

## *Safety and Mission Assurance Support Services with ALD's Reliability and Safety Analysis Software Tools*

## CASE STUDY

### **NASA The National Aeronautics and Space Administration**

"The greatest Adventures begin with a small step". 50 years of technological advancement and space explorations have made NASA's **constellation program** possible. With the retirements of NASA's space shuttles, The Constellation Program opens a new era in space exploration. NASA analyzed the mission needs in 2006, and has selected ALD's Software and Services to deliver Safety and Mission Assurance Solution to NASA's Constellation Program. The NASA contract is a Multi-year contract, under which, ALD's team of engineers and scientists supports Safety, Mission Assurance and Reliability for the Constellation program. This is achieved based on ALD's state of the art safety and reliability software tools. As part of this project, ALD's engineering team were re-located to Johnson Space Center in Huston Texas USA, to conduct detailed Reliability, Safety and Mission assurance analysis while utilizing ALD's world renown tools and techniques including :

Reliability Prediction and Modeling

FMECA

FTA

Safety Assessment



ALD's solution provides comprehensive RAMS for Space borne Applications. ALD has developed software techniques to implement advance reliability, safety analysis procedures for NASA's Constellation program, assessing overall trends, identify strengths and weaknesses and make recommendations for design, qualification, and analysis requirements for increasing mission reliability and safety levels.

*NASA. The National Aeronautics and Space Administration is an Executive Branch agency of the United States government, responsible for the nation's civilian space program and aeronautics and aerospace research. The Constellation Program opens a new era in space exploration with the development of Orion crew exploration vehicle, Altair Lunar Lander, Ares I Crew Launch Vehicle, and Ares V Cargo Launch Vehicle and booster vehicles to replace the Space Shuttle. The scientific revelation to be revealed of the Constellation Program will take humans to the moon, Mars, and exploring even further into the Solar system.*

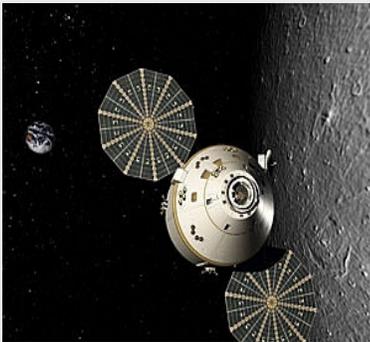
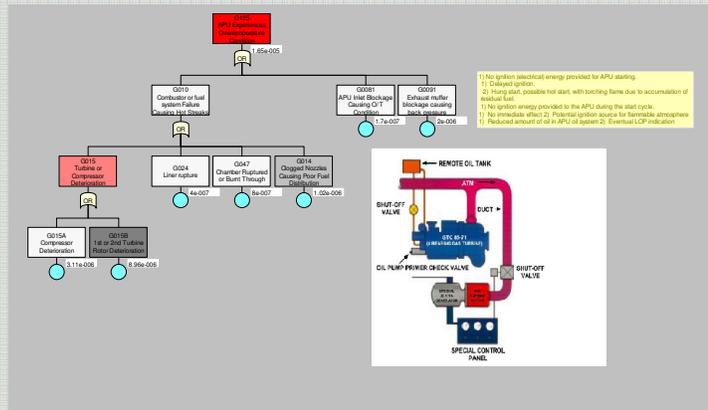
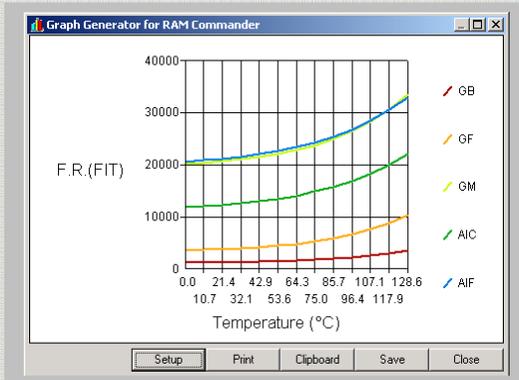


## In Focus: RAM Commander

RAM Commander at NASA is the focal tool for Safety, Reliability and Quality for the Constellation program systems.

RAM Commander constitutes a central RAMS database, which supports International standards (IEC 61508, EN 50128, EN 50129, EN 50126, IEC 62380) and includes:

- Reliability Prediction and Failure Rate Calculations;
- Fault Tree Analysis;
- FMECA; and
- Safety Assessment



The Project Overview window displays the following information for project 'NASA\_CP':

- Project Information:** Name: NASA\_CP, Revision: , Description: Communication System.
- Reliability Analysis:** Reliability Block Diagrams (Available, 10 diagrams), Markov Analysis (Available, 8 diagrams), Mission Profile (Available, 1 mission profiles).
- Maintainability/ILS/Maintenance:** Maintainability prediction (Done, MTTR=0.34194 h), Spare parts (Available, 1 scenarios), RCM, MSG-3, IIA.
- Reliability Prediction:** Operating mode (Done, FR=89.0731), Non-Operating mode (Done, FR=14.8262), Derating/Stress analysis (Available, 3 scenarios).
- Failure Analysis:** FMECA (Available, with Testability), Fault Tree Analysis (Done, 6 trees), Event Tree Analysis (Done, 1 diagrams), Process FMEA (Available), Design FMEA (Available).
- Safety:** Safety Assessment (Available, 3 failure conditions), MMEL (IIA).