

No Doubt – The LRAS3/FS3 Story of Mission Assurance

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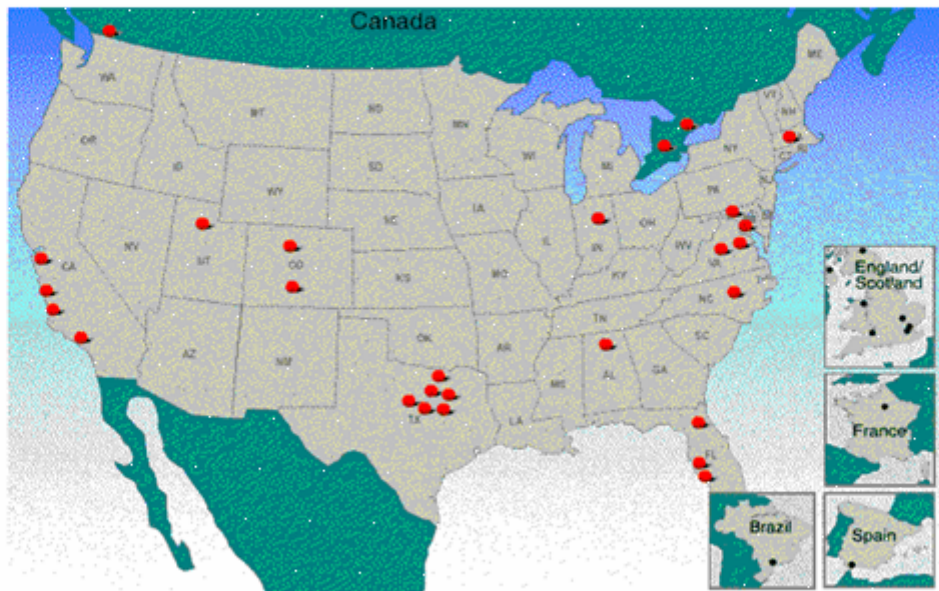
Network Centric Systems

Agenda

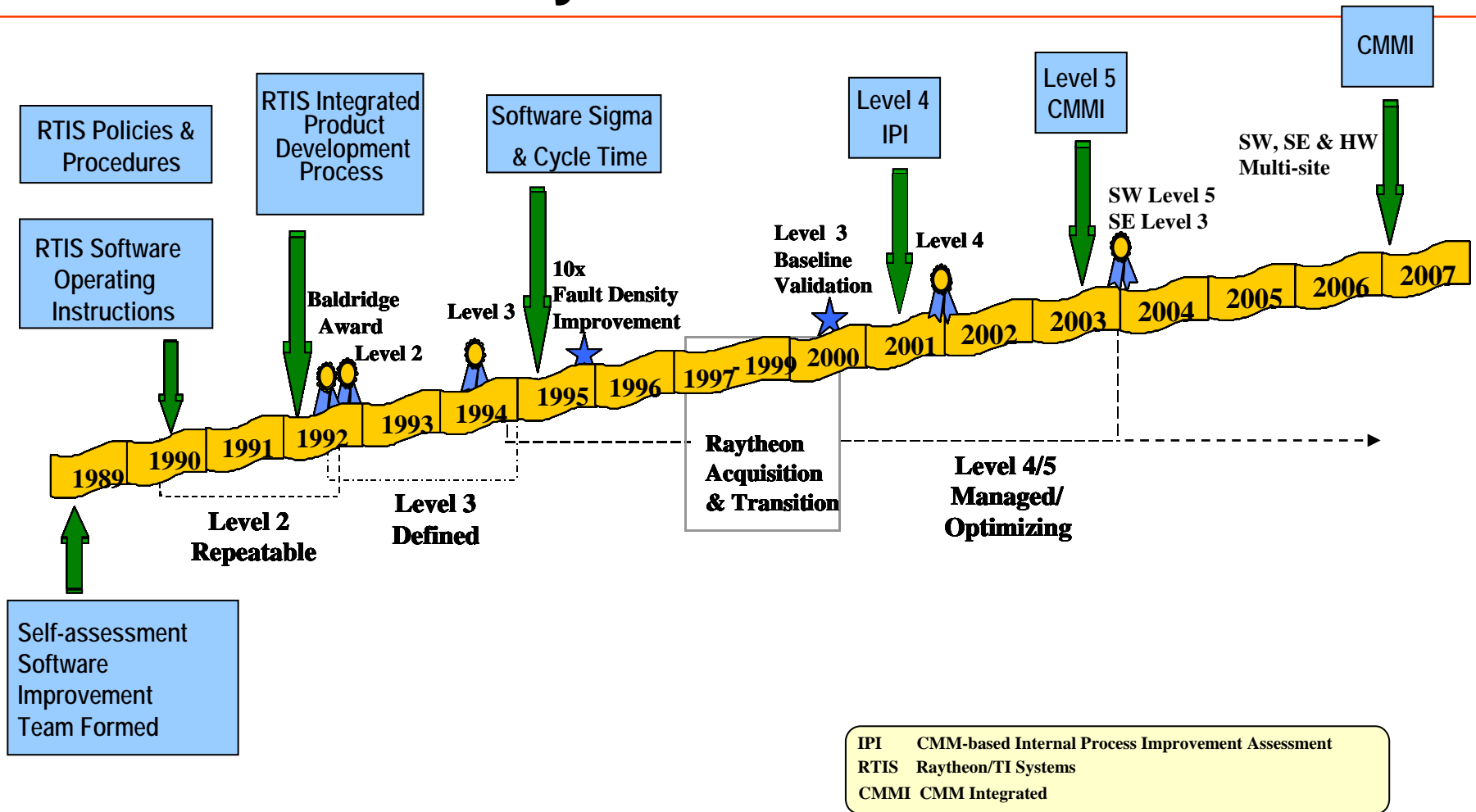
- Introduction to Raytheon
- LRAS3/FS3 Overview
- Sound Engineering Processes
- Partnership With The Customer
- Results Speak For Themselves
- Summary

Introduction to Raytheon

- Raytheon is an industry leader in defense and government electronics, space, information technology, technical services, and business aviation and special mission aircraft
- Network Centric Systems (NCS) develops and produces mission solutions for networking, command and control, battlespace awareness, and air traffic management



Introduction to Raytheon – continued



LRAS3/FS3 Overview

- The LRAS3/FS3 is a long range reconnaissance and surveillance multi-sensor suite system with the capability to determine far target location (FTL) coordinates, and to provide real-time target detection, recognition, and identification capability to the scout while permitting 24-hour adverse weather operations. In addition, the FS3 variant provides laser designation of a target for laser guided weapons.



LRAS3/FS3 Product supports scout and fire support missions

LRAS3/FS3 Overview – continued

- FS3 product supports Knight fire support missions. The LRAS3 product supports scout operations and is operable in both a stationary vehicle mounted configuration and in an autonomous dismounted configuration. The host vehicle for the system is the High Mobility Multi-purpose Wheeled Vehicle (HMMWV) and Stryker Armored Vehicle.



LRAS3/FS3 Product supports scout and fire support missions

Sound Engineering Processes

- SW engineering processes assessed as CMMI Level 5, in 2003
- Rigorous approach to engineering practices, key examples include:
 - Requirements Management
 - Used DOORs tool to support bi-directional traceability
 - Ensures that the impact of changes to requirements is understood and addressed through out the system
 - Configuration Management
 - Used through out the life-cycle of the product from Requirements Definition, through design, implementation, test and maintenance
 - A multi-tiered approach that has different requirements for different artifacts and for different points in an artifact's lifecycle

Engineering process supports Mission Assurance

Sound Engineering Processes – continued

- Additional engineering practices that played a key role in the mission assurance success of LRAS3/FS3:
 - Peer Reviews
 - Not the “glamorous” part of the process, but rigorous application pays off
 - Verification by Quality Engineering
 - Verification, Validation
 - An iterative approach
 - Back to basics, back to the requirements
 - Quality Engineering
 - Maintained independence, but an integral part of the program
 - Ensured adherence to defined processes
 - Worked with program to find solutions

Engineering process supports Mission Assurance

Partnership with the Customer

- A series of demonstrations and user juries were conducted to refine the Raytheon understanding of the customer requirements:
 - User Jury #1
 - Combined with PDR (Preliminary Design Review) to ensure requirements are understood
 - User Jury #2
 - Paper copies of the display screens
 - End user participation requested (several different ranks)

Demonstrations and User Juries were key tactics

Partnership with the Customer – continued



Demonstrations and User Juries were key tactics

Partnership with the Customer – continued

- Demonstrations and user juries (continued):
 - Engineering Confidence Test: Demonstration #1
 - Fire LDM (Laser Designator Module) from external run box
 - External mounted camera - alleviate delays for packaging/fabrication
 - Insert filters in front of camera to simulate end system performance
 - Program Gate: Demonstration #2
 - Interim demonstration of more integrated system at longer ranges
 - Tactical Demonstration
 - After completion of the Vehicle Sensor Mount and end system development

Demonstrations and User Juries were key tactics

Partnership with the Customer – continued

- Customer participation in major reviews
 - PDR – Preliminary Design Review
 - CDR – Critical Design Review
 - TRR – Test Readiness Review
 - IPR – Interim Progress Review
- All of these reviews involved customer participation and an agreement regarding actions and authorization to proceed

Formal Reviews were a key tactic

Partnership with the Customer – continued

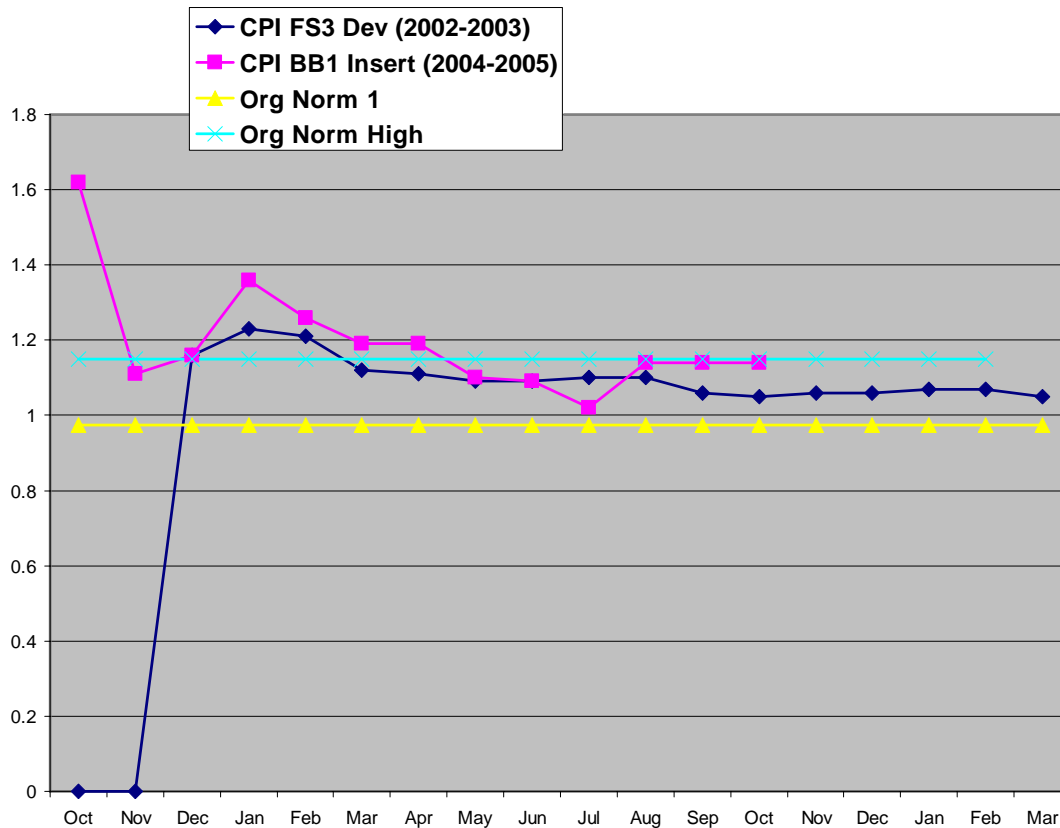
- Field Service Representative in place to facilitate maintenance issues for deployed systems.



Maintaining systems assumes high priority.

Results Speak for Themselves

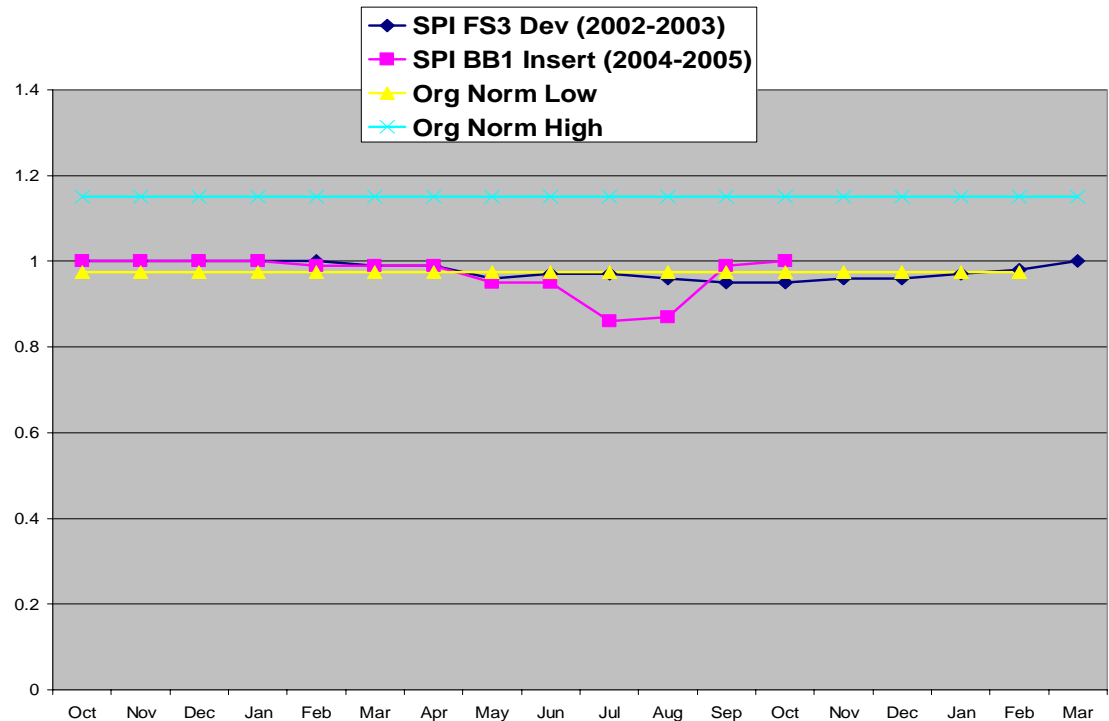
- Software CPI has consistently stayed within organizational limits for several years



Achieved Budget as well as Mission Assurance

Results Speak for Themselves – continued

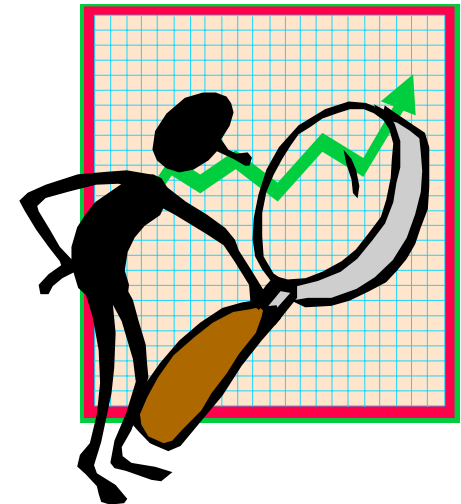
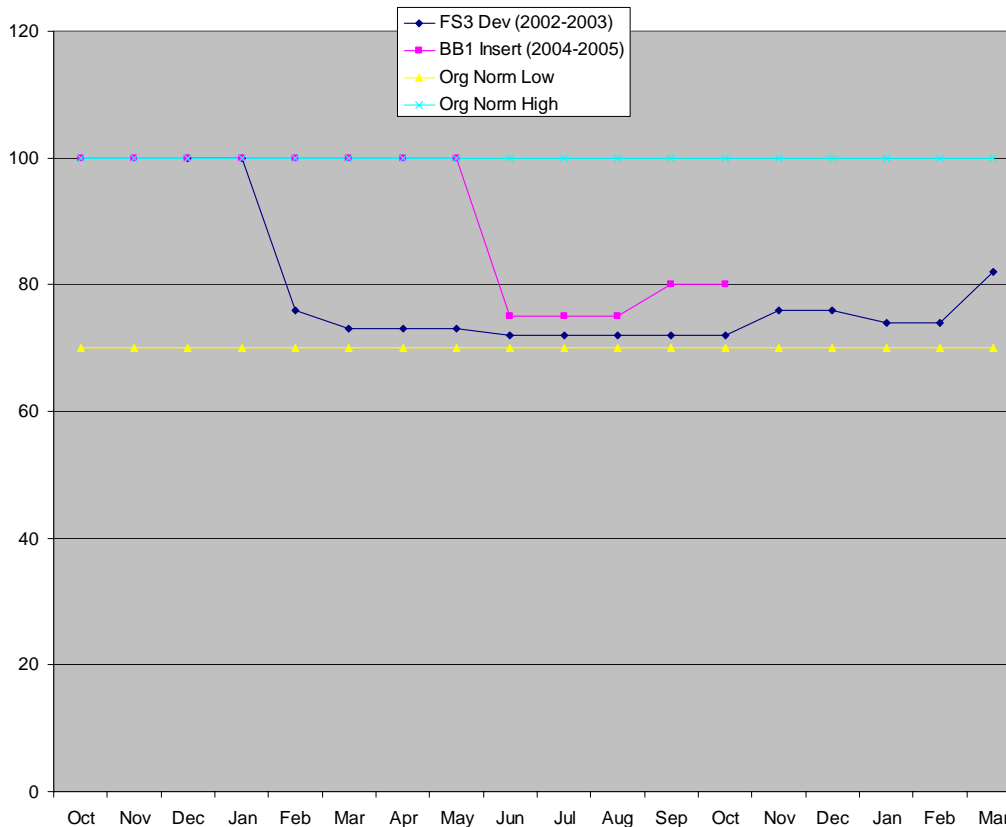
- Software SPI has consistently stayed within organizational limits for several years



Achieved Schedule as well as Mission Assurance

Results Speak for Themselves – continued

- Defect containment metrics for software remained within organizational limits over multiple development efforts



No Doubt – A Mission Assurance Success Story

Results Speak for Themselves – continued

- To date, there have been two follow-on software maintenance contracts in addition to development effort to enhance software and hardware



No Doubt – A Mission Assurance Success Story

Results Speak for Themselves – continued

- Positive feedback from in-theatre user community
 - Highly positive feedback in multiple applications
 - Not originally designed for mounting on buildings, but modified and used on rooftops to monitor borders / surveillance



No Doubt – A Mission Assurance Success Story

Results Speak for Themselves – continued



"Best damn investment the Army ever made" ..Army Scout

No Doubt – A Mission Assurance Success Story

Summary

- Sound Engineering Processes coupled with a partnership with the Customer have led to success for the LRAS3/FS3 program, Raytheon, and the Army:
 - A program that is within budget and on time
 - A product that performs – with no doubt



No Doubt – LRAS3/FS3: A Mission Assurance Success Story

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Questions

