Jason-1 Telemetry, Command and Communications Subsystem (JTCCS)

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By Mike de Gyurky
Szabolcs.M.deGyurky@jpl.nasa.gov
20030304
This Command and Control System is:

- Fully Operational
- Modular
- Plug and play
- Portable
- Distributable
- Open Architecture
- Easy to Use
- Very Easy to Learn (Low Cost Training)
- Ready for Lights Out Operation
- Very Low Cost

- Designed for a Twenty Year Lifetime
- Designed to Support Multiple Spacecraft
- Developed With a New Management Methodology
The JTCCS Subsystem

Telemetry, Command and Communication Subsystem (JTCCS)

- NASA Earth Terminals
- CNES Simulator
- CNES Earth Terminal
- FTP Server
- Communication Process
- Telemetry Process
- Command Process
- Earth Terminal Simulator
- ET Control and Monitor Process

Science Data Subsystem (SDS)
Sequencing Subsystem (JSEQ)
CNES
JTCCS Functional Tasks

- Control and Monitor Earth Terminals
- Receive, Store, Process and Display Real-time and Recorded Telemetry Data.
  - HKTMR - Onboard Housekeeping Recorded Telemetry Data
  - HKTMP - Real-time Housekeeping Telemetry Data (During Passes)
  - PLTM1 - Payload Telemetry Data One
  - PLTM2 - Payload Telemetry Data Two
- Command and Monitor Satellite Status
- Translate and Transmit Commands
- Decommutate and Distribute Telemetry Data
- Manage and Archive Data Files
JTCCS Pluggable Architecture

Operating System

Inter-process communication (IPC)  Database  Processes & Threads  Other Encapsulated Functionality

Common Services (CS)

Talarian  Sequencing  Data Products  Predicts  Event Manager  Telemetry  Tele-Command

Java Native Interface (CSJNI)  COM  UI Server  Automation

Java VM  TCL

= Potential Future Plug-ins
JTCCS System Elements

- Size: 489,000 Lines of Code (LOC)
- Total cost: $8.7 Million
- Fully Documented: 7000 pages (JPL-D-4000).
- Software Languages: Java, C++ and TCL
- Operational Modes: Manual, Automatic and Unattended
- Designed to Support Four Generations of Satellites Over a Twenty Year Life Cycle
- Wireless and Handheld Personal Digital Assistant Capability
Impacts of Lifecycle Architecting Decisions

The Correct Application And Synthesis of Experiences In

- The Managers’ Role as Systems Architect and Teacher
- Understanding Cognitive Dynamics
- The Importance of Verbal and Written Communications
- The Importance of Task Oriented Organization
- The Selection and Tailoring of Software Standards
- Understanding Inferential and Traditional Architectures
- Selecting The Proper Development Methodology
- Selecting The Correct Control Points For Production
- Project Management In Low Cost High Quality Systems
- The Impact of Leadership in Software Intensive Projects
- Estimating Software Development Cost
Common Software Service Architecture

Java Native Interface

Common Software Services
- IPC
- Shared Memory
- Timers/Timing
- Threads/Synch
- Processes Ctrl
- File Services
- Global Variables
- Debug
- Database

Operating System

SmartSockets

ODBC