

Telescience Resource Kit (TReK)



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NASA/EO50/Michelle Schneider

Michelle.Schneider@nasa.gov

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Telescience Resource Kit (TReK)

- TReK is one of the Huntsville Operations Support Center (HOSC) remote operations solutions. It can be used to monitor and control International Space Station payloads from anywhere in the world. It is comprised of a suite of software applications that provide generic data system capabilities and access to HOSC services.
- The TReK Software has been operational since 2000. A new cross-platform version of TReK is under development and will be released in phases during the 2014/2015 timeframe.
- The new version of TReK will run on Windows and Linux.
- Portions of the TReK software will be suitable for use by payloads on-board (TReK Toolkit).
- Capabilities to support the following ISS CRs will be included in the new TReK software.
 - ISS Change Request (CR) 13351 Ku-Band Forward Access for Payload Operations
 - ISS Change Request (CR) 01379 Delay Tolerant Networking (DTN) on Joint Station LAN

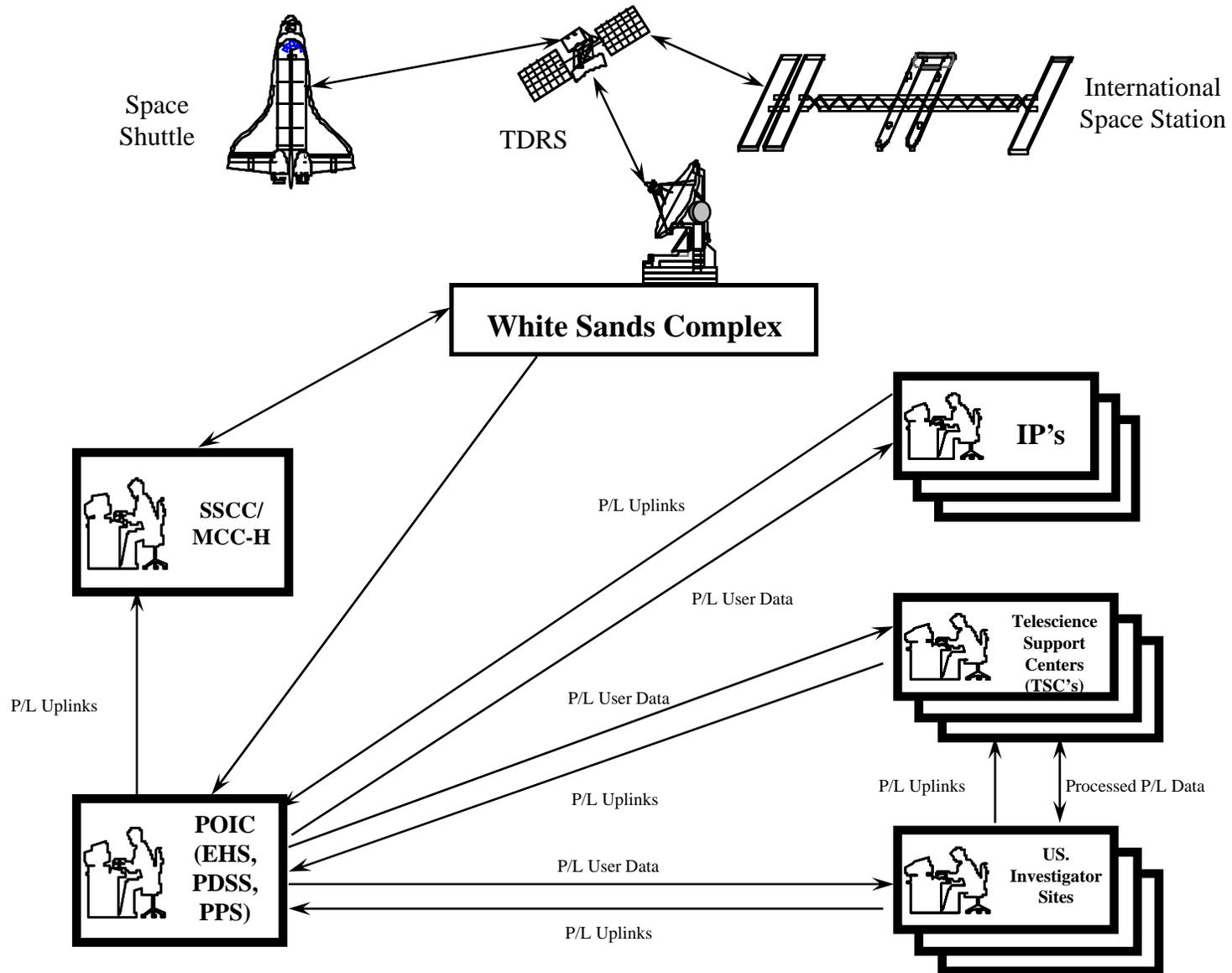
TReK Release 3.x Overview



Topics

- ISS Payload Telemetry and Command Flow
 - Telescience Resource Kit (TReK)
 - Telemetry Services
 - Command Services
 - Command Management Services
 - TReK Customer Support
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ISS Payload Telemetry and Command Flow





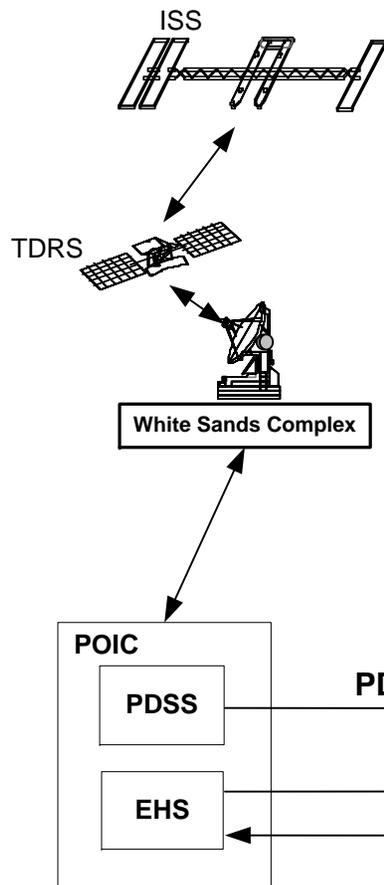
Telescience Resource Kit

- TReK is a suite of software applications that provide:
 - Local ground support system functions.
 - Telemetry Services
 - Command Services
 - Command Management Services
 - An interface with the Payload Operations Integration Center (POIC) to utilize POIC remote ground support system services.
 - TReK runs under Windows 7.
 - The TReK software is free.
 - Cost of PC and Commercial Software Products (3k – 5k).
 - Operating System, Microsoft Access, Word, Excel, Others
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Telemetry Services

TReK Telemetry Capabilities:

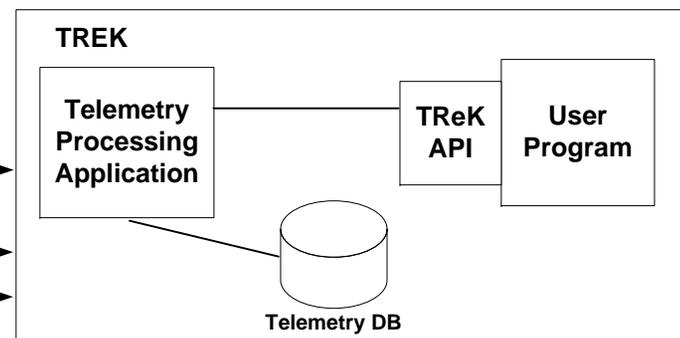
- * Receive, Process, Record, Forward, and Playback Telemetry Packets.
- * Display, Record, and Monitor Telemetry Parameters
- * Extract Telemetry Parameters from Recorded Data Files
- * View Incoming Telemetry Packets (Hex/Text Format)
- * View/Record Telemetry Processing Statistics
- * Telemetry Application Programming Interface (API)
- * Telemetry Database



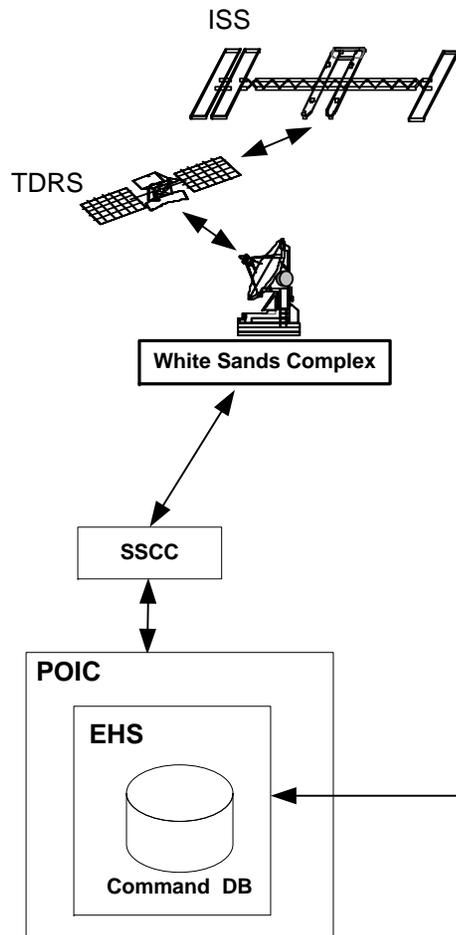
PDSS Payload & UDSM Packets (UDP)

User Defined GSE Packets (UDP)

Custom Data Packets (TCP)

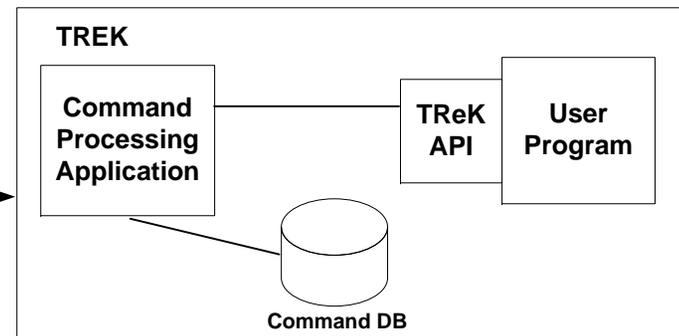


Command Services



TReK Command Capabilities:

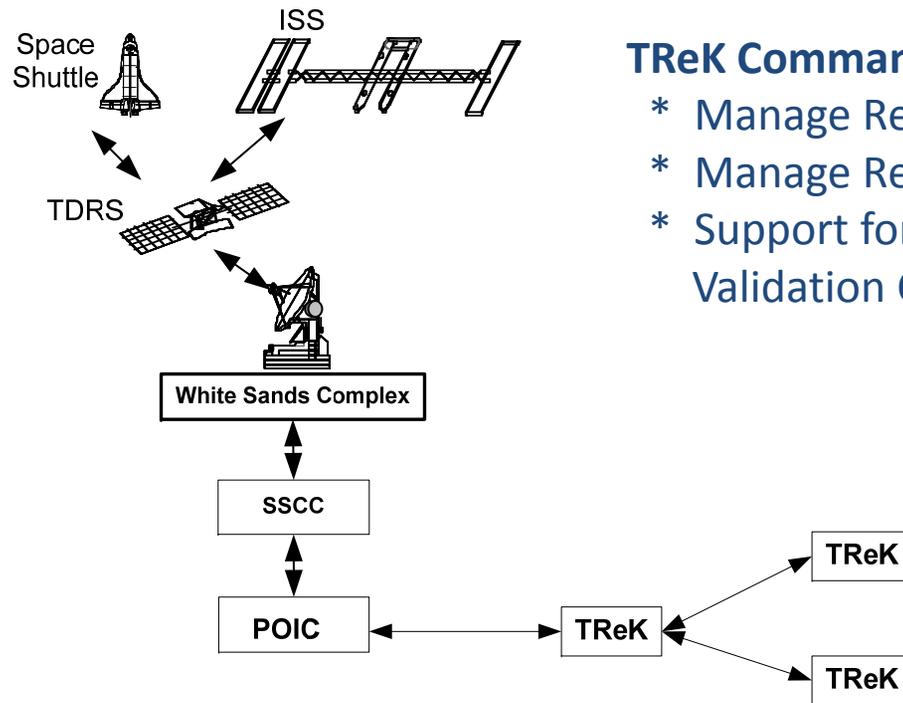
- * Command System Status & Configuration Information
- * Remotely Initiated Command (Cmd Built from POIC DB)
- * Remotely Generated Command (Cmd Built at Remote Site)
- * Command Updates
- * Command Responses
- * Command Session Recording/Viewing
- * Command Track
- * Command Statistics
- * Command Application Programming Interface (API)
- * Command Database



Command Connection (TCP)



Command Management Services



TReK Command Management Capabilities:

- * Manage Remote User Logins
- * Manage Remote User Commanding
- * Support for User Provided Command Validation Checking

TReK Cross Platform Overview



TReK Products

TReK Toolkit

- A suite of lightweight libraries and utility applications for use with the ISS Ku-Forward capability.
- The toolkit includes:
 - Device Services Library
 - Data Library
 - CFDP Library
 - CFDP (GUI) Application
 - CFDP (Console) Application
 - HOSC Payload Ethernet Gateway (HPEG) access (GUI) Application.
- The toolkit items can be used individually or together.
- Applicable toolkit items are suitable for use on-board ISS.
- The toolkit will be available for Windows and Linux. At this time, specific OS targets are Windows 7 and Red Hat Enterprise Linux 6.x.

TReK Desktop

- The full suite of TReK capabilities in a desktop environment (Windows & Linux)

Note: TReK releases are no longer supported on Windows XP.



TReK 4.0.0 (TReK Toolkit) Content

Software	Description
CFDP Application	Provides capabilities to perform file transfer functions using the CCSDS File Delivery Protocol (CFDP). This application has a graphical user interface.
CFDP Console Application	Provides capabilities to perform file transfer functions using the CCSDS File Delivery Protocol (CFDP). This application is a console application and is targeted for use onboard ISS. It was provided to serve two purposes: (1) a CFDP console application for customers to use right out of the box, and (2) an example program showing customers how to use the CFDP Library to perform common CFDP functions.
CFDP Library	Provides an application programming interface to perform file transfer functions using the CCSDS File Delivery Protocol (CFDP).
Device Services Library	Provides an application programming interface to perform functions such as creating sockets, sending data, receiving data, etc.. Includes support for Unicast, Multicast, TCP Listener, TCP Server, and TCP Client.
Data Library	Provides an application programming interface to create, populate, build, and decompose packets. Includes support for pre-defined and custom headers and packets.
HPEG Application	Provides access to HOSC Payload Ethernet Gateway (HPEG) services. This application has a graphical user interface. It provides the capability to log into the HOSC and request HPEG services. This includes selecting a ground node ID (if applicable), starting and stopping services, and enabling and disabling the HPEG Idle Check.
TReK Help Application	Provides integrated help for all TReK applications and libraries.

This is the first release of the TReK Toolkit. There will be additional releases that add more capabilities.

TReK Customer Support

- The TReK Team provides the following types of support to TReK customers:
 - Beta Software Testing Program
 - TReK Web Site (<http://trek.msfc.nasa.gov>)
 - Help Desk (Technical Support Phone Line – 256-544-3521)
 - E-Mail Technical Support Help (trek.help@nasa.gov)