Meeting at NASA Glenn Research Center (GRC)
1/5/2016 through 1/7/2016

1/5/2016 Agenda:

Morning:

- Gave prepared presentation (haphazardly) to Dale and Rich
- Attended SCaN Testbed staff meeting and presented at a high level of this project

Afternoon:

- Shadowed Mike and Nick in the High Bay as they were characterizing the MODCOD vs. EsNo curve for the PCI DVB-S2 card.
- Initiated process for log-in credentials to high bay computers.
- Attended WPI/PSU/GRC Telecon
- Received JPL Radio documents from Dale

1/6/2016 Agenda:

Morning:

- Discussed implementation architecture with Rich
- Watched an ISS pass over GRC while the ACM feature of DVB-S2 on the return link was tested.
- Shadowed Mike and Joe
- Got EDS log in credentials fixed.

Afternoon:

- Practiced procedure of using the JPL BB and Avionics for EDS testing.
- Mike and I walked through successfully loading and running the GGT Launch Waveform onto the JPL radio through the Avionics Trek software.

1/6/2016 Agenda:

Morning:

- Wrote a blink LED Verilog program to test on the JPL BB system.
- Attended branch meeting under Jean.
- Worked with Mike in SDR lab to compile blink LED program for both FPGAs in JPL Radio
- Mike and I walked through the process of taking an FPGA bitstream and loading it onto the JPL radio through the Avionics Trek software.
- Successfully loaded and ran the blink LED program.

Afternoon:

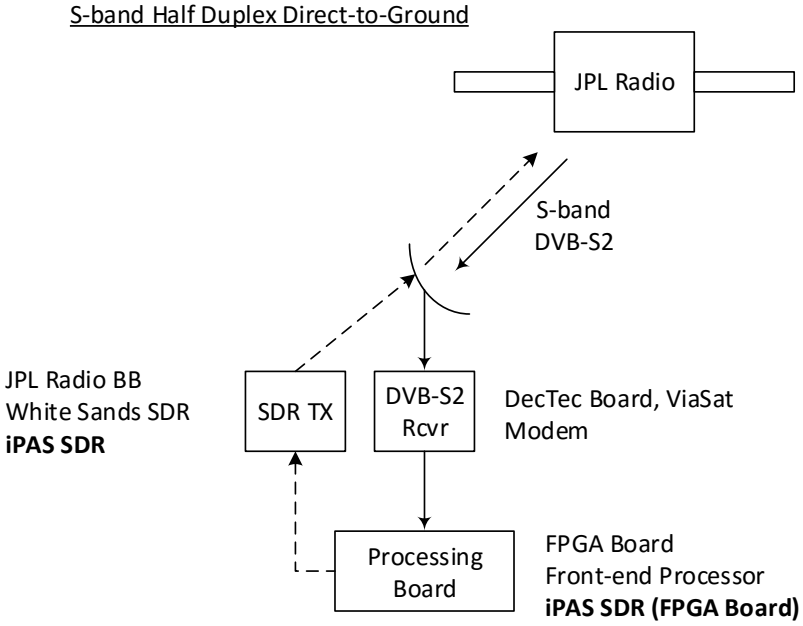
- Downloaded VPN client for remote log in and verified remote access
- Talked with Rich about the IPAS radio details and implementation architecture.

Notes from 1/5/2016

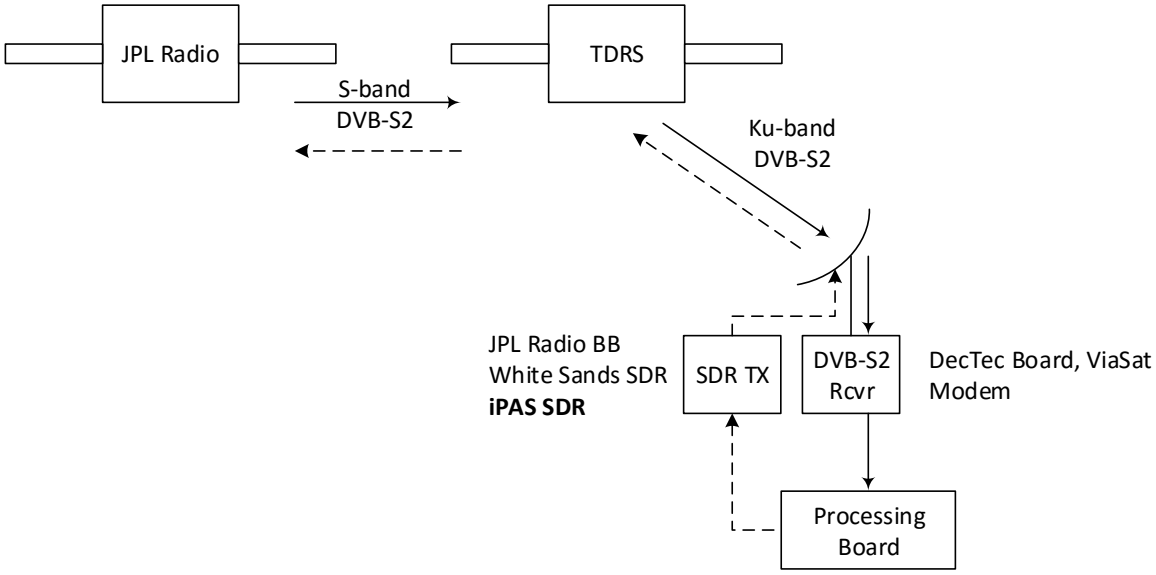
Notes about Current Progress

- We should discuss putting MAC layer inside DVB-S2 instead of outside (discussed in Tues. Telecon)
    - Inside DVB-S2 payload
    - Using MODCOD-1
    - Low delay with low block length
- AGC on JPL is manually controlled on FPGA
- ISS R&D Conference is really science-related – we need to tie back how this project affects us on Earth
- AIAA SPACE Conference is easier for Glenn to travel to.
- For L-band ionospheric measurements, check the IGS repository
- On the forward (WSC -> Harris) link, we don't have any option but BPSK (TDRS legacy limitation), but we can vary data rates and coding.
- We cannot do direct-to-ground Ka-band.
- What rate do we need to use the Kalman filter? Do we need to process every sample received?
- For DVB-S2, do we even need an FPGA? We could technically do all of it using compuer processing.
- For floating point, Mike suggests LEON3 architecture.
- We should make sure the scope of the project doesn't get too large. We want a finished project.
- For the bent pipe configuration, we can only get the Spacewire interface to go up to 20 Mbps maximum which is pushing it.

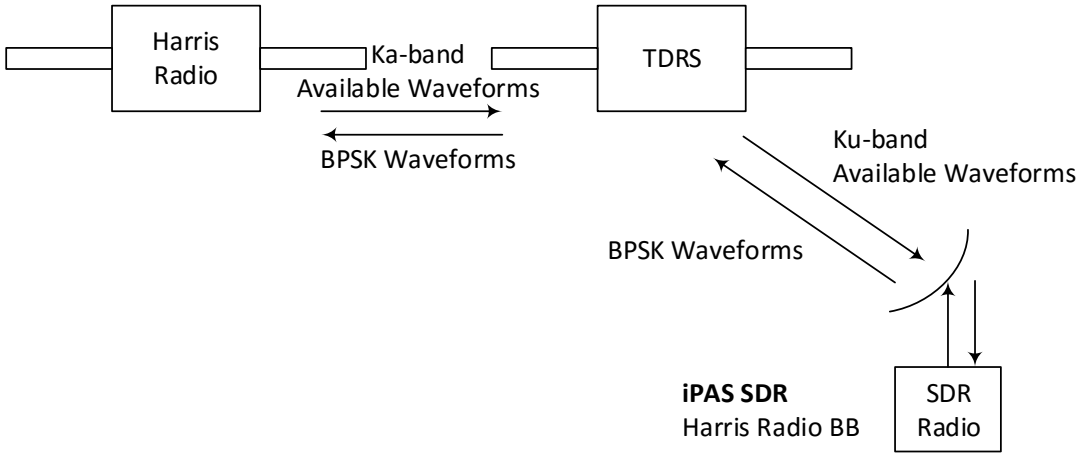
Notes about Design Architectures



S-band Half Duplex Space Network



Ka-band Full Duplex Space Network



Notes about Design Constraints

- DVB-S2 is a downlink only waveform (no plans for SDR DVB-S2 receiver) – COTS receiver on ground.
- Uplink through Space Network must be BPSK (can be different coding schemes and rates)
- Harris waveforms (experiment 6) are not designed to switch rapidly like DVB-S2.
- We need to quantify the amount of storage required for learning databases, where it is stored, and what happens if there's an upset. How do we "relearn" or reload a database?

Notes from 1/6/2016

Notes about iPAS Radio

- Consists of Xilinx ML605 development (Virtex 6), RF daughter card, and GPP. The GPP communicates with the ML605 through Ethernet.

Notes about Loading and Running a Waveform

REDACTED

Notes from 1/7/2016

Notes about Building, Loading, and Running a Waveform

Xilinx ISE 10.1 Full Version

REDACTED

Transferring a Waveform to JPL Radio BB

REDACTED

Running a Waveform on JPL Radio BB

REDACTED

Notes about VPN Access

REDACTED

Notes about Waveform Development

- Mike suggests developing in newer ISE then going back to 10.1 for synthesis. Need to be careful about IP core compatibility and inferred designs.
- ISE 10.1 full version (free) will create the bit streams needed.

Notes about Badge Access

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