

tribute to errors by well-intentioned, well-trained, experienced technicians.

The model serves as a tool to ensure that appropriate questions are asked during investigations of errors, to provide a data base containing standardized representations of events (incidents, mishaps, close calls), and to provide quantitative information as to why errors occur. The questions and the inputs to the model (that is, the answers to the questions) are divided into categories and subcategories. The main categories (see figure) are organizational inputs, team inputs, individual inputs, and design inputs. Subcategories can be added or modified, as needed, to adapt the model to applications other than space-shuttle processing at Kennedy

Space Center. To ensure consistency among users, each category is delineated by narrative definitions and examples of probing questions.

Two particularly notable examples of subcategories are those pertaining to written and verbal support information. These subcategories encompass such things as specifications, company directives, and government documentation.

In applying the model to a given event, an investigative team works from top to bottom and from left to right while reviewing each category. If a category is applicable, a cause code and a brief description of the event are entered into a comprehensive data base of events. Once trends have been identified through analysis of multiple events,

sources of data can be investigated to review specific problem sources. For example, if there appears to be a tendency for errors to arise in or from the verbal transmission of information, tape recordings of verbal exchanges can be audited in an attempt to identify sources of error.

This work was done by Patrick A. Simpkins, Tim S. Barth, and Jim Molina of Kennedy Space Center and Donna M. Blankmann-Alexander, Mark J. Nappi, and John W. Jamba of United Space Alliance. For further information, access the Technical Support Package (TSP) free on-line at www.nasa.gov under the Mathematics and Information Sciences category, or circle no. 162 on the TSP Order Card in this issue to receive a copy by mail (\$5 charge). KSC-11975