TABULATE JMP'S DRAG & DROP PIVOT TABLE – EASILY MAKE INTO NEW DATA TABLE

The screenshot shows the JMP Pro interface with a pivot table titled 'Navy Obligated Money by Congressional District - Tabulate'. The pivot table has columns for 'award_type', 'action_type', and 'Total \$ Obligated in \$M'. A context menu is open over the pivot table, with 'Make Into Data Table' selected. A tooltip explains: 'Creates a new data table from the table created in Tabulate.' An inset window titled 'Untitled 3 - JMP Pro' displays the resulting data table.

award_type	action_type	Sum	N
BPA CALL	ADDITIONAL WORK (NEW AGREEMENT,FAR PART 6 APPLIES)	\$4.4	7
	CHANGE ORDER	\$1.0	70
	CLOSE OUT	\$2.5	134
	EXERCISE AN OPTION	\$63.6	40
	FUNDING ONLY ACTION	\$115.9	224
	LEGAL CONTRACT CANCELLATIO		
	OTHER ADMINISTRATIVE ACTIO		
	SUPPLEMENTAL AGREEMENT FO		
	TERMINATE FOR CONVENIENCE		
DEFINITIVE CONTRACT	ADD SUBCONTRACTING PLAN		
	ADDITIONAL WORK (NEW AGRE		
	CHANGE ORDER		
	CLOSE OUT		
	DEFINITIZE CHANGE ORDER		
	DEFINITIZE LETTER CONTRACT		
	EXERCISE AN OPTION		
	FUNDING ONLY ACTION		
	LEGAL CONTRACT CANCELLATIO		
	NOVATION AGREEMENT		
	OTHER ADMINISTRATIVE ACTIO		
	REREPRESENTATION OF NON-N		
	SUPPLEMENTAL AGREEMENT FO		
	TERMINATE FOR CONVENIENCE		
	VENDOR ADDRESS CHANGE		
	VENDOR DUNS OR NAME CHAN		
DELIVERY ORDER	ADD SUBCONTRACTING PLAN		

	award_type	action_type	Sum(Total \$ Obligated in \$M)	N
1	BPA CALL	ADDITIONAL...	\$4.4	7
2	BPA CALL	CHANGE ...	\$1.0	70
3	BPA CALL	CLOSE OUT	\$2.5	134
4	BPA CALL	EXERCISE ...	\$63.6	40
5	BPA CALL	FUNDING ...	\$115.9	224
6	BPA CALL	LEGAL ...	\$0.0	1
7	BPA CALL	OTHER ...	\$129.8	673
8	BPA CALL	SUPPLEMEN...	\$8.6	140
9	BPA CALL	TERMINATE ...	\$0.1	64
10	DEFINITIVE ...	ADD ...		3
11	DEFINITIVE ...	ADDITIONAL...	\$123,973.4	338

GRAPH BUILDER – VISUAL PIVOT TABLE

CONDITIONAL DATA FILTERING “ACTION TYPE” WITHIN “AWARD TYPE”

Local Data Filter

24898 matching rows

Inverse

[1] award_type (4)

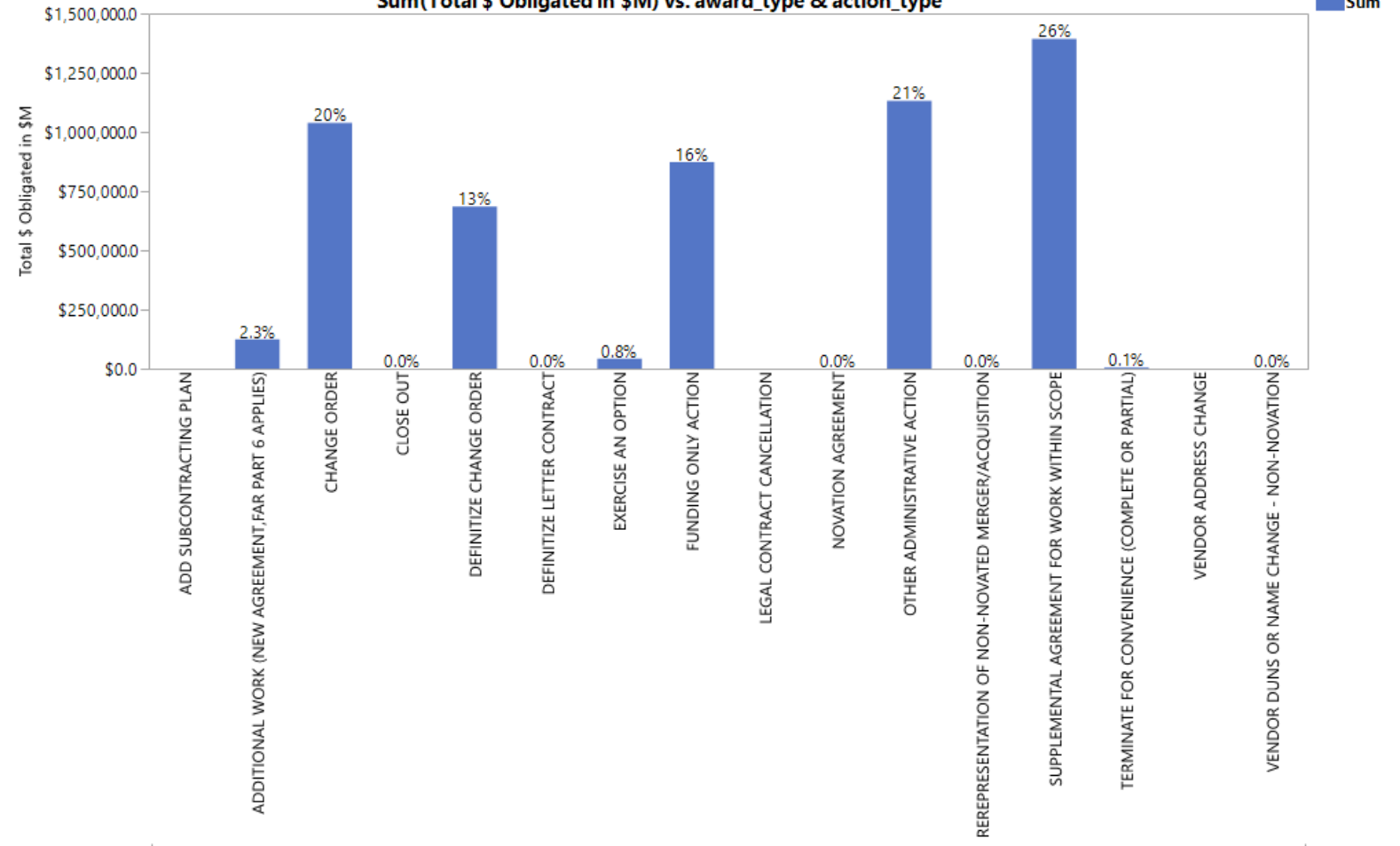
- BPA CALL (6652)
- DEFINITIVE CONTRACT (24898)
- DELIVERY ORDER (111867)
- PURCHASE ORDER (53115)

action_type (17)

- ??? (2561)
- ADD SUBCONTRACTING PLAN (3)
- ADDITIONAL WORK (NEW AGREEMENT,FAR PART 6 APPLIES) (338)
- CHANGE ORDER (1580)
- CLOSE OUT (183)
- DEFINITIZE CHANGE ORDER (419)
- DEFINITIZE LETTER CONTRACT (9)
- EXERCISE AN OPTION (2081)
- FUNDING ONLY ACTION (5602)
- LEGAL CONTRACT CANCELLATION (1)
- NOVATION AGREEMENT (5)
- OTHER ADMINISTRATIVE ACTION (6485)
- REREPRESENTATION OF NON-NOVATED MERGER/ACQUISITION (3)
- SUPPLEMENTAL AGREEMENT FOR WORK WITHIN SCOPE (5566)
- TERMINATE FOR CONVENIENCE (COMPLETE OR PARTIAL) (55)
- VENDOR ADDRESS CHANGE (1)
- VENDOR DUNS OR NAME CHANGE - NON-NOVATION (6)

Graph Builder

Sum(Total \$ Obligated in \$M) vs. award_type & action_type

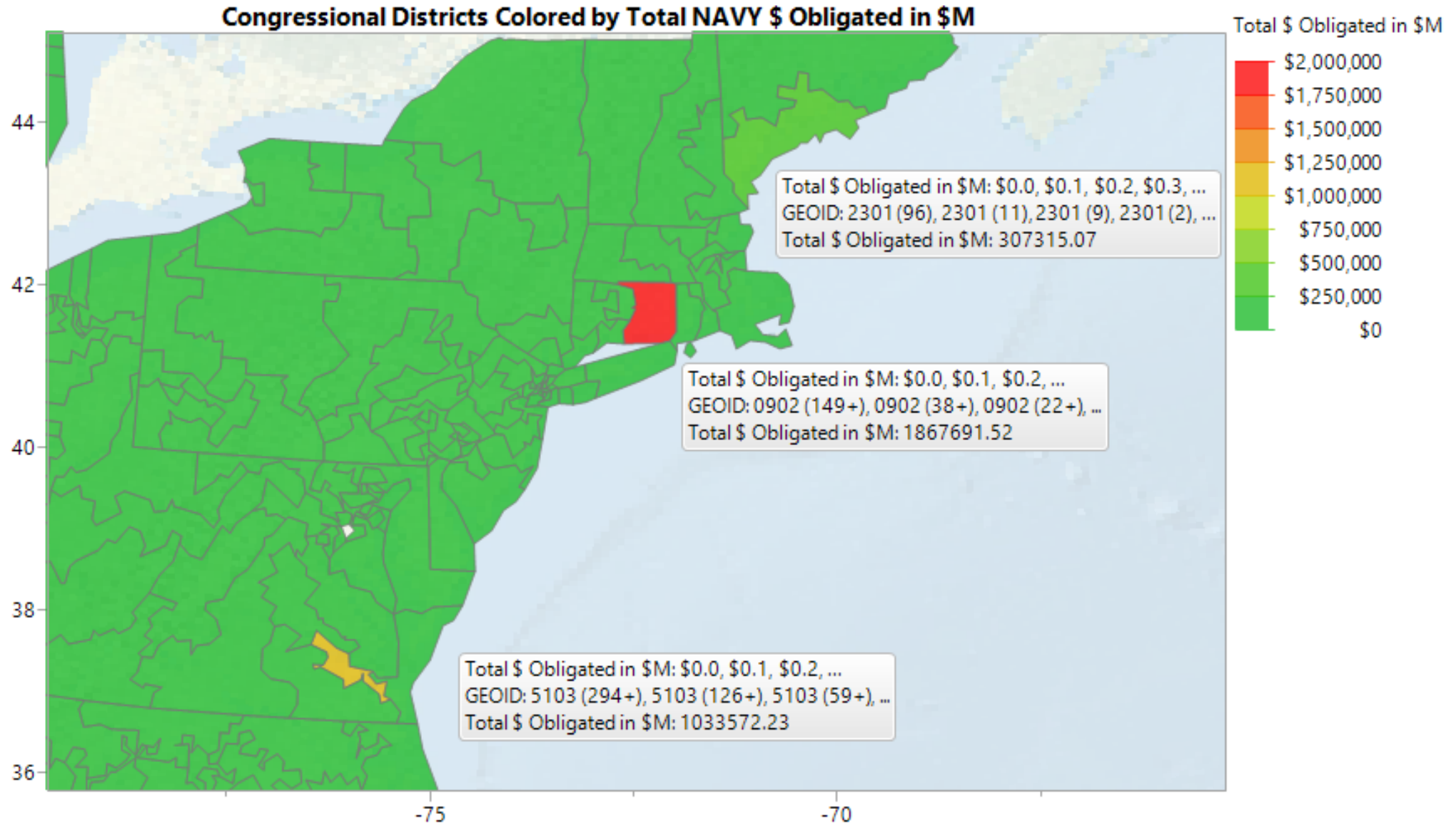


DEFINITIVE CONTRACT
award_type / action_type ordered by total_dollars_obligated (ascending)

Where(award_type = DEFINITIVE CONTRACT)

MAPS AND IMAGES

NAVY OBLIGATED SPENDING BY CONGRESSIONAL DISTRICT IN \$M



MAPS AND IMAGES

MAPS ANIMATED OVER TIME AND SAVED AS A .GIF CAN BE DROPPED INTO PPT

Local Data Filter

Clear Favorites

2520 matching rows

Inverse

Date m/y (36)

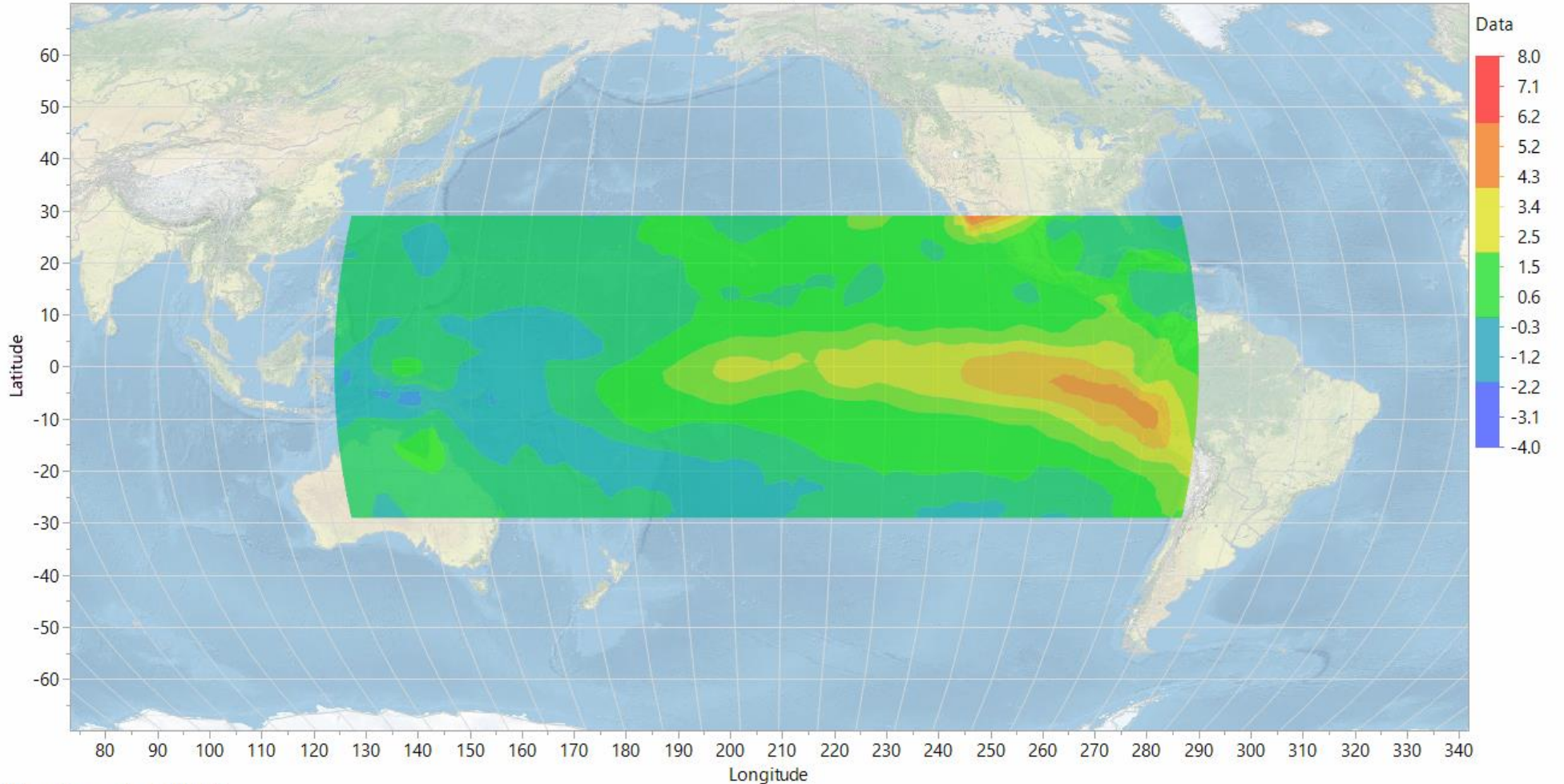
01/1997 (2520)
02/1997 (2520)
03/1997 (2520)
04/1997 (2520)
05/1997 (2520)
06/1997 (2520)
07/1997 (2520)
08/1997 (2520)
09/1997 (2520)
10/1997 (2520)
11/1997 (2520)
12/1997 (2520)
01/1998 (2520)
02/1998 (2520)
03/1998 (2520)

AND

OR

Graph Builder

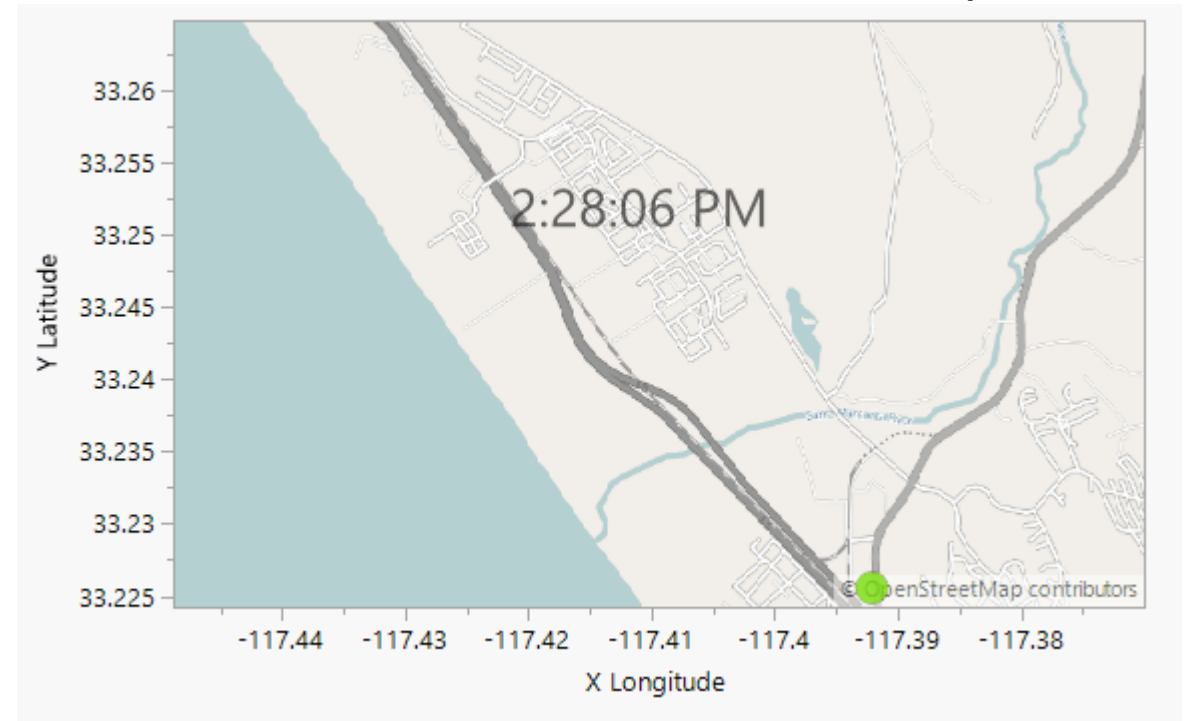
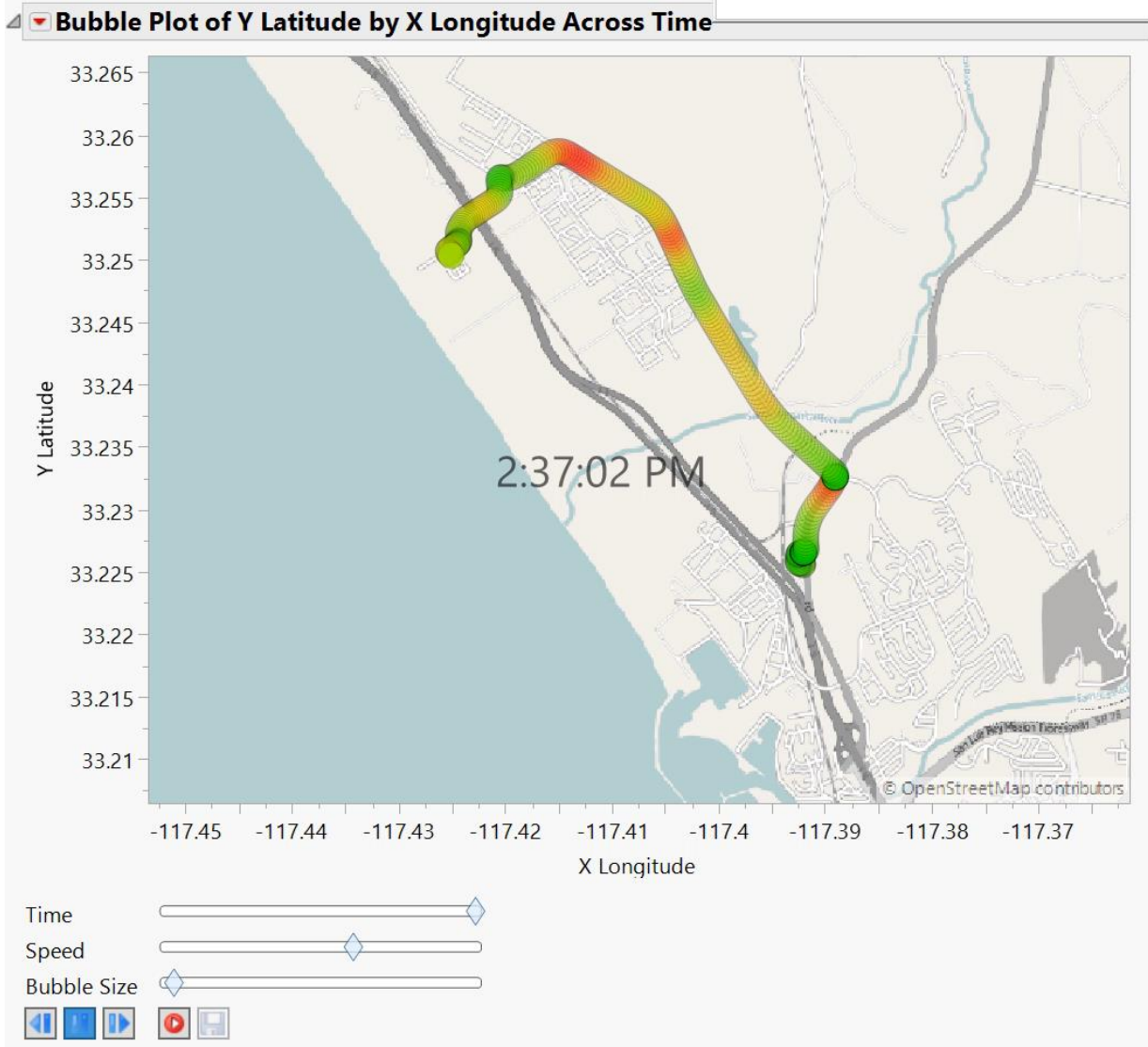
Latitude vs. Longitude



Where(Date m/y = 09/1997)

MAPS AND IMAGES

MAPS ANIMATED OVER TIME: SAVED AS PPT VIDEO (LEFT) ANIMATED GIF (RIGHT) OR HTML (USE QR CODE TO VIEW AT PUBLIC.JMP.COM ON YOUR PHONE)



MAP OF PRINTING PLATE

HOVER TO PULL UP IMAGE OF DEFECT OR PLOT OF SENSOR OVER TIME

Note random data line chart - Graph Builder - JMP Pro

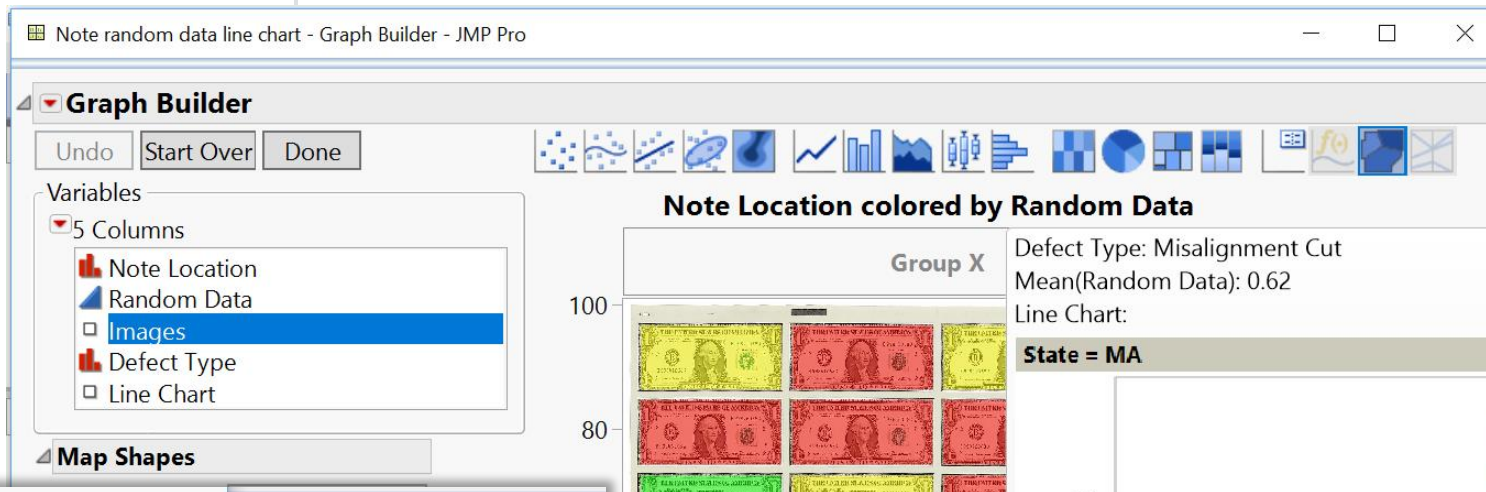
Graph Builder

Undo Start Over Done

Variables

- 5 Columns
 - Note Location
 - Random Data
 - Images**
 - Defect Type
 - Line Chart

Map Shapes

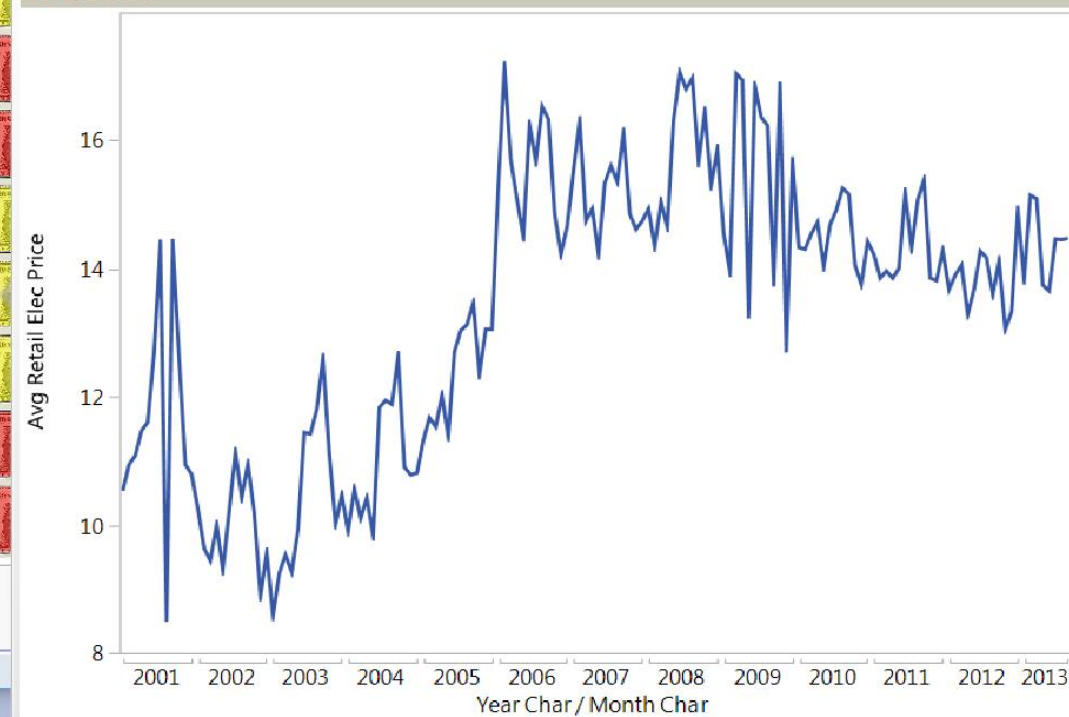


Note Location colored by Random Data



Defect Type: Misalignment Cut
Mean(Random Data): 0.62
Line Chart:

State = MA



Defect Type: Ink Smear
Mean(Random Data): 0.60
Images:

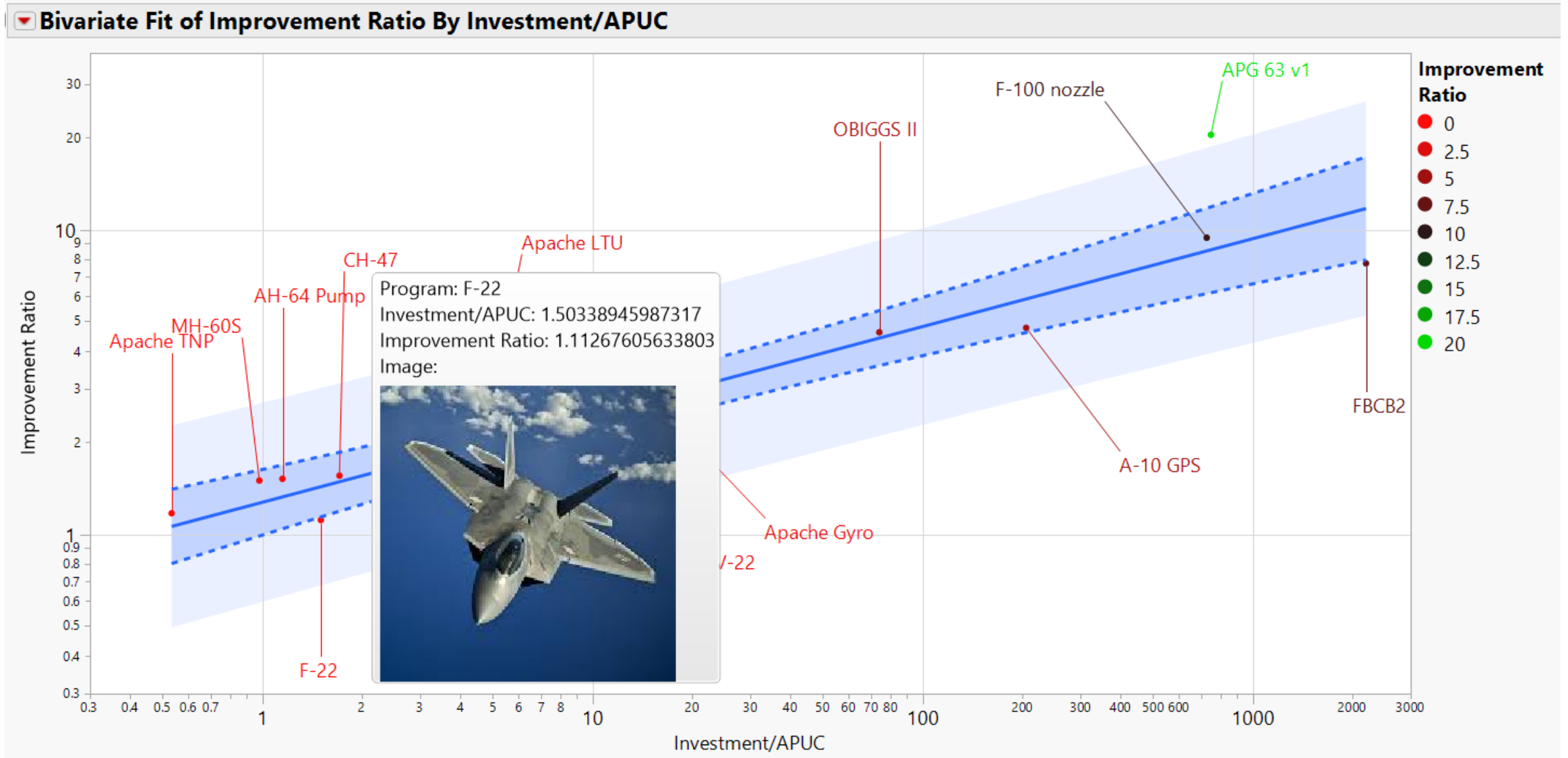


evaluations done



MAPS AND IMAGES

IMAGES CAN BE IMPORTED IN BULK AND SHOWN BY HOVERING ON A DATA POINT



JMP AS DATA HUB

EASILY IMPORT DATA FROM EXCEL, TXT, CSV, PDF, SAS, DATA BASES, WEB, & EASILY EXPORT MODELS (WITH 13 & 14 PRO) TO: SAS, PYTHON, JAVASCRIPT, C, SQL EASILY PUBLISH REPORTS TO WEB (HTML); SAVE REPORTS TO POWERPOINT

Excel Import Wizard

Data Preview

	Revenue by Territory	Column 2	Column 3
1			
2	Country	Units (1000's)	Revenue ...
3	France	23	216.89
4	Germany	42	396.06
5	Italy	12	113.16
6	UK	32	301.76
7	China	15	141.45
8	Japan	34	320.62
9	Singapore	3	28.29
10	U.S.	104	980.72
11	Canada	12	113.16
12			
13	TOTAL	277	2612.11

Rows Shown: 13 / 13

Worksheets

Select sheets to open	Custom setting
JAN	
FEB	
MAR	
APR	
MAY	
JUN	
JUL	
AUG	
SEP	
OCT	
NOV	
DEC	

Select all

Individual Worksheet Settings

Worksheet contains column headers

1 Column headers start on row

1 Number of rows with column headers

2 Data starts on row

1 Data starts on column

Concatenate worksheets and try to match columns

Create column with worksheet name when concatenating

Use for all worksheets

Restore Default Settings Back Next Import Cancel Help

Preview Pane Refresh

Update settings on any change

Update now

Show all rows

JMP Home Window - JMP Pro [2]

File Tables DOE Analyze Graph Tools Add

- New
- Open... Ctrl+O
- Quick Open Alt+Shift+O
- Close Ctrl+W
- Import as Data
- Import Multiple Files...
- Save Ctrl+S
- Save As...
- Revert
- Database
- SAS
- Internet Open...
- Publish...
- Create Excel Workbook...
- Preferences Ctrl+K
- Print... Ctrl+P
- Print Preview
- Page Setup...
- Send...
- Recent Files
- Save Session Script...
- Exit JMP Ctrl+Q

Report: Formula Depot - JMP Pro [3]

Manage Models and Generate Score

Formula Depot

Formula Scripts

Neural - Y

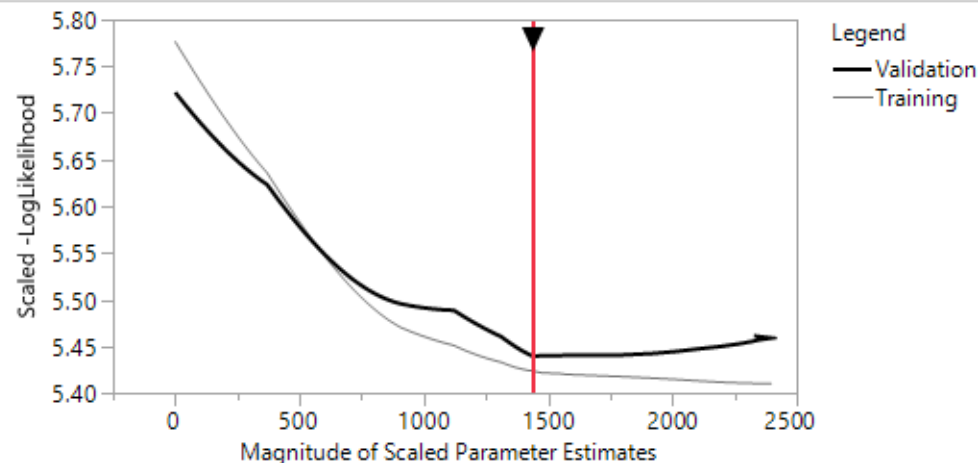
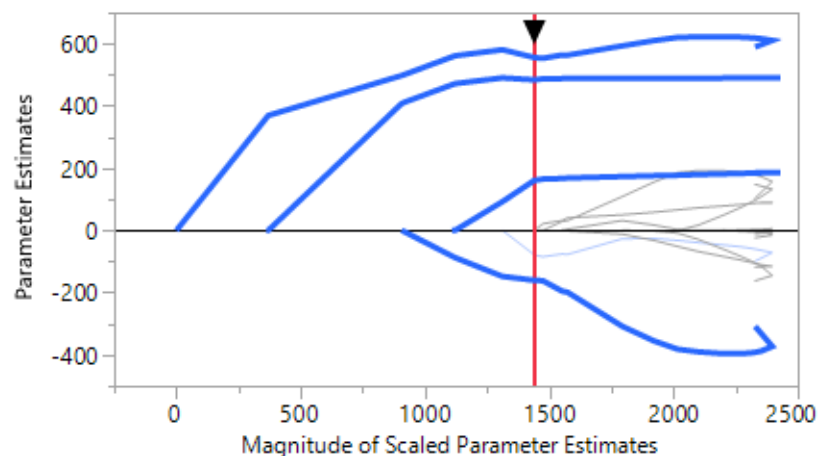
- Show Script
- Copy Script
- Copy Formula as Function
- Copy Formula as Transform
- Rename New Column
- Generate C Code
- Generate Python Code**
- Generate JavaScript Code
- Generate SAS Code
- Generate SQL Code
- Run Script
- Remove

FAST MODERN REGRESSION (JMP 12)

INTERACT WITH ADAPTIVE LASSO MODEL – VARIABLE & MODEL SELECTION FOR DATA THAT’S HIGHLY CORRELATED AND/OR NON-NORMAL

Measure	Training	Validation	Test
Number of rows	294	74	74
Sum of Frequencies	294	74	74
-LogLikelihood	1594.5348	402.5022	399.46519
Number of Parameters	7	7	7
BIC	3228.8547	835.13285	829.05883
AICc	3203.4613	820.70136	814.62735
RSquare	0.506121	0.4320668	0.5061904
RMSE	54.852588	55.703388	53.440629
Lambda Penalty	6030.1572	.	.

Solution Path

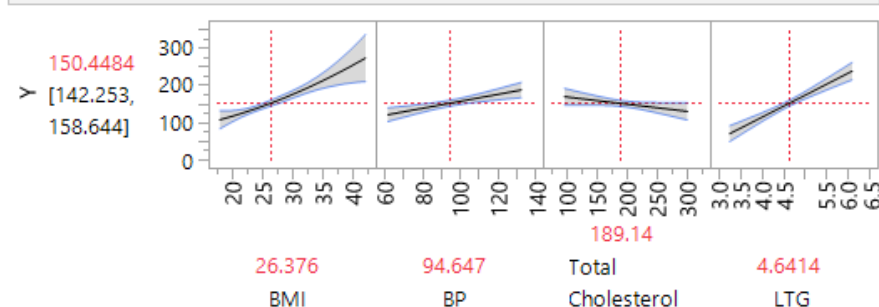


Parameter Estimates for Original Predictors

Term	Estimate	Std Error	Wald ChiSquare	Prob > ChiSquare	Lower 95%	Upper 95%
Intercept	-302.705	39.488631	58.761791	<.0001*	-380.1013	-225.3087
BMI	6.3716072	0.8995747	50.167619	<.0001*	4.6084731	8.1347413
BP	0.6863572	0.2729626	6.3225768	0.0119*	0.1513604	1.2213541
Total Cholesterol	-0.253761	0.1183203	4.5997185	0.0320*	-0.485664	-0.021857
HDL	-0.355974	0.28592	1.5500595	0.2131	-0.916367	0.2044185
LTG	61.913643	8.8560351	48.87582	<.0001*	44.556133	79.271153

Near Machine Learning accuracy, AND provides a more interpretable model with confidence intervals

Prediction Profiler



FAST MODERN REGRESSION (JMP 12)

INTERACT WITH ADAPTIVE LASSO MODEL – VARIABLE & MODEL SELECTION FOR DATA THAT’S HIGHLY CORRELATED AND/OR NON-NORMAL

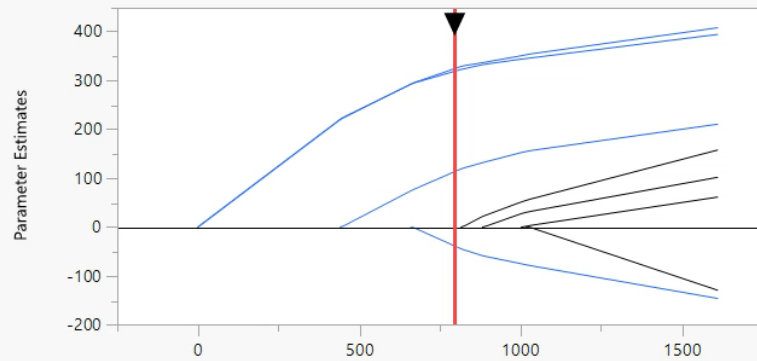
Generalized Regression for Y

Normal Double Lasso with Validation Column

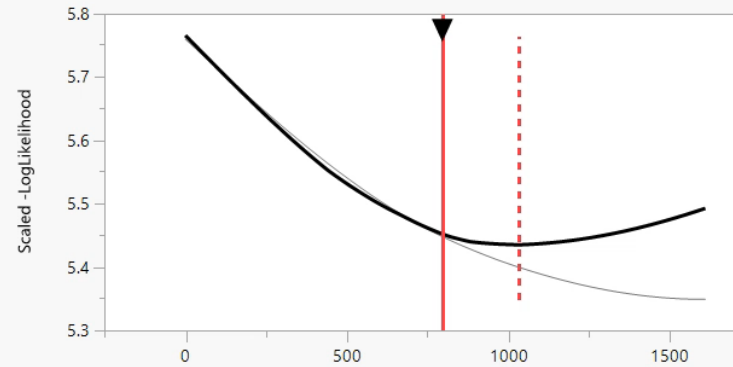
Model Summary

Measure	Training	Validation
Number of Parameters	6	6
BIC	2921.1427	986.53533
AICc	2899.9899	972.70835
RSquare	0.4634797	0.465176
RASE	56.231929	56.470668
Lambda Penalty	205.93138	.

Solution Path



Magnitude of Scaled Parameter Estimates



Magnitude of Scaled Parameter Estimates

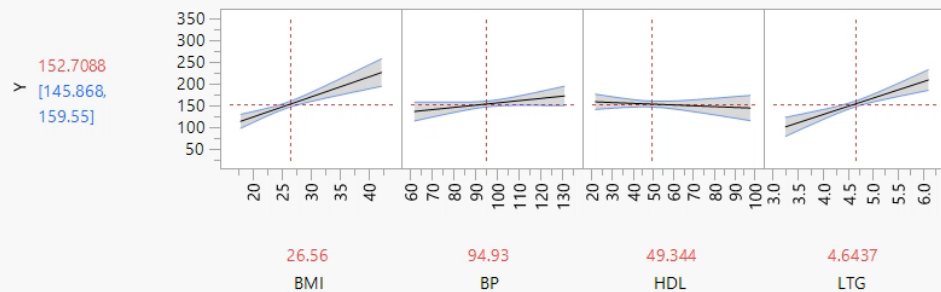
Legend
 — Validation
 — Training

Reset Solution

Parameter Estimates for Original Predictors

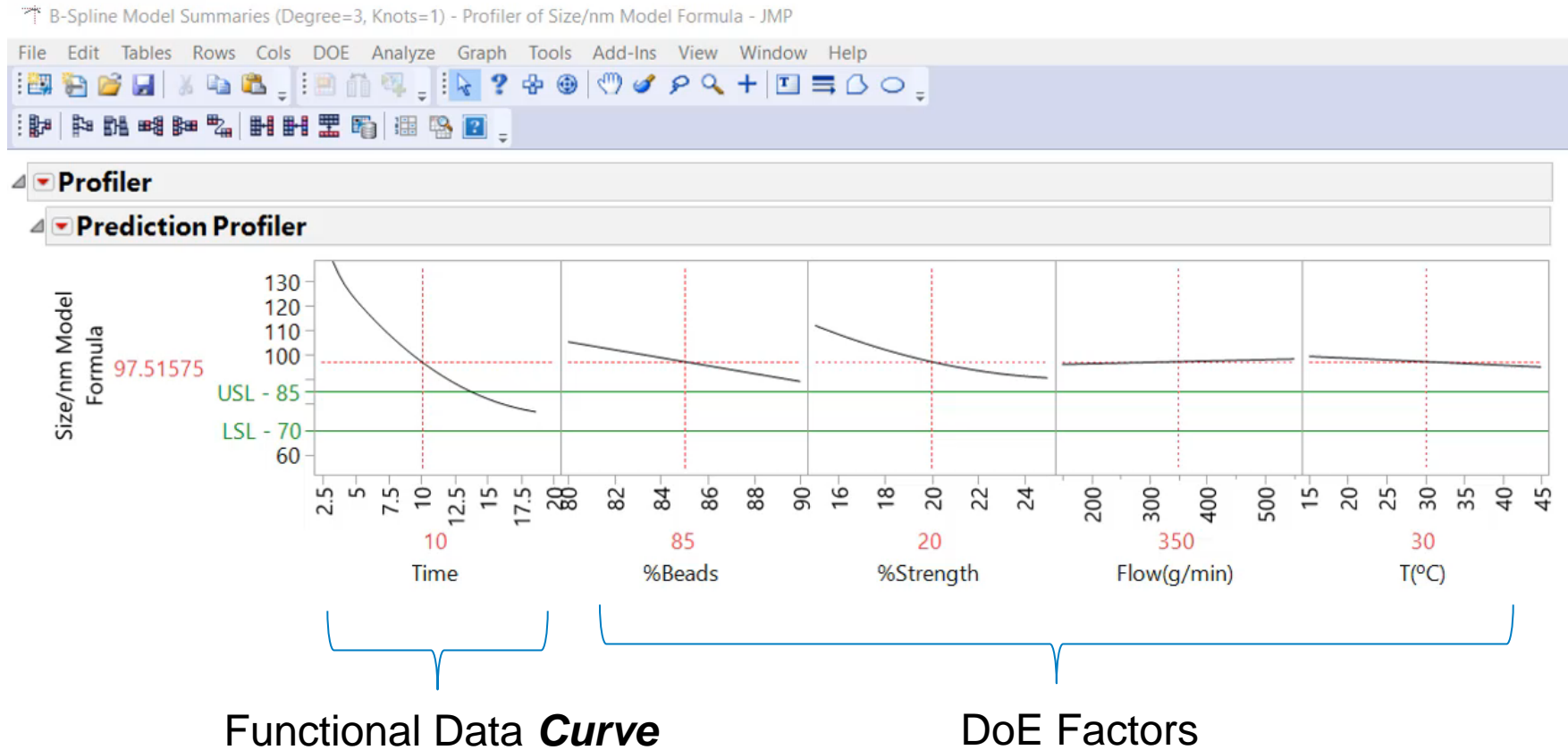
Effect Tests

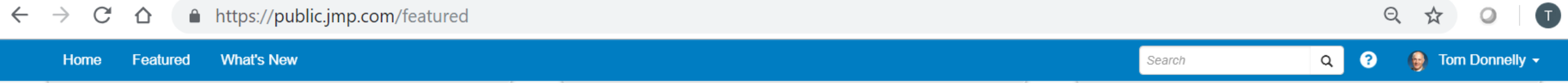
Prediction Profiler




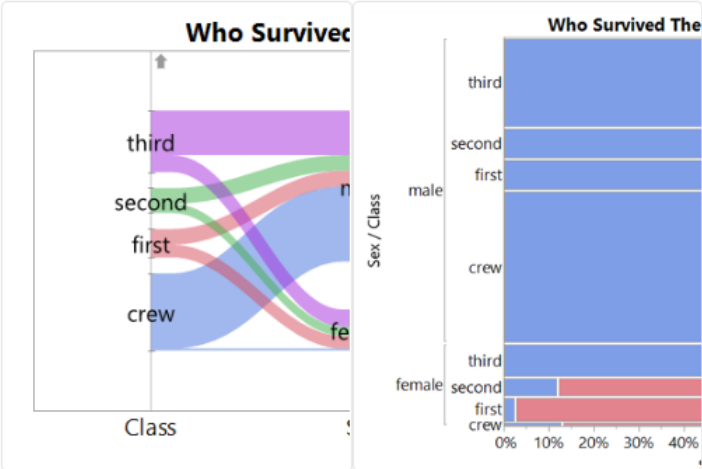
FUNCTIONAL DATA ANALYSIS (JMP 14)

MODELING THE “SHAPE” OF A STREAM OF DATA – SHAPE IS THE FUNDAMENTAL UNIT OF OBSERVATION – DIMENSION REDUCTION WITH FUNCTIONAL PCA ABLE TO CONTROL AND PREDICT SHAPE AS FUNCTION OF DOE FACTORS






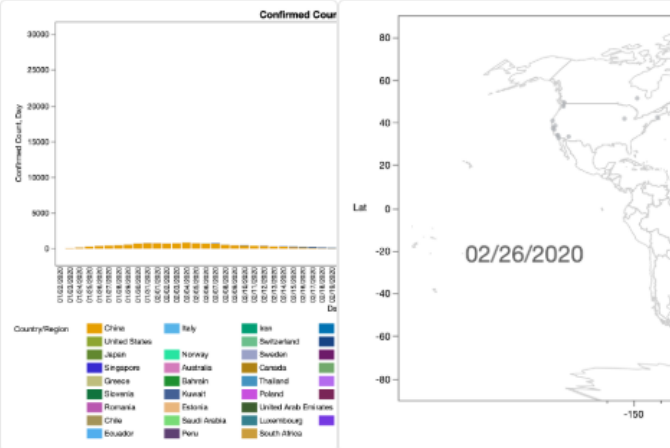
 Who Survived the Titanic?
Phil Kay





Interactive plots visualise Titanic survivor data.


Views: 87 Wed Mar 06, 2019 4:49 am

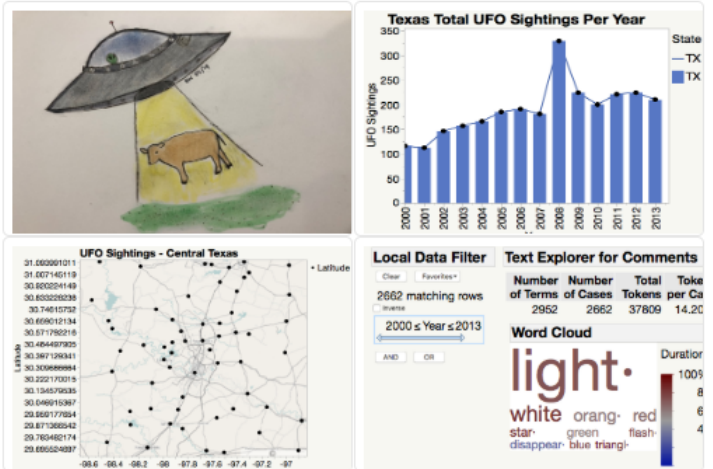
 Coronavirus COVID-19 Global Cases
JMP_Byron



Time series data represented in multiple graph formats

 1379  0 Sat Mar 21, 2020 2:54 pm

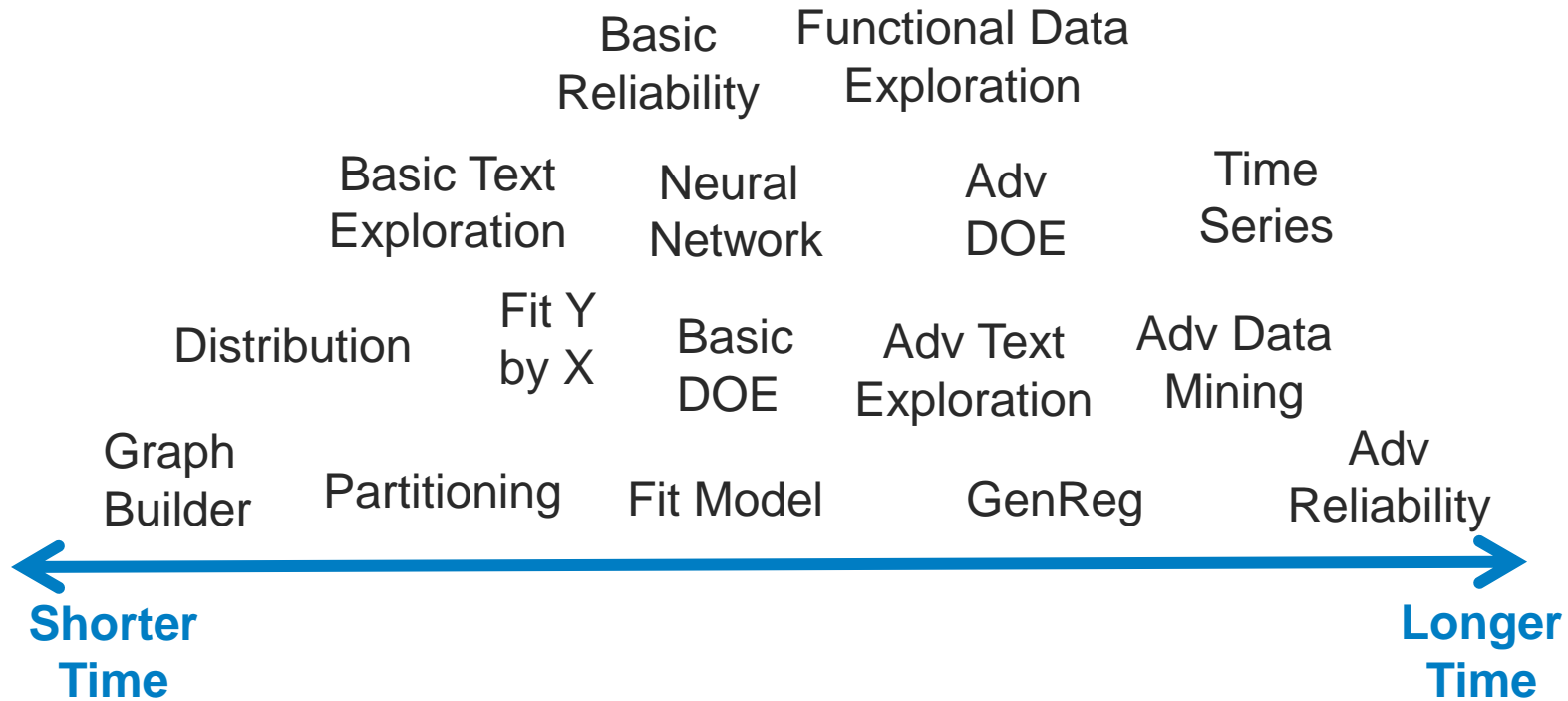
 Texas UFO Sightings
Scott Wise



I visualized the number and location of UFO sightings in Texas from 2000 to 2014. I also explored the text of comments in sighting reports.

Views: 65 Mon Mar 04, 2019 9:57 pm

HOW LONG DOES IT TAKE TO LEARN JMP? DEPENDS... ON YOUR LEVEL OF STATISTICAL KNOW HOW



SUMMARY: JMP CAPABILITIES THAT CAN HELP YOU MOVE FROM DATA TO DECISION – *FASTER!*

- Exploratory Data Analysis with Dynamic Linking & Filtering
- Design of Experiments – Real & Simulated Data
- Reliability Analysis, Accelerated Life Test, Reliability Growth
- Surrogate modeling of simulations
- Visual Multivariate Modeling
- Robust Data Mining using Honest Assessment stopping criteria when using Decision Trees, Neural Networks, Regression, Non-Linear modeling
- Maps and Images – animation over time
- Data Wrangling – recoding, impute missing, find outliers, import, export
- Fast and Modern Penalized Regression – interact with model (12 Pro)
- Exploratory Text Analysis – dimension reduction – Topic Vectors (13 Pro)
- Functional Data Analysis – modeling the “shape” of a data stream (14 Pro)

Dark Data: Why What You Don't Know Matters

Chapter 7: Dark Data and the Big Picture

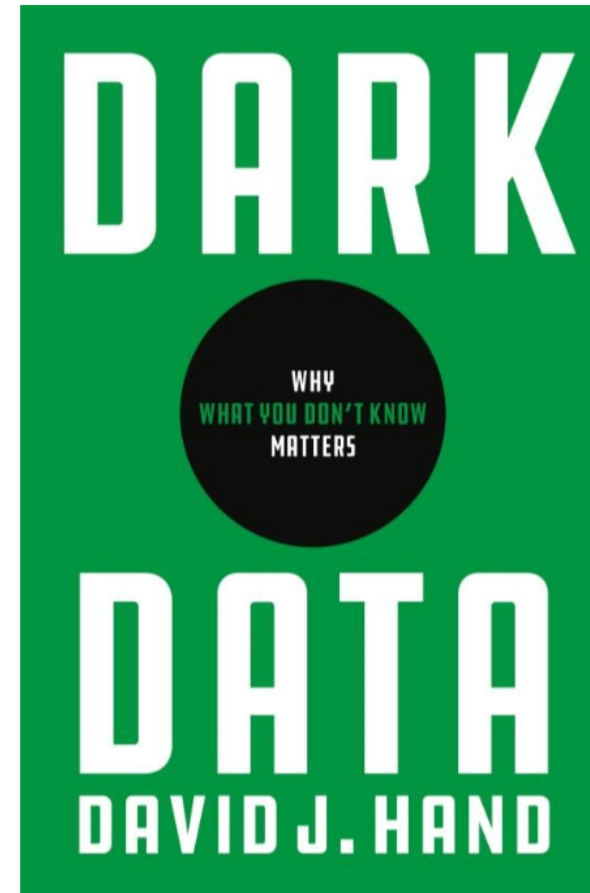
By David Hand



With data doubling every two years, it's easy to assume that any observation, decision, or conclusion one makes can be an informed one supported by data. That's not always the case says author David Hand. Professor emeritus of

mathematics at Imperial College London, former president of the Royal Statistical Society and a fellow of the British Academy, Hand suggests that our seemingly data-saturated world is full of Dark Data, the expanse of data that we don't see.

While it's impossible to know everything, missing data could be crucial to our understanding of a situation or problem. In his latest book, *Dark Data*, Dr. Hand explores the many ways we can be blind to missing or unseen data and how, in our rush to be a data-driven society, we might be missing things that matter, leading to dangerous decisions that can sometimes have disastrous consequences.



JMP
Resource
Center



https://www.jmp.com/en_us/whitepapers/book-chapters/dark-data.html

RESOURCES

My Recorded Tutorials & Slide Decks at www.jmp.com/fedgov

These 9 videos cover predictive analytics (including text exploration), data visualization, and "What's New in JMP 14?" topics.

Building Better Models Overview and Use of Honest Assessment	Neural Networks - Single Layer, Dual Layer, Boosted	All Graphs are Wrong - Some are Useful - Or view Xan Gregg's Original 2015 Discovery Summit Presentation
Regression Linear, Stepwise, Logistic, & All Possible	Generalized Regression Near Machine Learning Accuracy – More Explainable Model	What's New in JMP 14? JMP Learning Resources
Decision Trees Simple Partition, Bootstrap Forest, & Boosted Tree	Text Exploration Analyze Unstructured Free Text	Functional Data Explorer Modeling a "Stream" of Data – New in JMP 14

JMP DEFENSE & AEROSPACE TEAM ... AND HOW TO CONTACT US

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Technical Questions, Getting Started, Tutorials, Mentoring...

Tom Donnelly, PhD, CAP

Principal Systems Engineer & Co-Insurrectionist

tom.donnelly@jmp.com

302-489-9291

Naval PA Capability

The PA capability, based on automated data analytics, would support battle management aids by developing “what-if” and “if-then” predictive scenarios to shape the synthesis of future intelligent decisions and adaptive capabilities. This conceptual capability would inform decisions concerning courses of action (COA) based on what the longer-term effects are projected to be. It would enable short-term and long-term objectives to be weighed as tactical decisions are made.