



Honeywell International – Aerospace Division

Honeywell saves time and produces highly reliable devices using JMP®

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Senior Ops Excellence Specialist (Black Belt)
Honeywell

Since 1995, the Design Engineering department of Defense and Space Electronic Systems (DSES), part of Honeywell's Aerospace Division, has utilized the rich feature set of JMP® to meet and exceed productivity goals. This unit is the world's premier supplier of sensors for commercial and military aircraft, spacecraft, locomotives, and oil well navigation.

Precision sensors, such as thermal switches and accelerometers, control temperatures and track the movement of high value equipment (i.e. satellite applications, international space station, spacecraft, etc.). Accelerometers enable navigation in aircraft while thermal switches perform auto de-icing of aircraft wings, for example. For each of these vital instruments, JMP helps Honeywell optimize the design of the device for increased product efficiency.

“JMP was chosen because it was recommended by the Six Sigma Academy,” said Paul Dwyer, Senior Ops Excellence Specialist (Black Belt) for the Design Engineering department of Inertial Sensor Products. “We previously had been using [various statistical software packages], but JMP had a combination of capabilities and ease of use the others couldn't match.”

These factors played a significant role in the decision to use JMP because everyone from engineering research to those on the factory floor is affected by the information produced.

Challenges

“Aerospace products face continuing pressure to produce more, higher reliability and lower cost devices every year. The bar keeps going up,” said Dwyer. To meet those demands, DSES utilizes JMP as the statistical discovery tool of choice.

The big issue today is being able to quickly produce robust designs to meet the needs of the marketplace. Prior to using JMP, one had to remember how to query several databases, tie all of the data together and produce the appropriate analysis. Unless this is done daily, it is difficult to accomplish rapidly. “With JMP there are no weak links,” Dwyer stated. “JMP provides automatic data retrieval and analysis, which helps us develop quick responses to issues that arise.”

“Our industry is heavily data oriented and one of JMP's tasks is to convert that data into information that leads to action,” Dwyer said. “For example, we have a way to poll several databases simultaneously, join them together and correlate everything against everything else with multivariate analysis. Many times subtle relationships are found in this way.”

Using JSL and DOE

Honeywell relies on JMP's scripting capability, known as JMP Scripting Language (JSL), to automate analyses that determine the low-level parameters affecting end item performance.



JMP's Design of Experiments (DOE) capabilities facilitate the development of transfer functions, which determine those parameters worth tracking. Once the transfer function and the variation of the low-level parameters are identified, a robust product or process design can be created.

Solving Problems

"Previously, we would start tracking parameters that we thought were important, but the time it took to acquire and analyze the data would discourage the continued data analysis when the processes were working properly," said Dwyer. "This is a sure way to allow problems to recur. Scripting the analysis takes all of the work out of producing the required information."

Positive Improvements

The Augment Design feature greatly reduces the number of tests required to create a good transfer function. Many times the initial DOE does not capture a high enough percentage of the total variation. Augment Design provides the minimum number of

additional tests needed to identify the interactions or nonlinear effects of the variables of the transfer function. This feature allows a more complex DOE to be performed without starting from scratch by using all of the data available from previous experiments.

JMP scripts enable multiple analyses to be launched at once and posted to the company web site. In this way, people can get information about device behavior without even knowing how to use the software.

Results

By using JMP to identify important factors in product efficiency, the designers have confidence in their ability to predict product behavior. This confidence allows them to experiment in realms they were unwilling or lacked the time to evaluate before. The result is more competitive products.



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