

KSC's Integrated Design and Assurance System (IDAS)

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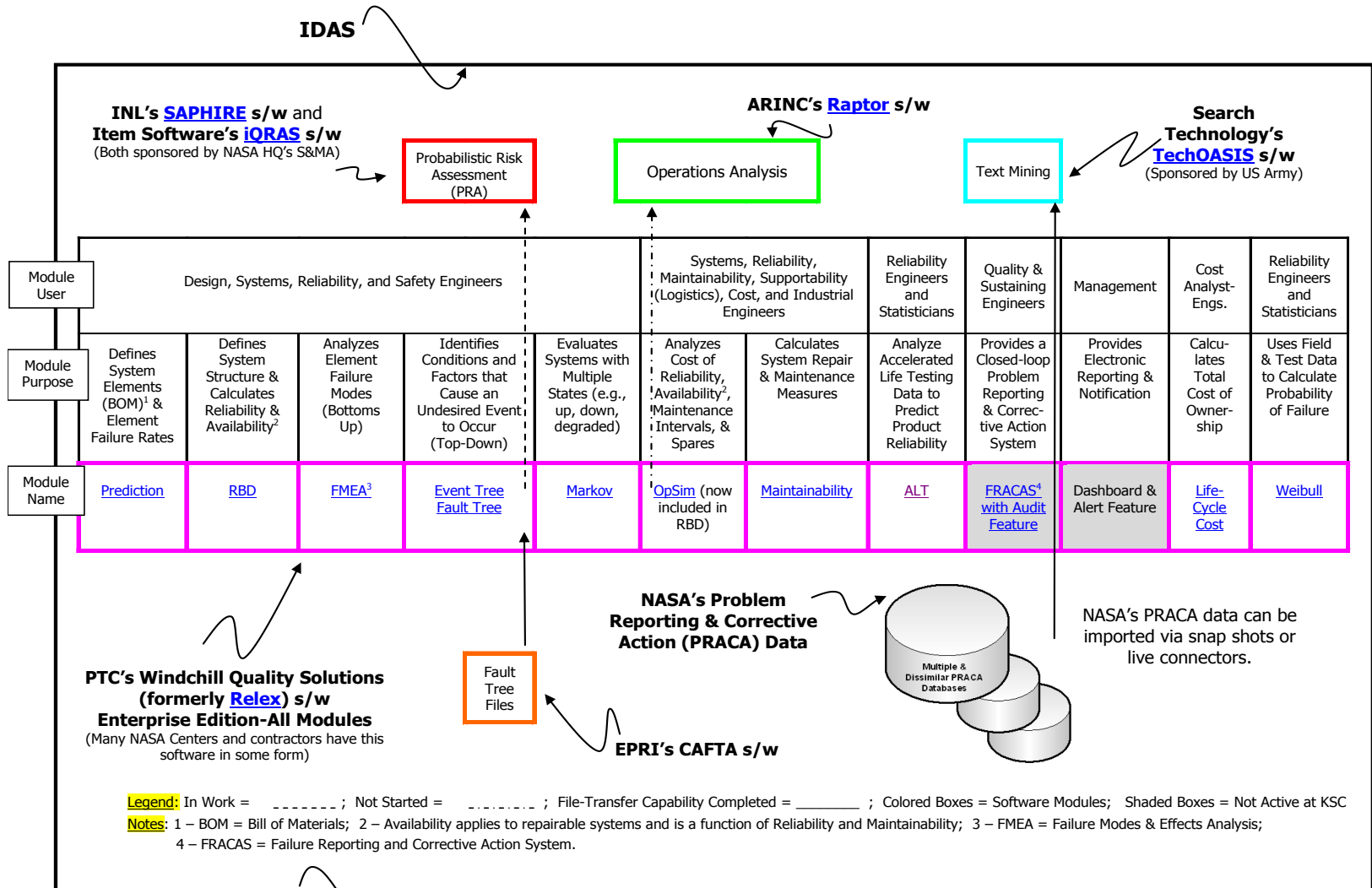
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External Website for IDAS: <http://kscsma.ksc.nasa.gov/Reliability/IDAS.html>

- Origin and Purpose: About six years ago, KSC's Office of Chief Engineer led the effort called IDAS. IDAS's goal that remains today is to provide and support a set of integrated COTS modules for any KSC employee at anytime (24/7) to "learn and do" engineering assurance analyses (e.g., reliability) over the life cycle of a system. In addition, IDAS had the purpose to demonstrate data file transfer with other COTS tools.
- Selected Features: IDAS allows an equipment list (bill of materials) to be imported or inputted and then used to populate various analysis modules. Some modules can be linked.
- IDAS is located on the KSC network and is totally electronic (e.g., provides access via NAMS, provides online training as well as by other methods, allows a user or group of users to build, run, and view analyses, and uploads to KSC's Product Data Management system).
- Use: IDAS is used by all KSC programs. For example with the Constellation Program, KSC Ground Systems' Systems Engineers in conjunction with KSC Design Engineers used IDAS to identify and make over 100 design changes prior to build. This work is described in an AIAA paper that was selected as one of the top 30 papers.
- Summary: In today's Model-Centric Engineering terms, IDAS is an integrated and highly supported suite of "model-based engineering" modules that perform various types of technical risk analyses, one important part of systems engineering, and is a step in the direction of closed-loop-model-based-systems engineering (MBSE).

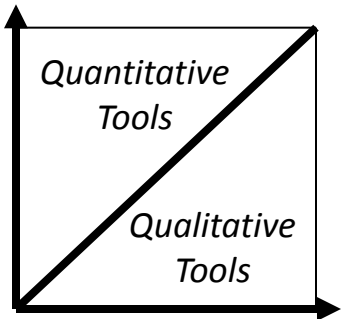
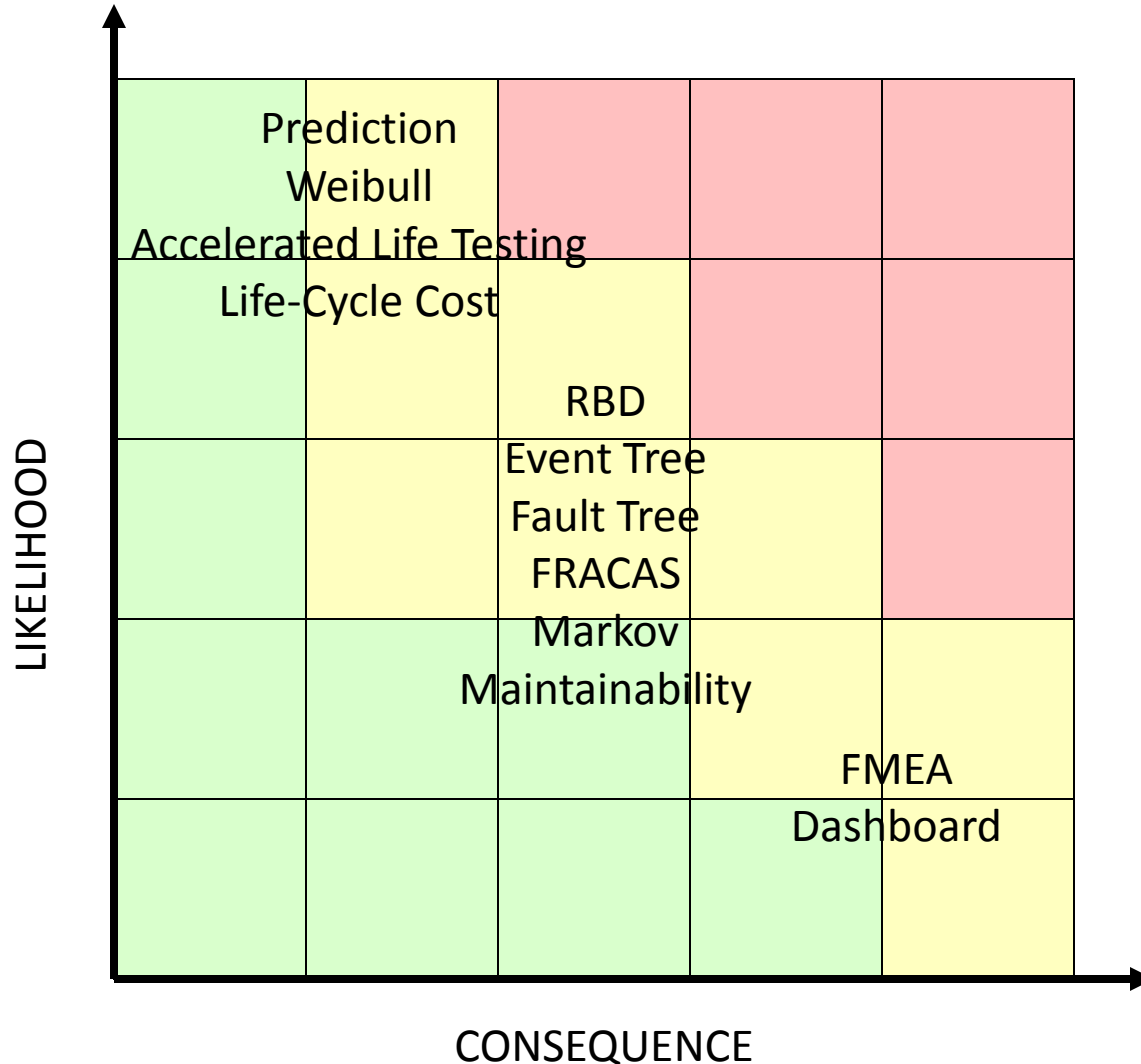
IDAS Modules by Vendor & File Transfer Capability



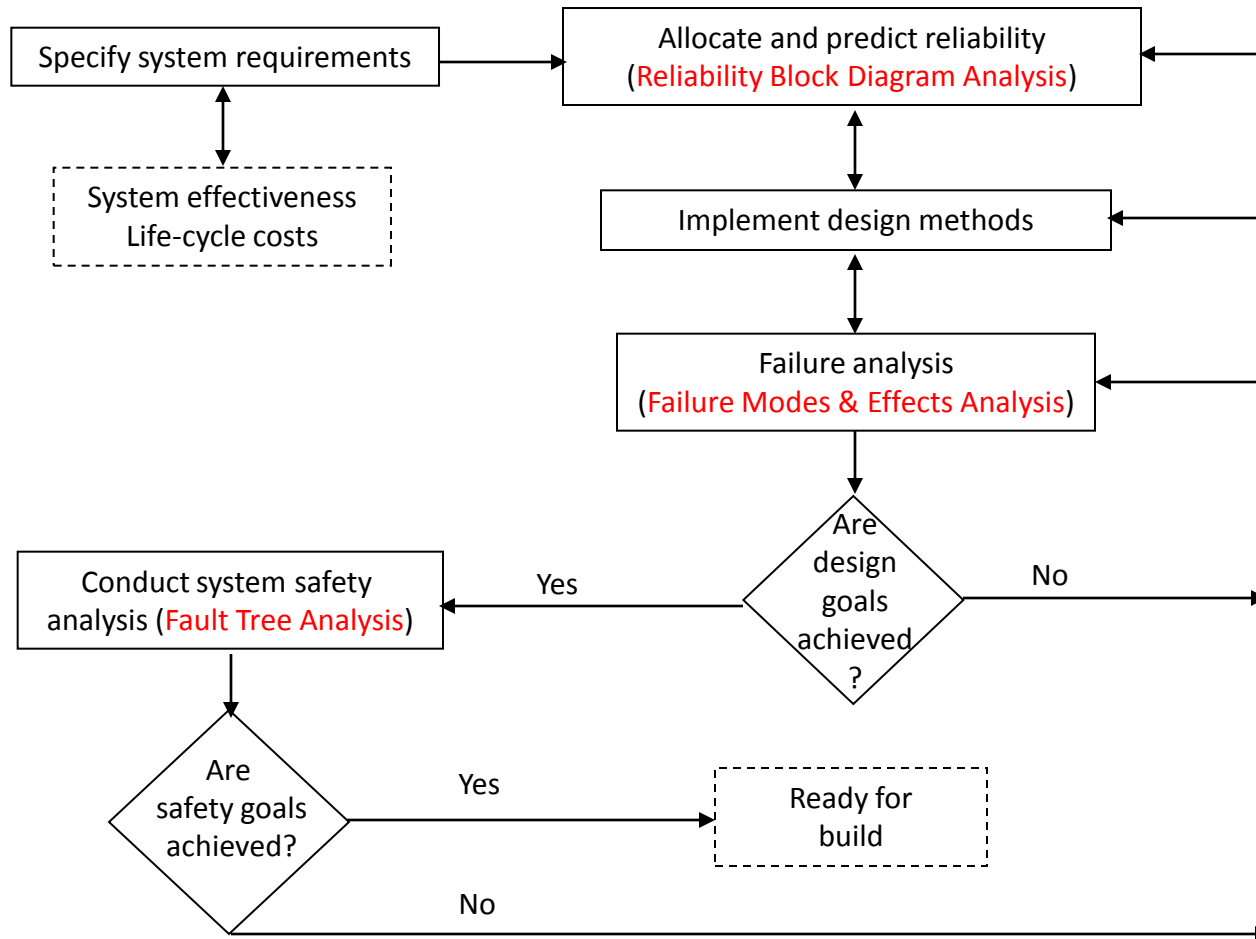
Upload IDAS products to **other systems** (e.g., Product data management (PDM) or Product lifecycle management (PLM))

PTC WQS (formerly Relex) Modules from a Risk Perspective

Internal Website for KSC's PTC WQS software: <https://sp.ksc.nasa.gov/sites/sre/tools/relextool/default.aspx>

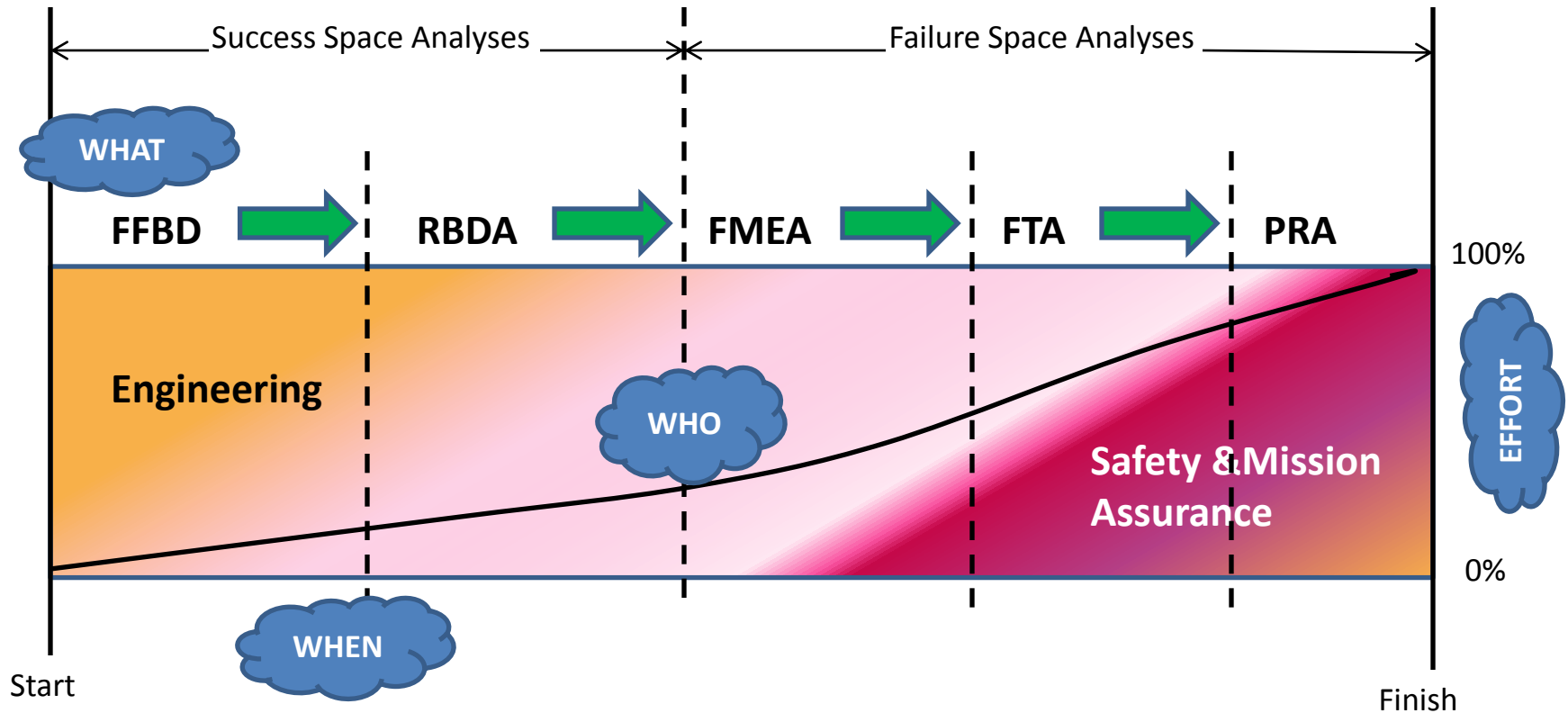


Selected **IDAS Modules** that Provide Engineering Assurance or Technical Risk Analyses during the Design Phase



Reference: An Introduction to Reliability and Maintainability Engineering, Figure 8.1, Charles Ebeling, 2005.

An Idealized Sequence for Producing Engineering Assurance Analyses



Analytical Products:

- FFBD** = Functional Flow Block Diagram
- RBDA** = Reliability Block Diagram Analysis
- FMEA** = Failure Modes & Effects Analysis
- FTA** = Fault Tree Analysis
- PRA** = Probabilistic Risk Assessment

Theme:

This work sequence (WHEN) builds and uses analytical products (WHAT) in an optimum manner—especially during the Design Phase. The appropriate mix of experts (WHO and EFFORT) make and deliver the right analytical product at the right time. In addition to serving the intended purpose at the desired time, each analytical product serves as an input that expands the technical fidelity of analytical products that follow.