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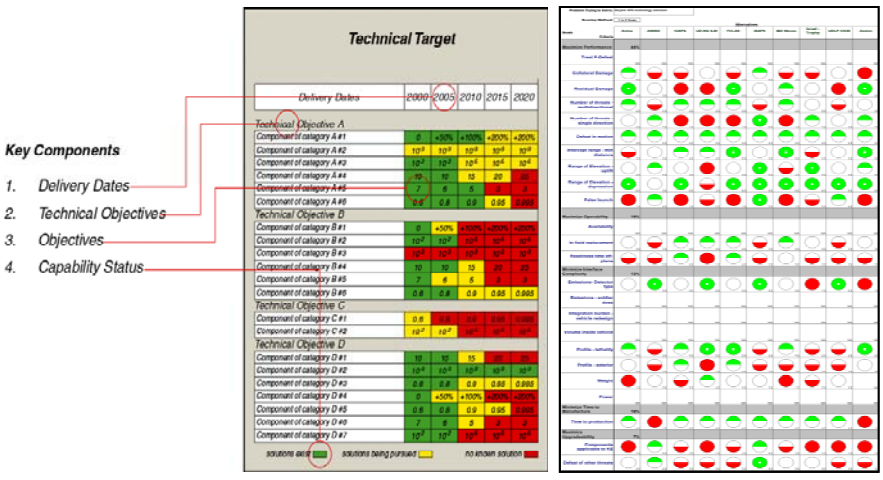
Trade Studies / Alternatives Analysis

Identifying what decisions need to be made to support system design is not always easy, and there is never enough time or money to consider all the myriad alternatives available to satisfy customer needs. System design decisions should always be based on the System Requirements underlying the topic of the decision. Trade studies provide the needed information for decision making and the documentation necessary to support the decision. Trade studies and their associated documentation eliminate second guessing of the resulting system design.

Alternatives analysis is the process of assessing the different methods for accomplishing system functions, creating system scenarios consistent with system modes and performance requirements, and developing and documenting alternate system concepts based on scenario and functional definitions. Alternatives analysis consists of any or all of the following activities.

- Conducting design analyses, simulations, and tradeoff studies to provide desired performance measurement data.
- Using modeling and decision analysis techniques, as applicable, to collect the data stipulated by established decision criteria.
- Conducting life-cycle cost and schedule analyses for each alternative under consideration.
- Comparing each alternative and selecting the best one or combining the best characteristics of several alternatives into an entirely new alternative to define the preferred system solution.
- Establishing schedule and cost baselines for the preferred system solution.
- Allocating system functions to actual physical components (hardware, software, and peopleware) of the preferred solution.
- Finalizing the project's Physical System Architecture.

Systems engineers at the Idaho National Laboratory use a broad base of experience and expertise to affect these trade studies and alternative analysis efforts and to guide informed, defensible decisions.



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