

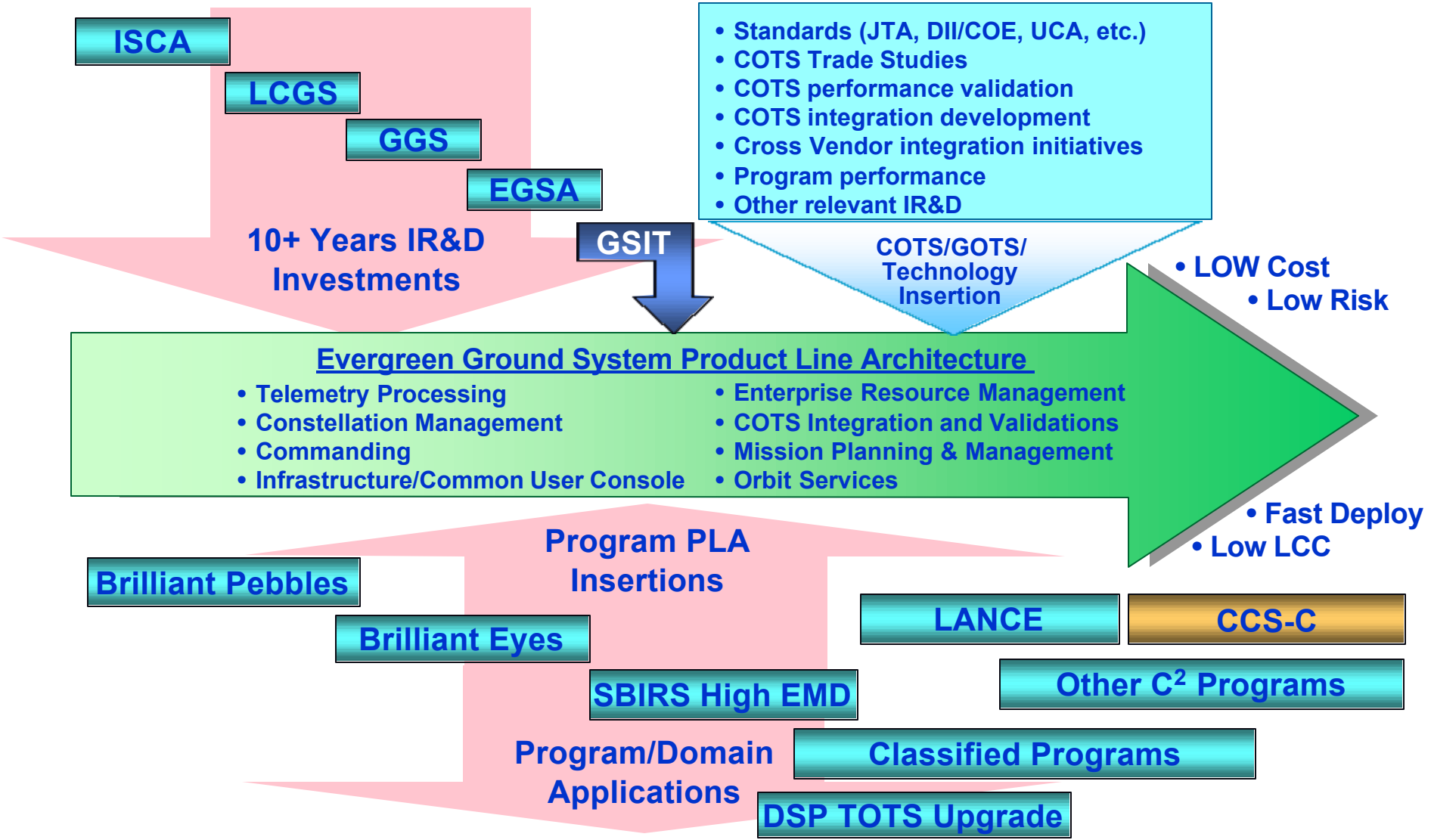


Evergreen Ground System Product Line

February 22, 2001



TRW's Evergreen Product Line Evolution



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**