SSCN 13351 Ku-Band Forward for Payloads

Overview

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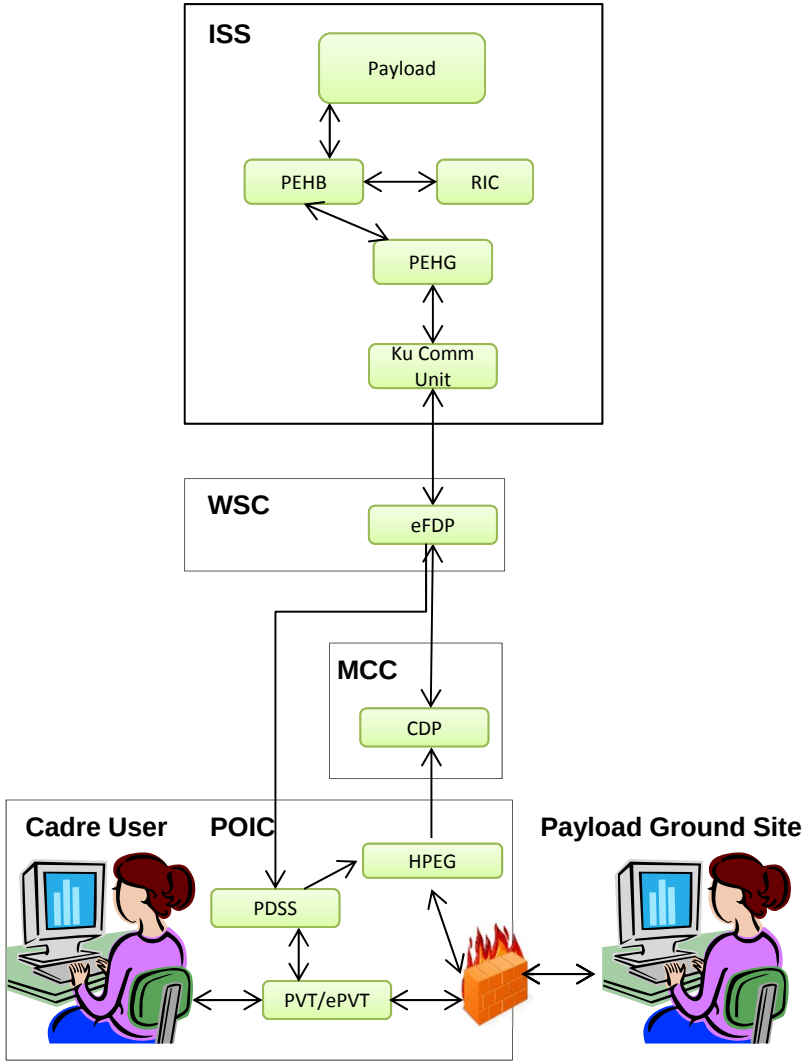
Ku-Forward Service Overview

- Ku Forward provides a secondary communication path that will allow Payload ground systems to communicate with their on-orbit Joint Station LAN (JSL) or Ethernet connected payloads via standard IP communication protocols
  - Primary communication (command) path is still S-Band commanding through the PL MDM with 1553 service to the Payload
- HOSC is developing capabilities/services (CR 13351) that will allow both the POIC Cadre and Payload Users access to devices connected to the onboard Payload LAN
- The diagram outlines the data flow for a payload user using the Ku-Forward service.



Ku-Forward Schedule Overview

- Ku Forward Internet Protocol (POIC-Cadre) ~ July 2014
  - Payload Operations & Integration Center (POIC) Cadre use of Internet Protocols to onboard devices
    - Ping to Express Laptops, Payload Ethernet Hub Gateway (PEHG) HRDL Gateways
    - Remote Desktop to Express Laptops
- Ku Forward Internet Protocol (POIC-Remote) & CCSDS File Delivery Protocol (CFDP) (POIC-Cadre) ~ November 2014 (approx.)
  - Remote Payload User use of Internet Protocols to access their payloads and POIC Cadre access to CFDP
    - Pings and Remote Desktop by Payload Users
    - Secure Shell
  - POIC Cadre access to CFDP
    - File Transfers
- Ku Forward CFDP (POIC-Remote) ~ March 2015 (approx.)
  - Remote Payload user access to CFDP
    - Full capability for Payload Users

PHASE 1

Ku-Forward Phase 1 Status

• Onboard iPEHG update applied	July 1, 2014
• Successful Phase 1 Readiness Review conducted	July 9, 2014
• Onboard Edge Router update applied	July 14, 2014
• Data Management Coordinator (DMC) Testing	July 15, 2014
• Payload Rack Officer (PRO) Testing	July 22, 2014

Ku-Forward Phase 1 Test Summary

Date	Test	Objective	Result	Notes
March 12, 2014 - Present	Cadre Testing	• DMC: PING numerous destinations, RDP to an EXPRESS Laptop, SSH and HTTPS to NAS • PRO: RDP and PING to EXPRESS Laptop.	**Success**	Performed during Operational Readiness Testing
July 15, 2014	Data Management Coordinator (DMC) verify end to end forward link function.	• DMC will perform an ICMP Ping Test to each Payload Ethernet Hub/Gateway (PEHG) Gateway and PEHG Controller		Testing end to end from the HOSC to ISS on-board PEHG.
July 22, 2014	Payload Rack Officer (PRO) verify Remote Desktop Protocol (RDP) with EXPRESS Laptop Computer (ELC).	• PRO will perform an ICMP Ping Test to ELC in the US Lab, Columbus and JEM Laboratories • PRO will utilize RDP to remotely log into a selected ELC in the US Lab, Columbus and JEM Laboratories to start and stop an application and perform some file manipulation operations		Dependent on successful DMC test. Once the initial testing is complete the PRO Team will schedule testing for each additional EXPRESS Rack and Derivative to perform the Ping and RDP testing on a non-interference basis when the Racks are available.

PHASE 2

Requesting Ku-Forward

- Payload teams will need to update their Payload Integration Agreement (PIA) to add Ku-Forward as a requested service.

- Work with your Payload Integration Manager (PIM) to complete the PIA and submit other required reports.

Ku-Forward New Documentation

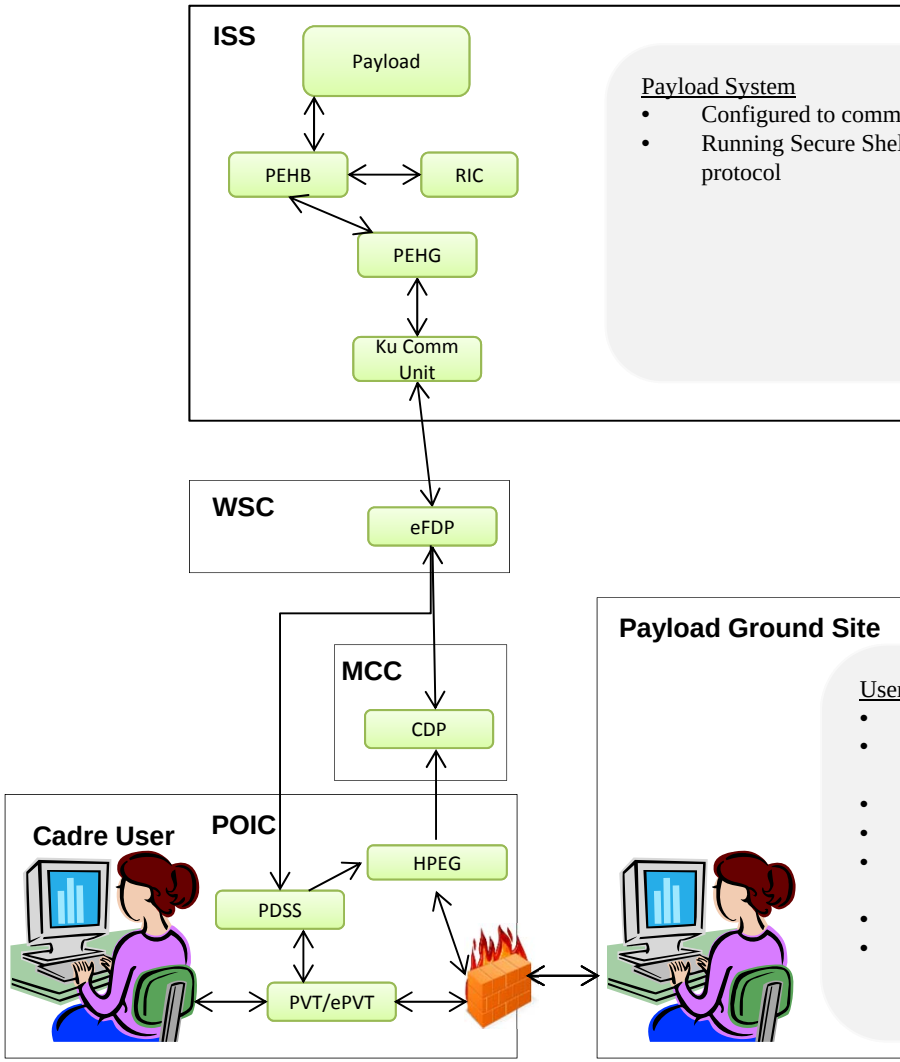
- SSP 50974 – ISS Onboard IT Security Requirements for USOS Systems
  - To establish the IT security requirements designed to maintain and improve the security posture of NASA's ISS IT systems
  - These requirements will provide a baseline security implementation that is consistent across all US assets
  - Systems that have the potential for creating a hazard will meet the applicable Computer-Based Control Systems requirements called out in SSP 51700 or SSP 50038
- SSP 50989 – ISS IT Security Policy for Onboard Connected Ground Support Systems
  - To provide security for all information systems and information collected, processed, transmitted, stored, or disseminated with respect to the ISS
  - To provide a baseline security implementation that is consistent across all IP/P systems
  - Updated to include HOSC Payload Ethernet Gateway (HPEG) subsystem

POIWG Topics related to Ku-Forward

- General Topics
  - PSRP Ku Forward Requirements Following this Presentation
    - Covers the safety requirements for using Ku-Forward
- Splinter Topics
  - Ku-Forward & Delay Tolerant Networking (DTN) Splinter Thursday July 24th at 9AM
    - Open session to further discuss the Ku-Forward project as well as introduce the DTN project.
  - Ku-Forward IT Security Thursday July 24th at 10AM
    - Open session to discuss the IT Security Requirements documents

BACKUP

Ku-Forward Payload User Access



Payload System
- Configured to communicate on the Payload LAN
- Running Secure Shell, CCSDS File Delivery Protocol, Remote Desktop, and/or Payload custom protocol

Payload Ground Site

User Actions
- Authenticates to EHS
- If authorized for Ku-Forward service, user will connect to the HOSC Payload Ethernet Gateway (HPEG)
- A list of user destinations and their respective protocols is returned to the user interface
- User will select a destination and start the session
- Using the Proxy IP Address returned the user will initiate the application they wish to use for that session
- Sessions are preserved across LOS windows
- When finished user will stop session
  - HPEG checks for inactivity and will prompt user to reply. No reply will lead to a disconnect from HPEG

Ku-Forward Phase 2 Documentation

- SSP 57072 – Standard PIA for ISS Pressurized Payloads Update
  - POIC has updated the document to include the Ku-Forward option.
- SSP 52050 – Payload Software Interface Control Document Part 1
  - Describes Ku-Forward service and outlines approved protocol assignments.
    - Current tested protocols include Secure Shell, Remote Desktop, ICMP Ping, HTTPS.
- SSP 57000 – Pressurized Payload Interface Requirements Document
  - Updated to include verification requirements for Ku-Forward use.
- SSP 50974 – ISS Onboard IT Security Requirements for USOS Systems
  - To establish the IT security requirements designed to maintain and improve the security posture of NASA's ISS IT systems
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  - Systems that have the potential for creating a hazard will meet the applicable Computer-Based Control Systems requirements called out in SSP 51700 or SSP 50038
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Ku-Forward Phase 2 Documentation

- Safety Review Panel Memorandum Titled PAYLOAD KU FORWARD COMMAND/OPERATIONS RESTRICTIONS
  - Establishes safety policies for use of this new capability.
- SSP 50305 POIC to Generic User Interface Definition Document
  - Updated to include HOSC Payload Ethernet Gateway (HPEG) subsystem

Points of Contact for Ku Forward Operations

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Acronyms

CFDP	CCSDS File Delivery Protocol
CMD	Command
CPS	Consolidated Planning System
CR	Change Request
DFP	Data Flow Plan
DMC	Data Management Coordinator
ECW	Emergency Caution & Warning
EHS	Enhanced HOSC System
ELC	EXPRESS Logistics Carrier
FCT	Flight Control Team
FTP	File Transfer Protocol
GCP	Ground Command Procedures
HOSC	Huntsville Operations Support Center
HPEG	HOSC Payload Ethernet Gateway
HRDL	High Rate Data Link
HTTPS	Hypertext Transfer Protocol Secure
ICD	Interface Configuration Document
ICMP	Internet Control Message Protocol
IP	Internet Protocol
IST	Integrated Support Team
JSL	Joint Station LAN
LAN	Local Area Network
MDM	Multiplexer/Demultiplexer
MOD	Mission Operations Directorate
OSTPV	Onboard Short Term Plan Viewer
PEHG	Payload Ethernet Hub Gateway
PIA	Payload Integration Agreement
POD	Payload Operations Director
POH	Payload Operations Handbook
POIC	Payload Operations & Integration Center
POIF	Payload Operations and Integration Function
PRCU	Payload Rack Checkout Unit
PRO	Payload Rack Officer
PSI	Payload Software Integration
PSRP	Payload Safety Review Panel
RDP	Remote Desktop Protocol
SE&I	Systems Engineering & Integration
SSH	Secure Shell