

## CASE STUDY

# Accord™ Improves Trade Studies at Boeing Space and Communications

### BACKGROUND

*Boeing Space and Communications designs and manufactures engines for the Space Shuttle, International Space Station, and missile defense and reconnaissance systems.*

### THE CHALLENGE

*During the development of a new engine or the redesign of a current product, a challenge is to minimize the risk of making poor decisions when knowledge is uncertain and the market is changing.*

*In order to find the optimum design, and to meet criteria for performance, cost, and weight, many parameters must be traded off, one against the other.*

*The goal is to decide on a design that best satisfies all the criteria and represents stakeholders' views.*

***“Accord helped us quickly zero in on the best possible alternative and reach a conclusion with confidence.”***

***“We were able to quickly and accurately focus on important areas and issues influencing the decision, identify areas of disagreement, and build consensus with more certainty and rapidity than ever before.”***

*— J.O., Process Leader  
Boeing Space and Communications*

### CURRENT DECISION-MAKING METHOD

Boeing's current method is based on a decision matrix, sometimes called Pugh's Method. The process involves identifying alternatives and criteria, assigning weights to individual criteria, rating each alternative against each criteria using a 1-10 scale in matrix form, multiplying weights and ratings, adding total scores, and comparing. The satisfaction with one criterion is then traded off against the satisfaction with others.

### THE PROBLEM

There are major limitations to decision matrices:

- Uncertainty is often not addressed
- Knowledge levels are treated equal among alternatives
- Strong advocate viewpoints can easily dominate
- Experts are assumed to have the same experience for all options
- Consensus is not a consideration
- The best option is not clear when a final comparison of alternatives is close

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## Accord Improves Trade Studies

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Boeing engineers conducted two experiments comparing decision matrices to *Accord*. The goal was to evaluate *Accord* and determine if it could overcome the limitations in the traditional method.

### FIRST EXPERIMENT

A frequent Boeing design problem involves selection of an alternative rocket nozzle design for proposal to a funding agency. To evaluate *Accord*, Boeing chose a problem that had been abandoned as too complex using a decision matrix.

Four alternative concepts were compared to the current design configuration. Criteria included weight, thrust, performance, recurring cost, engine integration, capital cost, and repress flow.

### RESULTS

Boeing managers reported the following:

- *Accord* confirmed the decision matrix results
- Consensus was reached within a few hours, compared to one month with the decision matrix

Additionally:

- Qualitative and quantitative data were considered
- Several strong personalities were better managed
- Criteria refinement was easier and more thorough

### SECOND EXPERIMENT

A project using a decision matrix had been developed on a cumbersome spreadsheet, and the team had not agreed with the results. The problem was then readdressed using *Accord*.

The alternatives and criteria were entered into *Accord*. In addition, the importance weightings, determined by the customer, were also included. Boeing experts independently evaluated the alternatives, and the results were merged—eliminating groupthink and advocates affecting the outcome.

### RESULTS

Boeing managers reported the following:

- Team members agreed with the results
- The results were delivered quickly

Additionally:

- The risk of design cycle repetition was reduced
- Knowledge uncertainty was managed
- Decision confidence increased
- Risk mitigation areas were identified
- Team discussions and consensus were improved
- Strong personalities were better managed
- *Accord* was much easier to use and interpret

