OMNISYS INSTRUMENTS

SPF B1 Feed Package Status

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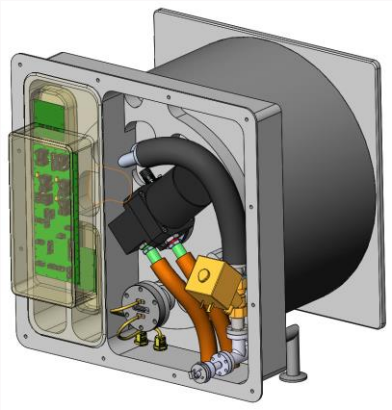
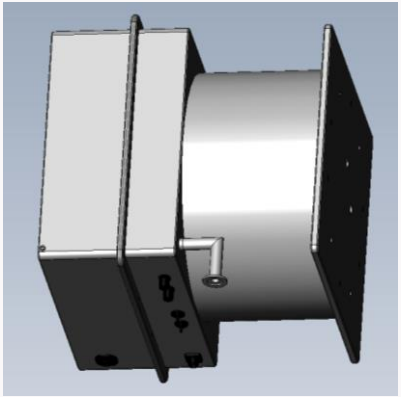
OMNISYS INSTRUMENTS

Omnisys Work Summary

- Mechanics
  - Cryostat to cool 1st stage LNAs
  - RFI protection
  - Easy access, easy to handle, low cost
  - Stand the environmental requirements
- Control System
  - Bias
  - Power
  - Monitoring & Control
- Cryo system COTS
  - Selection of
- Software
  - Interfaces SPFC
- RF after horn and 1st stage LNA
  - RF lineup design
  - 2nd stage LNA
  - Noise source and calibration
  - RF cabling
  - Equalizer, power detection etc





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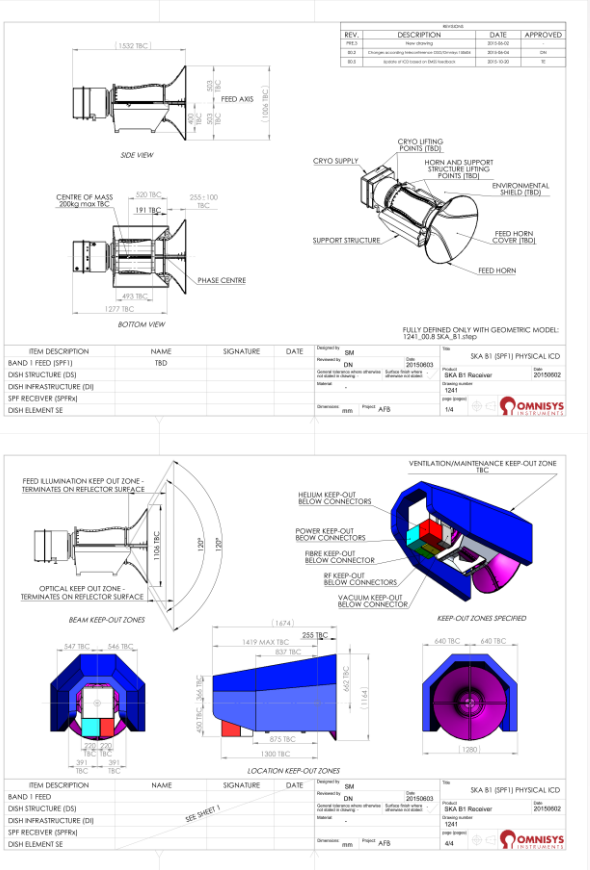
Mechanics

- The mechanical ICD was updated in October
- Work has been focused on interface design for easy installation, maintenance and repair and low cost
- Concept for how to mount the (large and heavy) horn to the support structure has been developed together with OSO
- Support structure now better referenced to the phase center for larger tolerances in alignment and positioning
- Still cryo as baseline, but possible that concept will be changed to room temperature LNAs
- Cryo is now designed for Oxford cold head, but it will be possible to accomodate also SHI cold head
- The RF supporting structure inside the cryostat has not yet been designed
- Right now, ongoing discussions about RFI design
  - Concept will be boxes in boxes
  - Cavities within the aluminium bulk material



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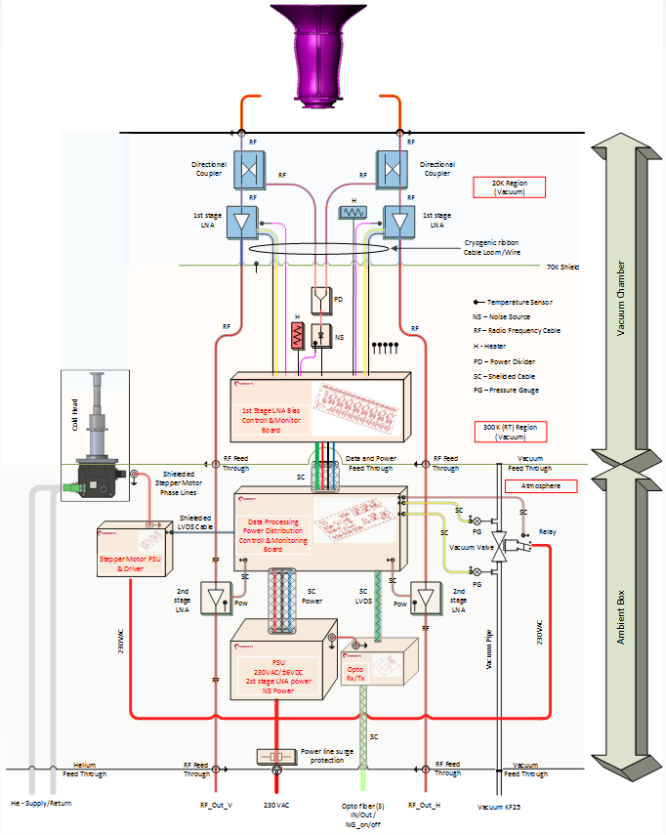
Control System

Ready (almost at least)

- 1st stage LNA bias control & monitor board
  - Successfully tested in room temperature
- Data processing, power distribution, control, & monitoring board
  - Communication with 1st Stage LNA Bias Control & Monitoring Board, Stepper Motor Driver and Opto Rx/Tx successfully tested.
- Stepper Motor Driver
  - Successfully tested
- Opto Tx/Rx Board
  - Successfully tested



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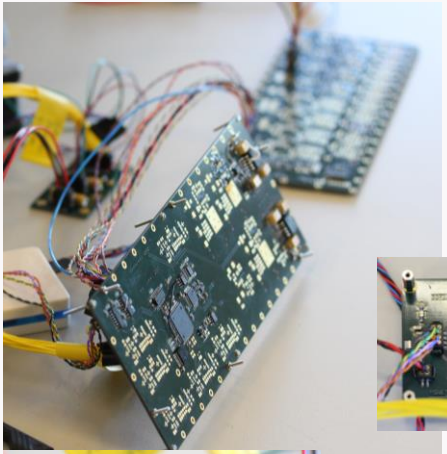
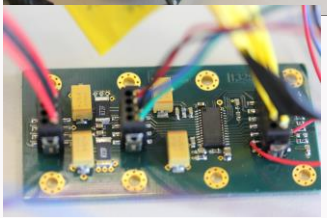
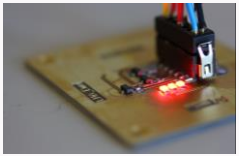
Control System cntd

Ongoing work:

- PSU
  - Design ongoing (awaits decision on NS power supply)
- Selection of relay for vacuum valve power line
- Final decision on what to have inside and outside cryostat
- Discussions with mechanics
  - Partitioning
  - EMI







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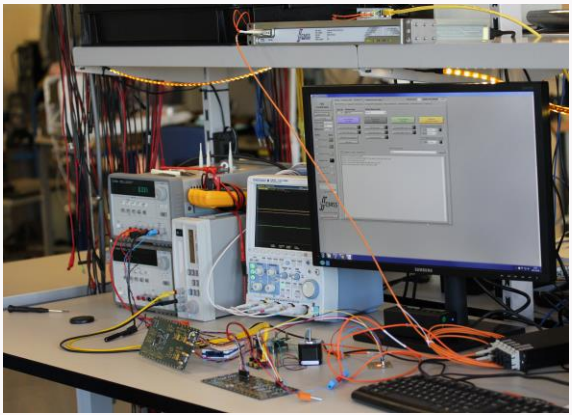
Software

- Communication with SPFC up and running
- The objective for the software has so far been to test the hardware; reading sensors, controlling stepper motor etc.. The hardware has now successfully been tested and now software is moving on to writing the end product
- Hence, the software ICD is now to be defined together with EMSS
  - FPC requirements
  - Commands
  - Monitors



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RF (excluding horn and 1st stage LNAs)

Ongoing work:

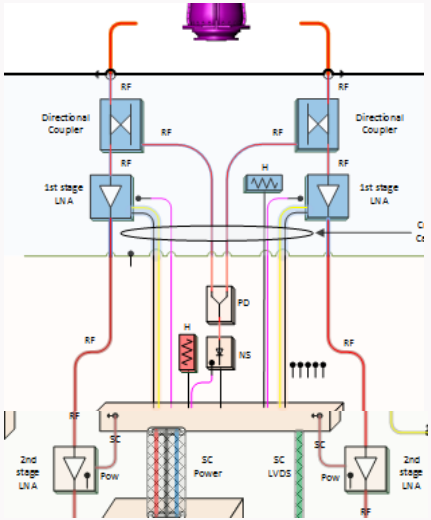
- RF lineup design: Make detailed requirements for 2nd stage LNAs, noise source, and possibly equalizers, given SKA-TEL-DSH-0000012- Single pixel feed req. specification and 1st stage LNA performance.
- Choice of COTS power splitter for noise injection
- Detailed design of RF cabling and connectors.

Next:

- Decision on whether to use COTS or custom design for 2nd stage LNA and NS and then detailed design

Custom designed 2nd stage LNA pros and cons

- Pros: easy to include power detector, equaliser etc, flexible, much smaller and less expensive than using COTS
- Cons: Some design work is needed



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RF cntd

Custom designed NS pros and cons

- Pros: easy and cheap to design and integrate attenuators, equalizers and power splitter, lower voltage requirements on PSU, which will save an additional tranformer
- Cons: design work is needed, risk

Custom design of 2nd stage LNA. One module per polarisation containing:

- a COTS LNA chip
- attenuators and equalizer to get correct gain and gain slope
- directional coupler with power detector

Custom design of NS. One module containing:

- a noise diode with bias
- a PIN diode switch to switch the power on and off
- an equalizer to get flat frequency response
- attenuator to get desired ENR and
- a built in 2-way splitter to get noise to both polarisations.