

# Developing Performance Measures for New Technologies

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## *Abstract*

To justify the research of new technologies is often fraught with a sense of foreboding. This is because the technology under evaluation is “new” in terms of use. The classical theory of reliability states that historical information on a process or system improves the reliability of the process or system. The Bayesian camp prefers to state it as the decrease in the degree of uncertainty in the success of the process or system. To assist a system development team to decide when, if at all, how and what new technology should be used in their new development is non-trivial. However, if the performance measures are stated early and very concisely, this methodology can be used to provide a relative table of merit. This paper describes one aspect of technology selection and illustrates how the process can be used to select the technology of choice.

## **Overview:**

Research and Development into new technologies for system development is an open-ended task. In most cases the innovator is oblivious to the deficiencies of the state-of-the-art technology and the integrator is reluctant to experiment with the untested. Two factors limit the R&D efforts of an organization, cost and schedule, which are not mutually exclusive. However, organizations weight these factors differently. For example, Government organizations are not as schedule driven as they are cost driven. Since most new systems have to be tested thoroughly before they are deployed in the field, the schedule to have a system ready in time is not as important as having a reliable system ready. For example, new instrumentation methods will not be used on a satellite till the results are proven, and most often by running them in parallel with older but tested systems. This emphasizes the necessity for highly tested reliable systems. At the same time, the push towards new technology requires the need for research and development.

On the other hand, Industry is schedule driven, and if the new technology does not meet the goals in the predicted time line, the new R&D effort is terminated and in some cases the technology is discarded. This does not eliminate the need for Industry to have highly tested and reliable systems. The aim of Industry is to make a profit, and hence the timeliness of the product is paramount. In many cases, products have been released to the public without being completely tested to eradicate early failures. However, it is only the industry leaders that can survive the bad press from this type of product release, and most smaller and newer companies have to incur very high costs to ensure the reliability and performance promises are met at time of release. The situation warrants a process, whereby, R&D programs across the board will ensure reliable and first time right systems within budgeted cost/schedule.