

Title: CONNECT Status

Communications, Navigation and Networking re-Configurable Testbed

SDR'09 SATCOM-SIG Workshop
Thursday, December 3rd, 2009
Hyatt Regency in Crystal City Virginia



Keeping the universe connected.

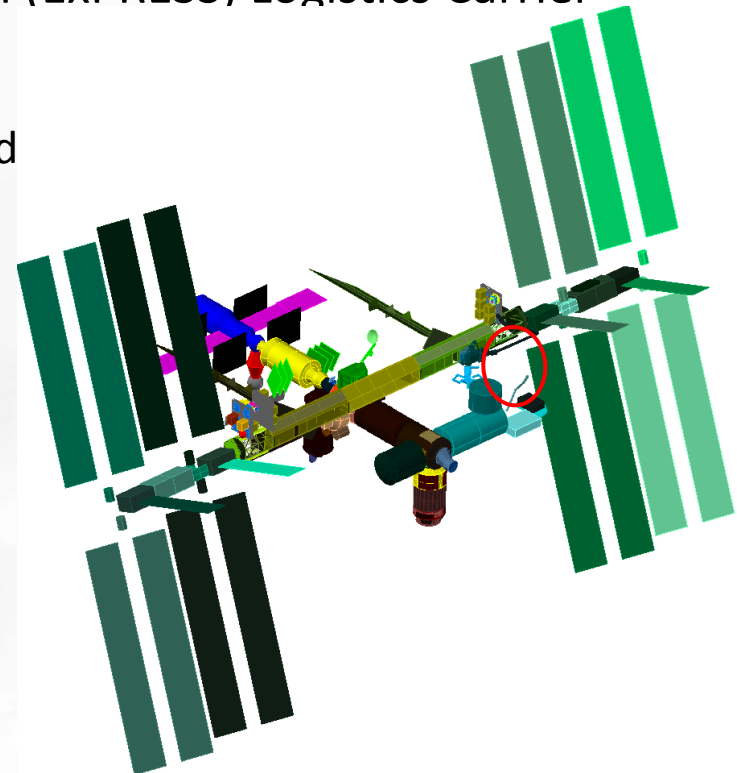
Name: Thomas Kacpura
Date: December 3, 2009

CONNECT Presentation Outline

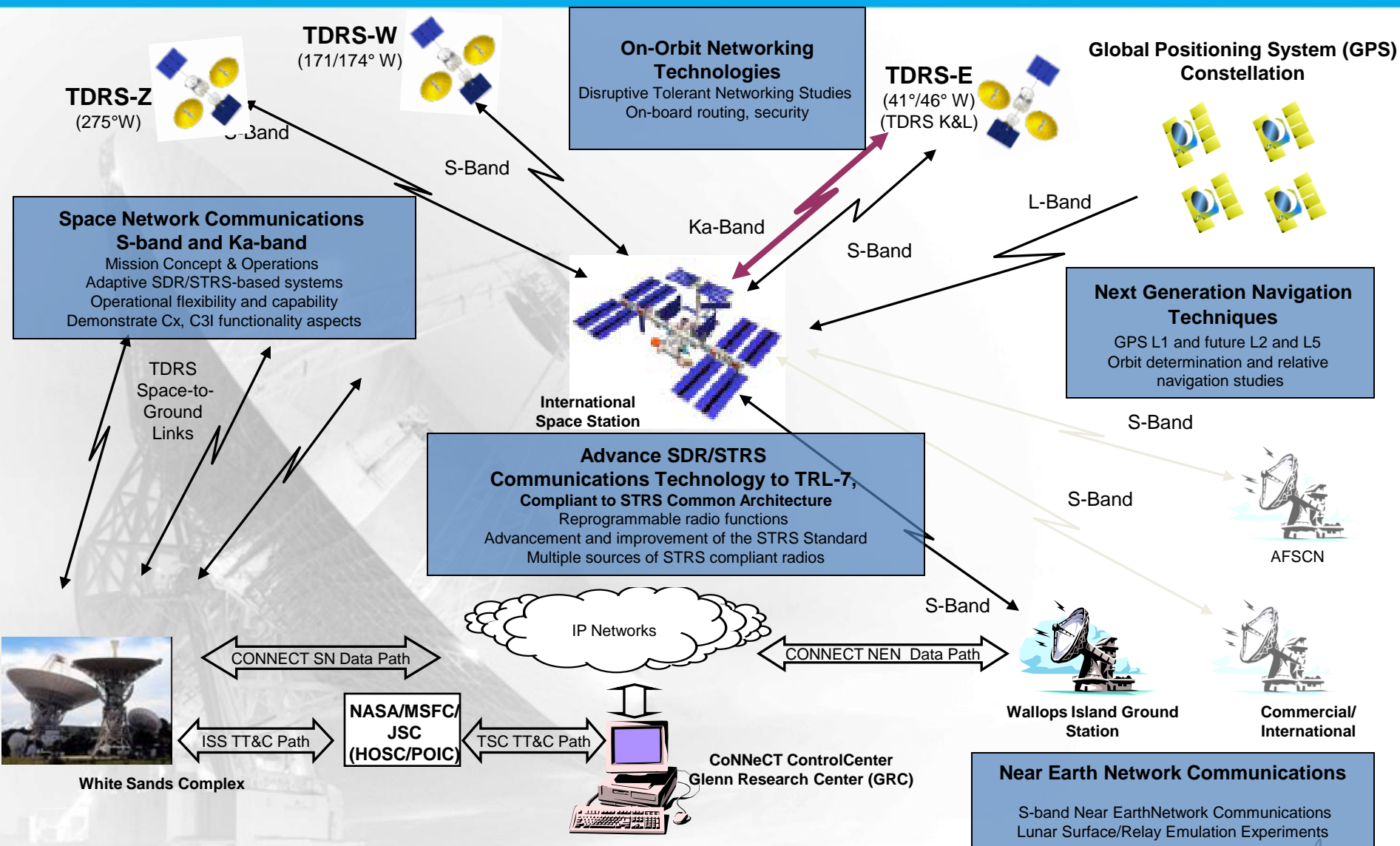
- Mission Overview
 - Mission Description
 - Goals/Objectives
 - Relevance
- Flight System Design
 - Location on ISS
 - Payload Configuration
 - Interfaces
 - CONNECT SDRs (Harris, GD, JPL)
 - RF Block Diagram
- Waveform
 - Development/Integration
 - Porting
- Experiment Flow

Mission Description

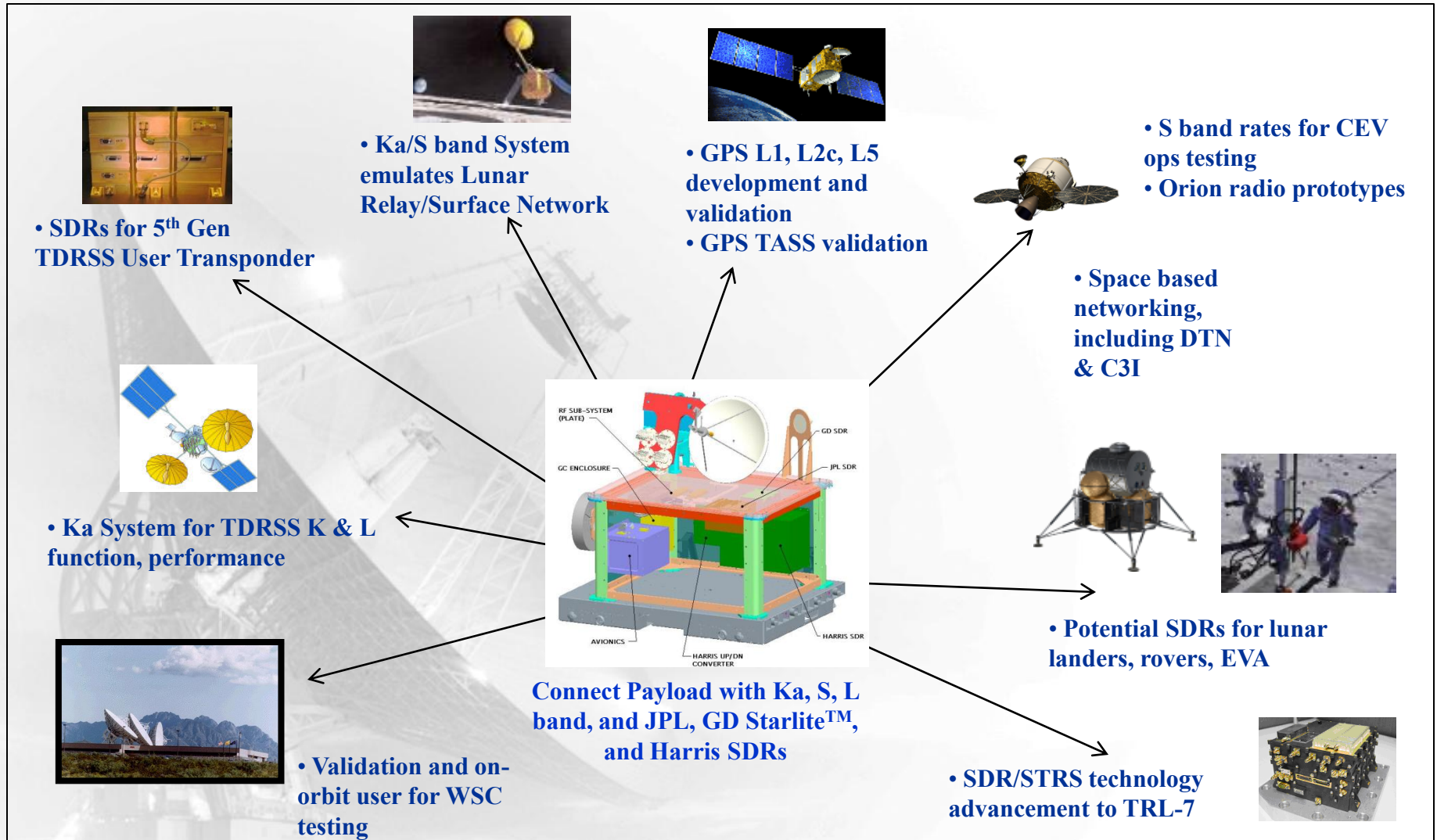
- Launch to the International Space Station (ISS) on a JAXA H-II Transfer Vehicle (HTV-3) in 2011
- Carrier configuration is Flight Releasable Attachment Mechanism (FRAM)-based payload and installed on an inboard ram-facing, zenith-facing Expedite the Processing of Experiments to Space Station (ExPRESS) Logistics Carrier (ELC) at the ISS P3 location.
 - SCAN Testbed will be transferred and installed to the ELC via Extravehicular Robotics (EVR) activity. Extravehicular Activity (EVA) is the back-up.
- The Flight System is designed to operate for a minimum of two years.
 - Experiment operations via ground commanding from GRC TSC



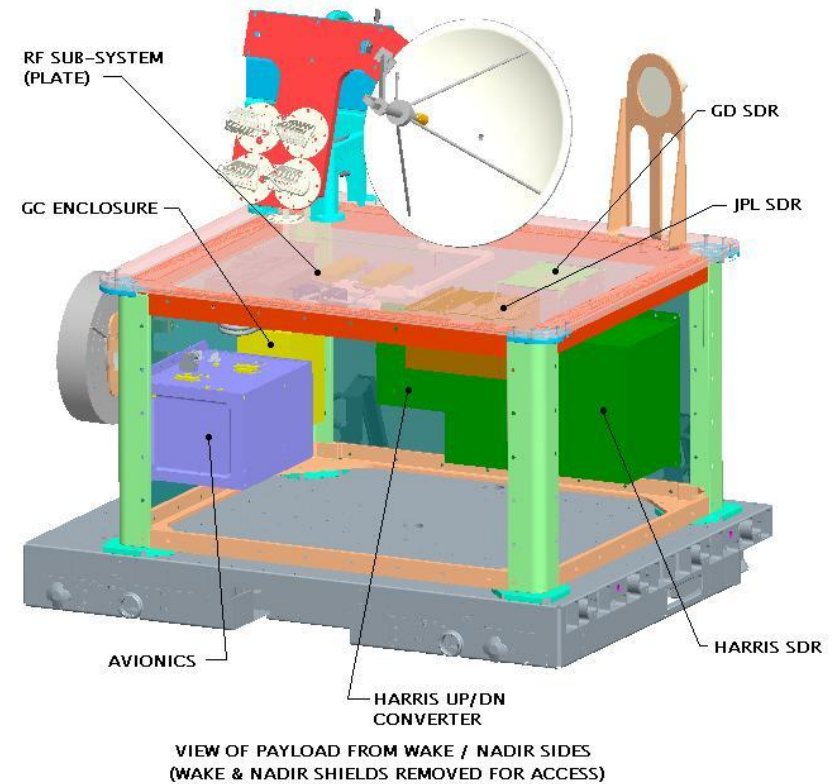
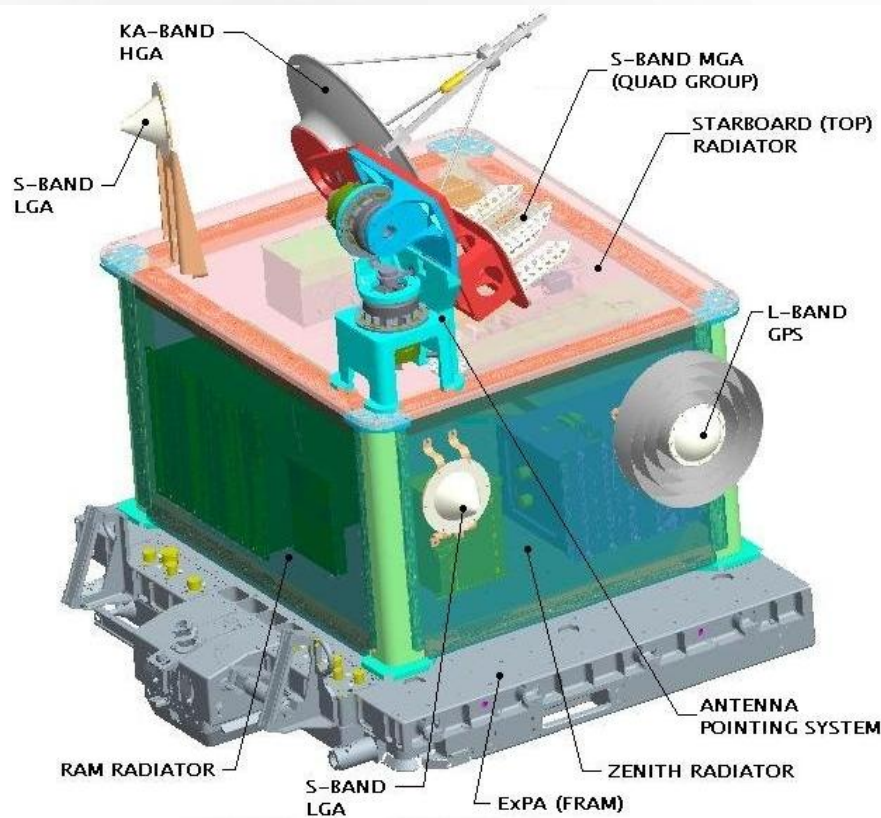
Communications, Navigation, and Networking reConfigurable Test bed (CONNECT)



CoNNeCT Provides Broad Relevancy to NASA Programs and Missions



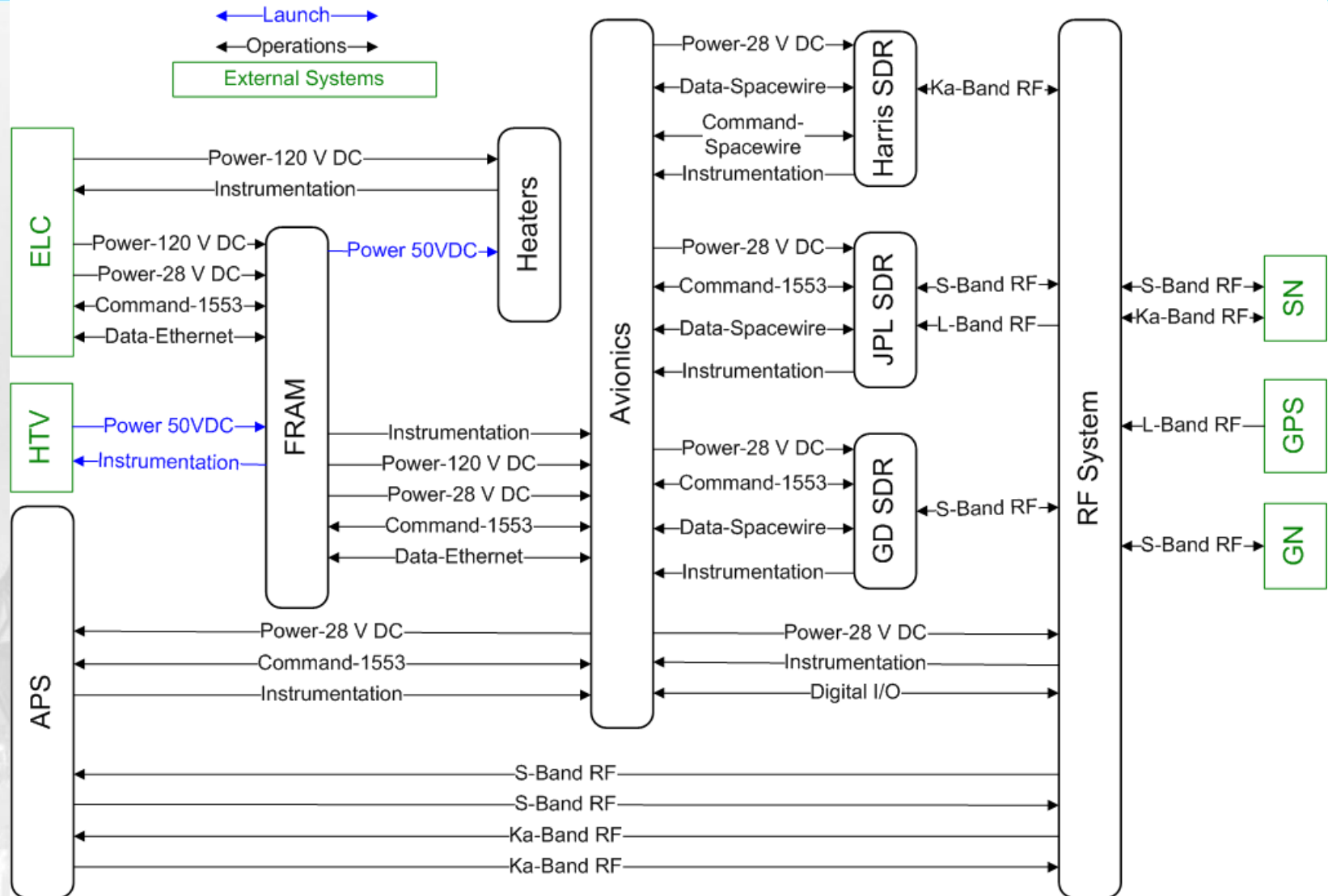
Flight System Design



VIEW OF PAYLOAD FROM WAKE / NADIR SIDES
(WAKE & NADIR SHIELDS REMOVED FOR VISIBILITY)

Flight System Top-Level Functional Flow Diagram

Avionics / SDR Interfaces



CONNECT Software Defined Radios

The CoNNeCT Payload has three STRS compliant SDRs.

Two radios are commercially supplied by GD and Harris, and one is a NASA sponsored radio by the Jet Propulsion Lab.

Each SDR will implement specific frequencies bands and waveforms.

GD S-Band SDR

- The GD CONNECT Starlight software defined radio is a reprogrammable S-band transceiver w/ space heritage.
- The SDR will be compliant with the STRS architecture, and will have a TDRSS DG1, Mode 1,2 & 3, & DG2 compatible waveforms installed and tested when delivered.



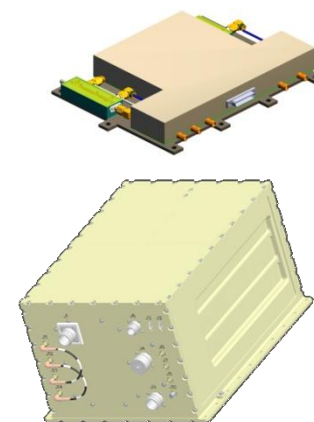
JPL S-Band, L-Band SDR

- The JPL CONNECT software defined radio is a reprogrammable S-band and L-band transceiver w/ space heritage.
- The SDR will have a GRC/GSFC TDRSS S-band DG1 Mode 2 and DG2 compatible waveform installed after delivery.

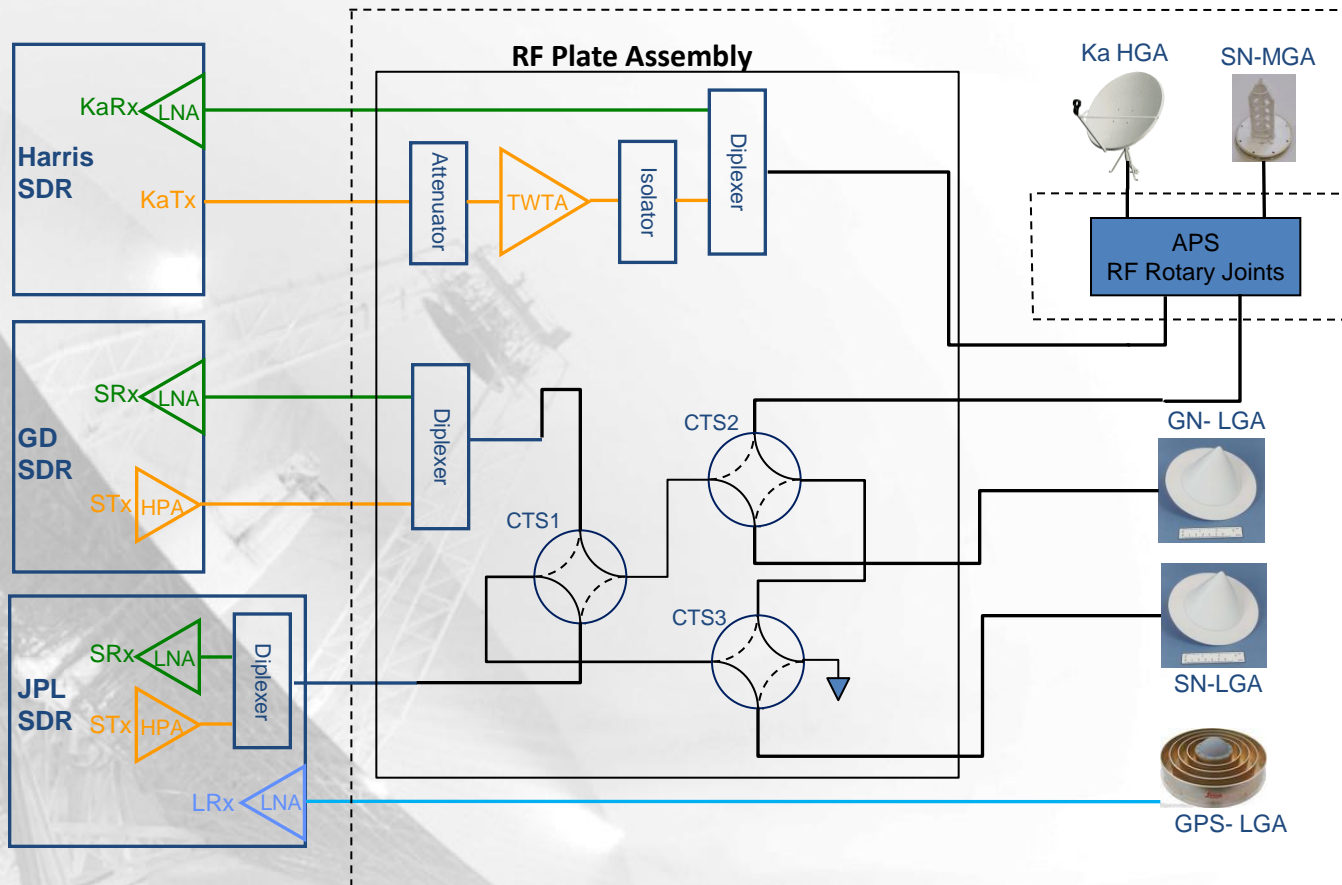


Harris Ka-Band SDR

- The Harris CONNECT software defined radio is a reprogrammable Ka-band transceiver.
- The SDR will be compliant with the STRS architecture, and will have a TDRSS Ka-band DG2 compatible waveform installed and tested when delivered.

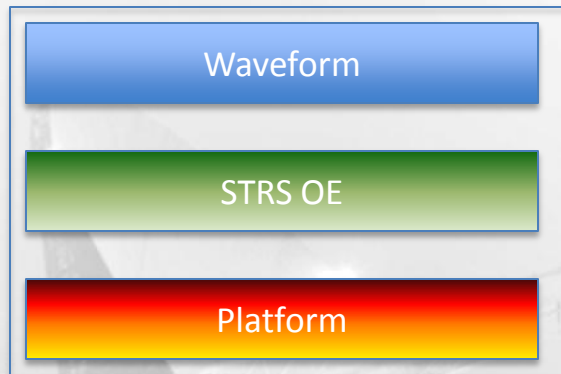


RF Functional Block Diagram



Platform/STRS OE/Waveform Development/Integration

STRS Compliant Radio



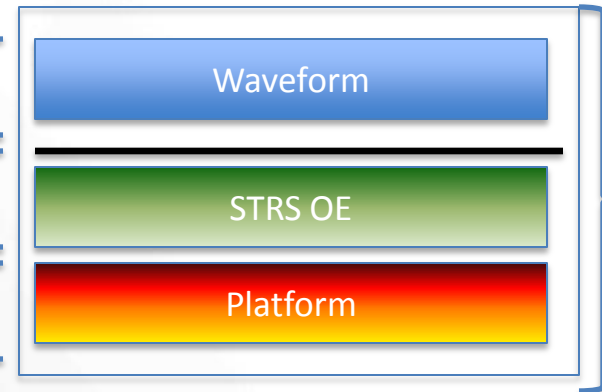
Developer

GRC/GSFC

JPL

JPL

Integrator



GRC

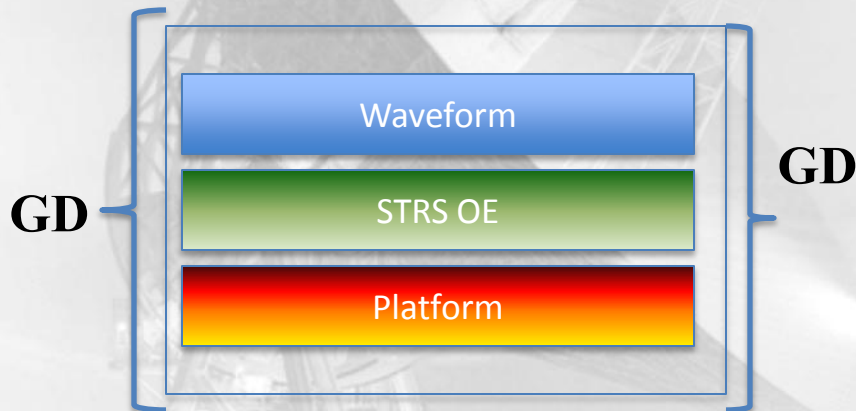
JPL-SDR

Developer

Integrator

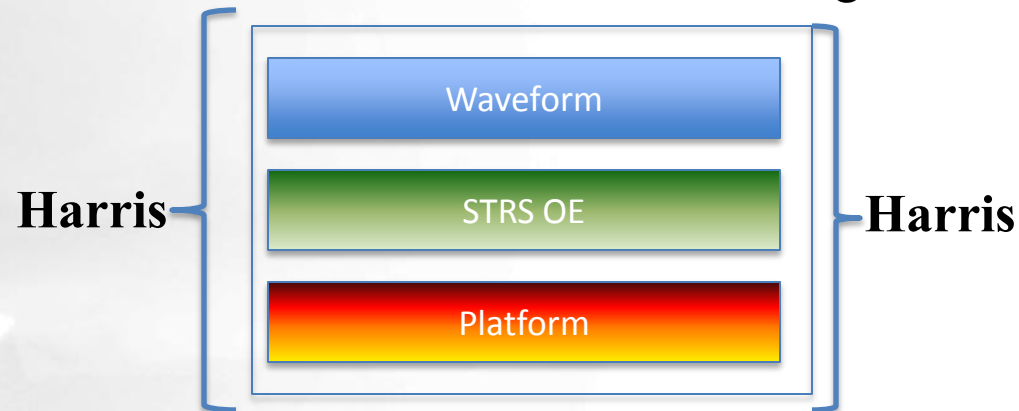
Developer

Integrator



GD

GD S-band SDR



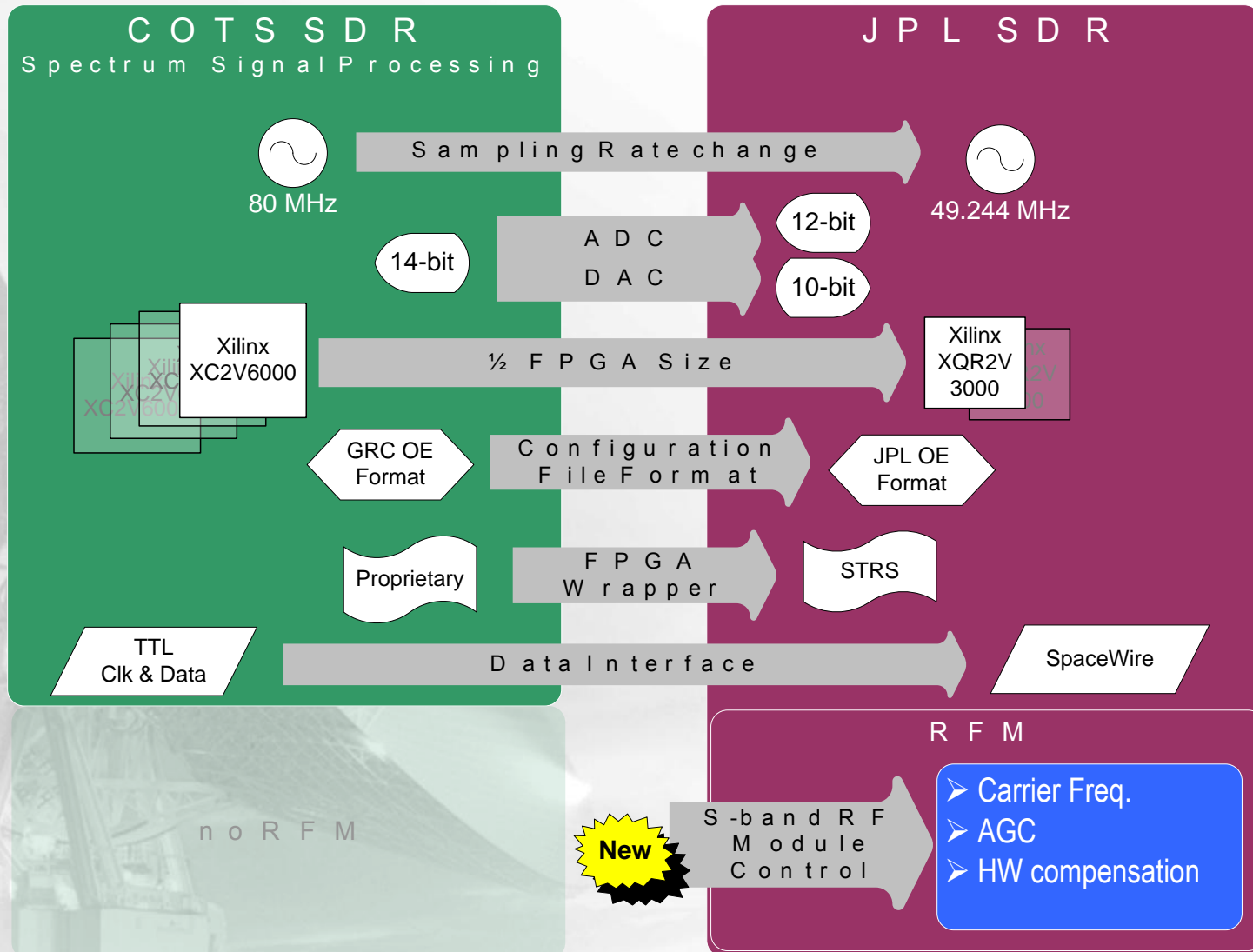
Harris

Harris

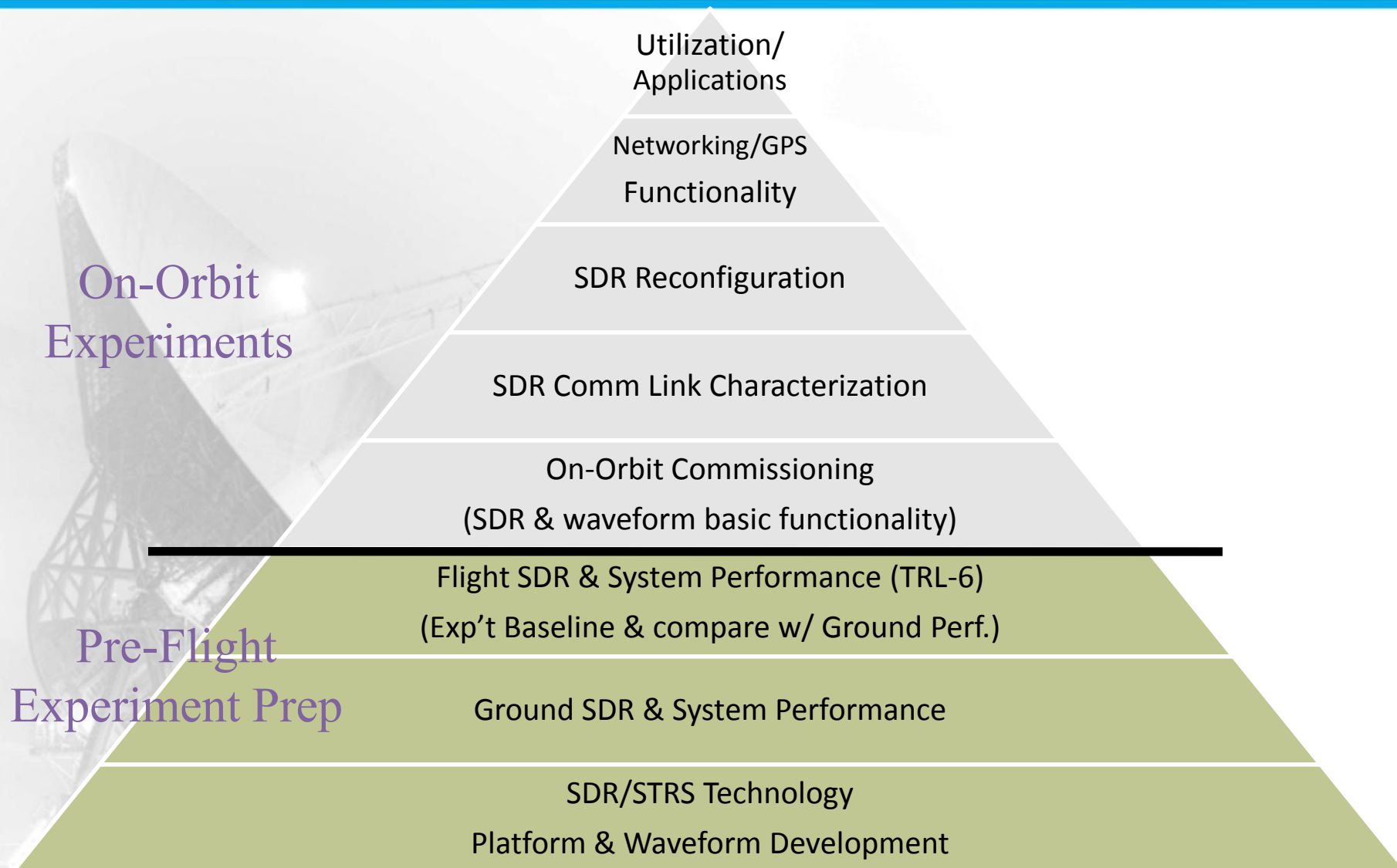
Harris Ka-band SDR

GRC-GSFC TDRSS Waveform

Porting to Flight SDR



CONNECT's Technology Development & Experiment Flow



Contact Info

- Thomas Kacpura
- NASA Glenn Research Center
- Thomas.J.Kacpura@nasa.gov

