# NASA Supplier Assessment Experience

**Steve Ogg**

**Assessments & Audits**

**Space & Airborne Systems**

**10/19/11**

# WHO WE ARE

- A technology and innovation leader specializing in defense, homeland security and other government markets throughout the world
- 2010 net sales: $25 billion
- 72,000 employees worldwide
- Headquarters: Waltham, Massachusetts

›› *A global leader in technology and innovation*

# SPACE AND AIRBORNE SYSTEMS

**Richard R. Yuse**
President
**2010 Net Sales: $4.8B**
**Employees: 11,900**
**HQ: El Segundo, CA**

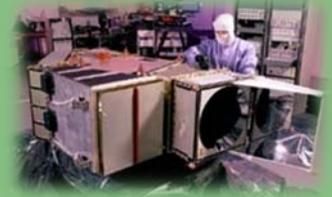Integrated sensing solutions for advanced applications in aviation and space technology

– Civil, National and Military Space Solutions
– Tactical Airborne Radars and Processors
– Electronic Warfare Systems
– Intelligence, Surveillance and Reconnaissance
– Integrated Aircraft Solutions

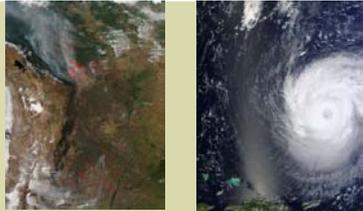›› *World leader in integrated sensor systems for space and airborne missions*

# Raytheon Space Sensors
## NASA Earth-observing and Planetary Missions

- **Landsat-7 Enhanced Thematic Mapper Plus (ETM+)**
  - Multispectral scanning radiometer providing high-resolution imaging information of the Earth's surface

- Moderate Resolution Imaging Spectroradiometer (MODIS)
  - Key instrument aboard the Terra (EOS AM) and Aqua (EOS PM) satellites

- **Miniature Thermal Emission Spectrometer (Mini-TES)**
  - Flown on Mars exploration rovers *Spirit* and *Opportunity*
  - Providing mineralogy of rocks and soils

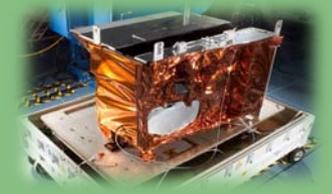- Miniature Radio Frequency Technology Demo (Mini-RF)
  - Advanced synthetic aperture radar
  - Identified ice in lunar polar regions

- **Visible Infrared Imagery Radiometry Suite (VIIRS)**
  - Replaces the data yield of three existing operational systems
  - First flight on NPP, primary sensor on JPSS satellites

44 year history of successfully delivering complex space sensors with 100% on-orbit performance

# *Mission Assurance Assessments & Audits*

- **Assessments & Audits organization is responsible for**

  - QMS/AS9100 Audits for Space & Airborne Systems (SAS)
  - Mission Assurance Assessments
  - Program Independent Assessments (PIAs)
  - Support other organizations with Certified CMMI Assessors
  - Support/coordination for external audits and assessments

- **Assessments and PIAs are a critical part of the Mission Assurance charter**
  - Utilizing Assessments and Audits to help ensure program, product and process efficiency

  - Identify potential business risks and opportunities and recommend improvements and/or corrective action as required

  - Performed by experienced and independent subject matter experts

# *Examples of Mission Assurance Assessments*

## Program Execution processes

- Transition to Production
- FRACAS Process
- Technical Requirements Flowdown
- Program Risk & Opportunity Mgmt
- Design Review Action Closure
- ERP Process Adherence
- Systems Engineering Planning

## Mission Assurance processes

- FRACAS
- CCB Effectiveness
- MRB/Non Conforming Material
- Drawing Check Effectiveness
- Objective Evaluation Plan vs. Held
- First Article Inspection process
- Supplier Assessment Effectiveness
- Purge Process

## Manufacturing and Test Infrastructure

- Test Commodities quality and availability
- Seismic
- Preventive Maintenance
- Calibration Out of Tolerance
- Safety Assurance
- Critical Ops Processes to achieve CMMI
- Design for Manufacturing and Test

**Additional Unplanned Assessments/PIAs Typically Increase the Total by 30-50%**

# *Program Independent Assessments (PIA's)*

**Raytheon**
**Space and Airborne Systems**

- **Behavior and Objective Evidence (OE) assessments using the *SAS Program Mgmt Best Practices* as the basis for assessment against the Programs current progress**

- **Generally selected from Top / Watch / Risk Program list**

- **Requests have come from Business Area VP's, Director or PM of Program w/ (6) month re-assessment if many issues exist initially or in follow-up requests by PM's**

| BA/MA | ACT | TAS | ISRS | ISRS | TAS | TAS EW | TAS EW | SS | ISRS | ACT | TAS | TAS | ISRS | ACT | SS | ISRS | TAS | ISRS | ISRS | Space |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Mgmt Best Practices | Prog L | Prog M | Prog N | Prog O | Prog P | Prog Q | Prog R | Prog S | Prog T | Prog U | Prog V | Prog W | Prog X | Prog Y | Prog Z | Prog AA | Prog AB | Prog AC | Prog AD | Prog AE |
| | Jan-10 | Jan-10 | Feb-10 | Mar-10 | Mar-10 | Apr-10 | May-10 | Jun-10 | Jul-10 | Sep-10 | Nov-10 | Jan-11 | Feb-11 | Mar-11 | Mar-11 | Apr-11 | Apr-11 | May-11 | Jun-11 | Jul-11 |
| Org/RRA | ▲ | ! | ▲ | ▲↑ | ● | ▲ | ● | ▲ | ●↑ | ● | ★ | ★ | N/A | ▲ | ● | ● | ●↑ | ▲↑ | ▲↑ | ★ |
| CCBM | ★ | N/P | ★ | ★ | ★ | ● | ● | ● | ▲ | ● | ★ | ■ | N/A | ● | ● | ★ | ★ | ● | ● | ★ |
| R&O | ● | ! | ● | ● | ★ | ▲↑ | ● | ● | ▲ | ● | ●↑ | ★ | ▲ | ▲↑ | ● | ▲↑ | ▲ | ● | ● | ▲ |
| IMP/IMS | ▲ | ! | ★ | ★ | ★ | ●↓ | ● | ★↑ | ● | ★ | ★↑ | ■ | ▲↑ | ● | ★↑ | ★ | ● | ● | ● | ★ |
| EVMS | ▲ | N/P | ★ | ● | ★ | ★ | ★ | ■ | ● | ●↑ | ★↑ | ★↑ | ▲↑ | ▲ | N/R | ● | ★ | ★ | ★ | ● |
| RM | ▲ | N/P | N/P | N/P | ★ | ● | ● | ★ | ● | N/P | N/R | N/P | N/A | ● | ★ | N/P | N/P | N/R | N/P | ★ |
| CLAS | ● | ! | ▲ | ▲ | ★↑ | ▲ | ● | ▲ | ●↑ | ★↑ | ● | ▲ | ▲ | ▲ | ▲ | ▲ | ★ | ● | ▲ |
| DTC | ■ | N/P | N/P | N/P | ▲ | ▲ | ▲ | N/P | N/P | N/P | ● | ★ | N/A | ● | N/P | N/P | N/P | N/R | ● | ★ |
| T2P | N/P | N/P | N/P | N/P | N/P | ▲ | ▲ | N/P | N/P | N/R | N/R | ★ | N/A | N/R | N/P | N/P | N/P | N/R | N/P | N/R |
| SCM | ★ | N/P | ★ | ● | ★ | ● | ●↑ | ★ | ▲ | ★ | ★↑ | ★ | ● | ● | ● | ★ | ● | ★ | ★ | ● |
| M&A | ▲ | ! | ▲ | ▲↑ | ★ | ● | ● | ● | ▲ | ● | ★ | ★ | ▲ | ● | ● | ● | ● | ● | ★ | ★ |
| PPR | ● | ! | ★ | ● | ★ | ● | ●↑ | ▲↑ | ▲ | ● | ★↑ | ●↑ | ▲ | ● | ● | ● | ● | ● | ●↑ | ● |
| PIA | ● | ! | ★ | ★ | ★ | ● | ● | ★ | ▲ | ● | ●↑ | ★ | ●↑ | ● | ★ | ● | ● | ● | ● | ● |
| RI | ▲ | ! | ● | ● | ■ | ▲ | ● | ▲ | ● | ●↑ | ★ | ★ | ▲ | ▲ | ▲ | ● | ▲ | ● | ● | ●↓ |

| **Legend** | ■ Exceptional Blue | ★ Very Good Green | ● Satisfactory Green | ◆ Marginal Yellow | ◆ Unsatisfactory Red | Trend |
|---|---|---|---|---|---|---|
| | | | | | | ↑ Improving    ↓ Declining |

# What We've Learned from NASA Assessments…

■ Preparation and planning is key to success for _everyone_

- Document availability and organization complete prior to Assessment

- Command Center Manual

- Nightly briefings on potential findings

- Daily schedule updates



- Triage of potential problems and reclama

- Timely Audit Preparation Training

- Points of Contact and schedule coordination complete prior to Assessment

- Configuration Management personnel (2) full time availability

- Assignment and preparation of escorts for NASA personnel

**Pre-Assessment Activities Necessary to Achieve Successful Results**

# NASA Assessments Add Value

- Professional teams that look for opportunities for improvement – *not just non-compliances*

- NASA recommendations have been implemented and have improved the competency and role of the Assessments & Audit organization

  - Improvements to AS9100 audit scope and scheduling

  - Investment in ASQ-CQA and RAB standards training and certifications

  - Implementation of an Auditor Mentoring program and expanded training curriculum for new auditors