Evergreen Ground System Product Line

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TRW’s Evergreen Product Line Evolution

Evergreen Ground System Product Line Architecture
- Telemetry Processing
- Constellation Management
- Commanding
- Infrastructure/Common User Console

- Enterprise Resource Management
- COTS Integration and Validations
- Mission Planning & Management
- Orbit Services

- Standards (JTA, DII/COE, UCA, etc.)
- COTS Trade Studies
- COTS performance validation
- COTS integration development
- Cross Vendor integration initiatives
- Program performance
- Other relevant IR&D

COTS/GOTS/Technology Insertion

- LOW Cost
- Low Risk
- Fast Deploy
- Low LCC

10+ Years IR&D Investments

Program PLA Insertions
- Brilliant Pebbles
- Brilliant Eyes
- SBIRS High EMD

Program/Domain Applications
- Classified Programs
- Other C² Programs
- DSP TOTS Upgrade

Brilliant Pebbles
Brilliant Eyes
SBIRS High EMD
DSP TOTS Upgrade
LANCE
CCS-C
Other C² Programs

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Product Line Motivators and Desired Features

- LCC savings motivate significant reuse -- a product line benefit
  - Architecture and components
  - Designs and test cases
  - Documentation
  - Operating and maintenance procedures

- Further LCC savings motivate COTS component use
  - Millions of lines of software source code involved
  - Technology refresh occurring at an accelerated pace
  - Leverages commercial investment to customer’s benefit

- Architecture is the key to an evolving/adaptable/extensible product line
  - Standards compliant to integrate new components with low risk
  - Adaptable to “best” components for customer’s domain
  - Extensible to accommodate change in mission requirements
  - Support for honest evaluation in component selection
An Evergreen Product Line Application - LANCE

- Launch and Network Control Equipment (LANCE) contract
- Mission: Launch and on-orbit telemetry processing and switching
- Customer: Office of Space Launch
- Site location: Schriever Air Force Base
- COTS component integration approach
  - 100 per cent COTS hardware
  - 93 per cent COTS software
  - 4 per cent applications and adaptation
  - 3 per cent glue-ware
- Schedule
  - Contract Award: April 1998
  - Shipment to site: September 1999
  - Turnover to Customer: February 2000
  - Initial operational capability: March 2000
  - OT&E completion: May 2000
  - Final operational capability: October 2000
Product Line Areas for Research

- Beneficial features of future product line architectures
- Development processes for component-based development
- Configuration management processes and tools
- Component ownership and maintenance
- Technology evolution and component refreshment
- Product line business and investment models
- Cultural obstacles to product line use
- Training and skills development for component-based systems