

## **The Development of NASA's Fault Management Handbook**

L. Fesq

Jet Propulsion Laboratory

Fault management (FM) is a maturing discipline; currently there is no unifying description or set of guidelines for this field. Disciplines related to FM do have formal methodology documents, and in some cases, NASA Procedural Requirements to guide development of the work products. However, none yet addresses the needs of FM. A common FM methodology is neither more nor less important than a methodology for Systems Engineering, Failure Modes and Effects Analyses, Hazards, or any other discipline or process.

A number of organizations both within and external to NASA have developed successful approaches to FM, and while many of these have been locally successful, they often are inconsistent with each other. In addition, teams internal to these organizations use different approaches to FM and deal with the same issues in a fragmented way. Both of these factors add to the difficulty of assessing the quality of the processes used and the development of interfaces, and may lead to designs that are complex and/or difficult to verify and validate. All of these approaches have difficulty addressing questions of completeness and effectiveness.

FM is a key factor to increase safety, reliability, availability, and performance in systems, and it should have the rigor of other safety-critical processes in order for significant improvements to be made. If the field does not mature by developing, documenting, and applying systematic methodologies for developing FM functionality, improvements to safety and reliability will be limited.

NASA recently has begun developing a FM Handbook to establish guidelines and to provide recommendations for defining, developing, analyzing, evaluating, testing, and operating the FM element of flight systems. It establishes a process for developing FM throughout the lifecycle of a mission and provides a basis for moving the field toward a formal and consistent FM methodology to be applied on future programs. This presentation describes the motivation for, the development of, and the future plans for the NASA FM Handbook.