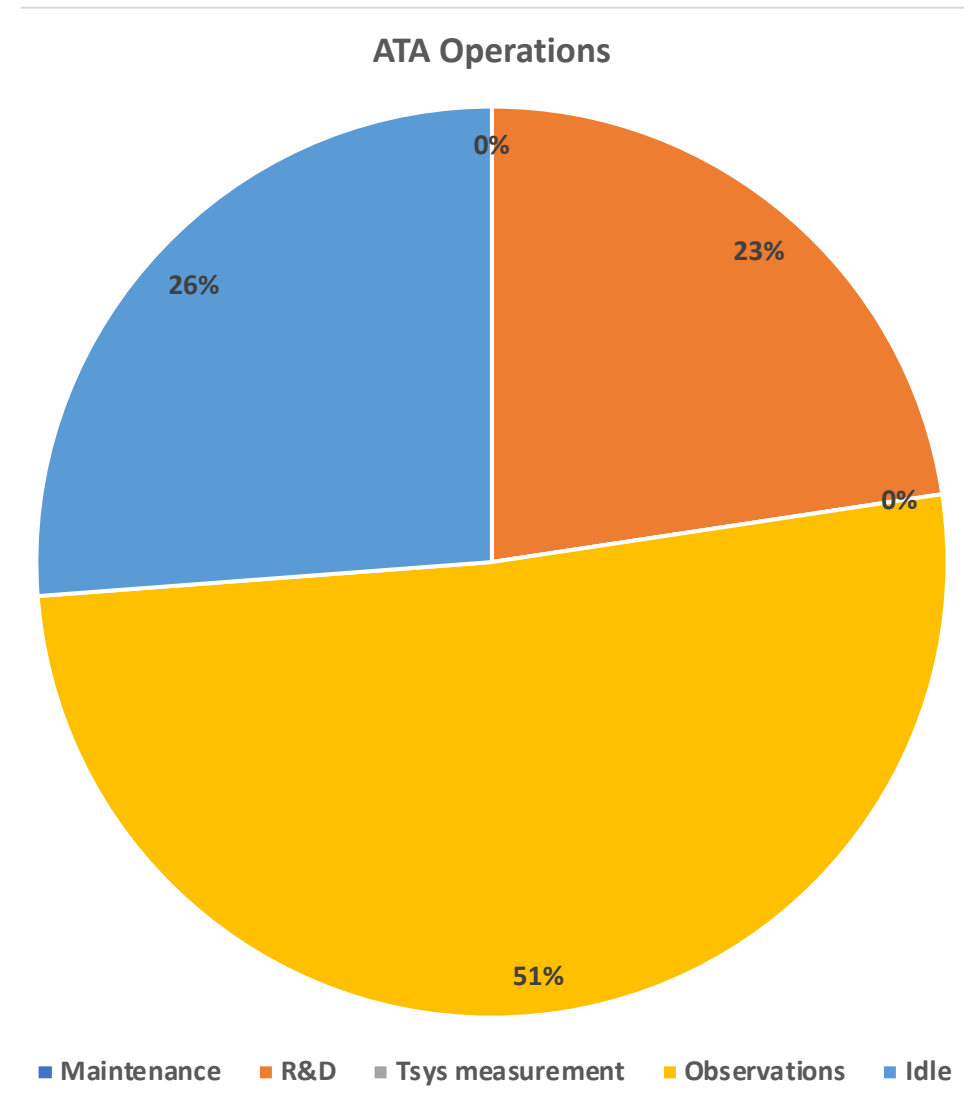


# General Update

- Antennas
  - maintenance completed
- Antonio Feeds
  - All 19 feeds running well
  - Maintenance planning for for 3C and 4J (next week)

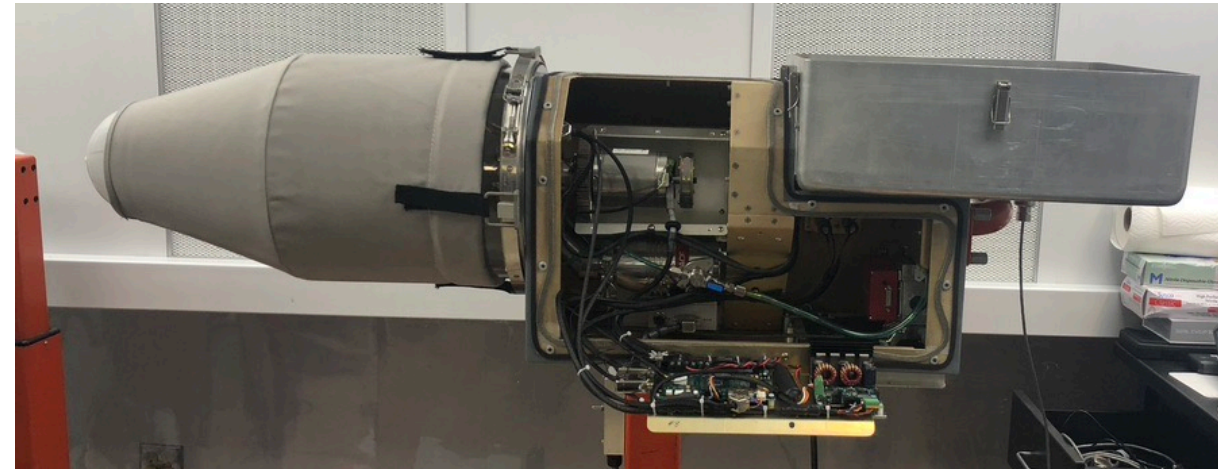
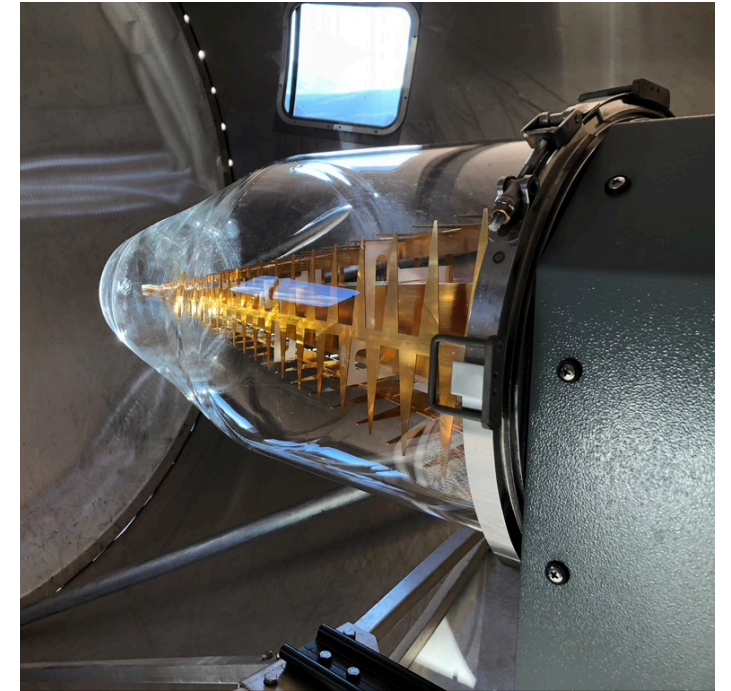
## Agenda for today's meeting

- Overview feed buildout
- Quad-Ridged Feed Horn Prototype
- Current status of observations and planning for new observing runs.
- Current status of DSP backend and next steps.
- RFI survey update



# Antonio Feed buildout:

- 6x additional log-periodic feed pyramids
  - ✓ 12x LNAs tested and at Minex
  - ✓ 6x gold plated log-periodic feeds
  - ✓ UT-034-95 coaxial cable
  - ☐ Wiring parts (Nano-D, 085 SS coaxial cable)
  - ☐ LNA Module, assembly with conditioned coaxial cables
  - ☐ Complete assembly and tip link installation
- 4x additional feed bases
  - ✓ Feed Control PCB
  - ✓ Fan Blowers
  - ✓ Cryocooler
  - ✓ Turbo Pump
  - ☐ Diaphragm
  - ☐ Main Enclosure
  - ☐ Wire Harness Retrofitted
  - ☐ Glass Dome
  - ☐ Base Plate Assembly
  - ☐ Hermetic Feedthroughs
  - ☐ Damper for Cryocooler
  - ☐ ...

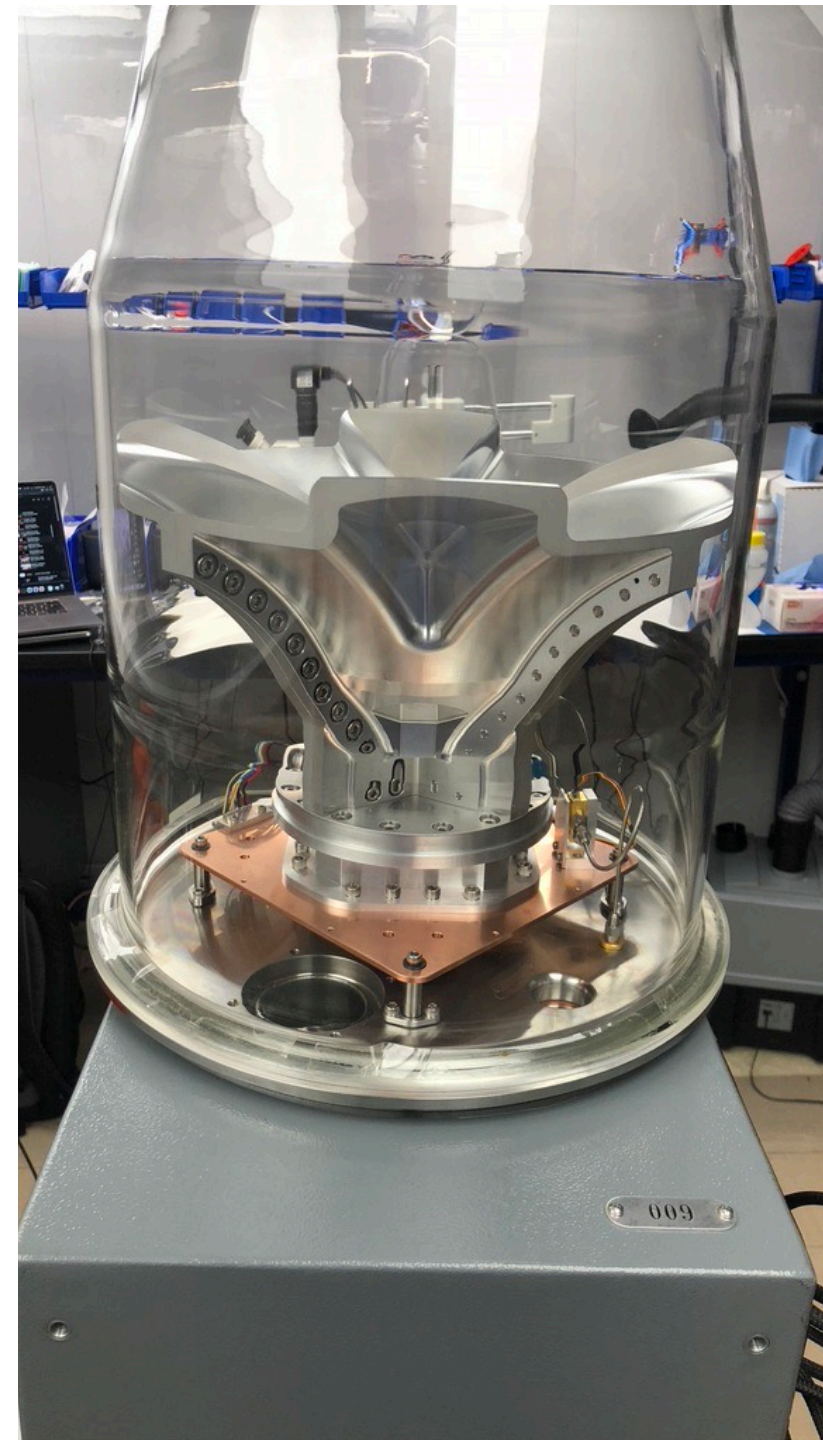
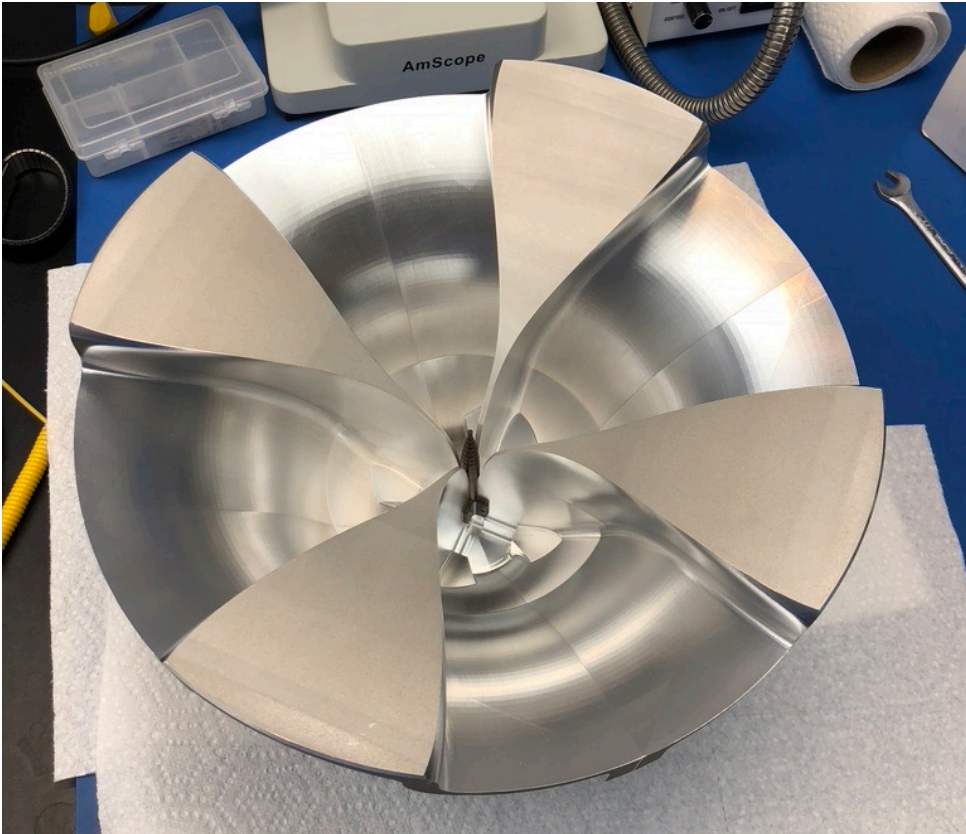


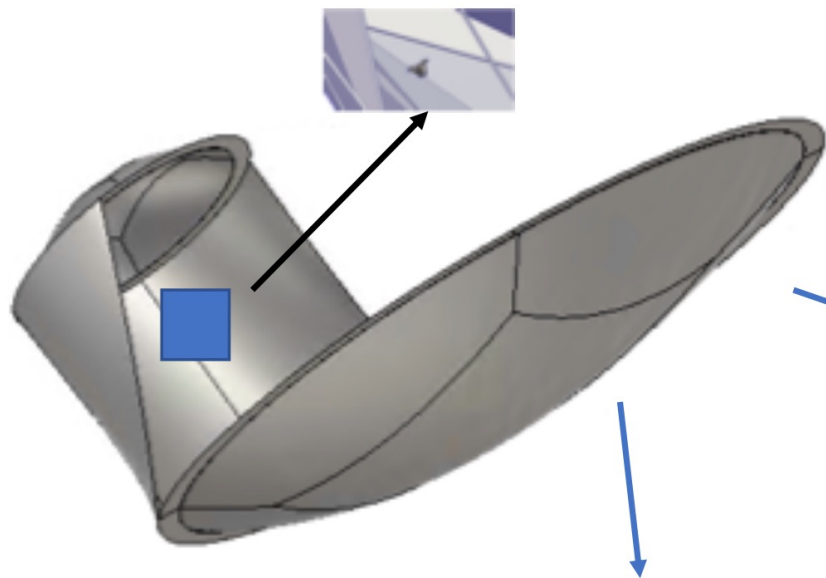
Trip to Minex 24-25 of March



# Quad-Ridged Feed Horn Prototype:

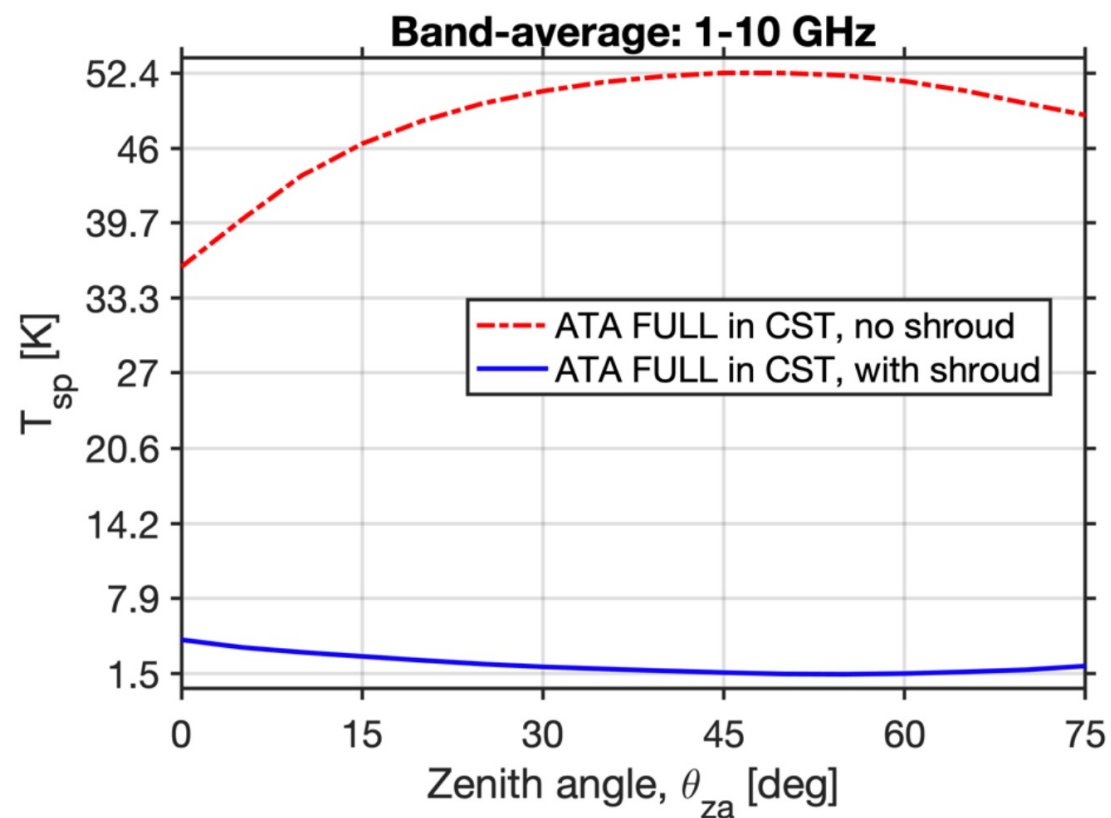
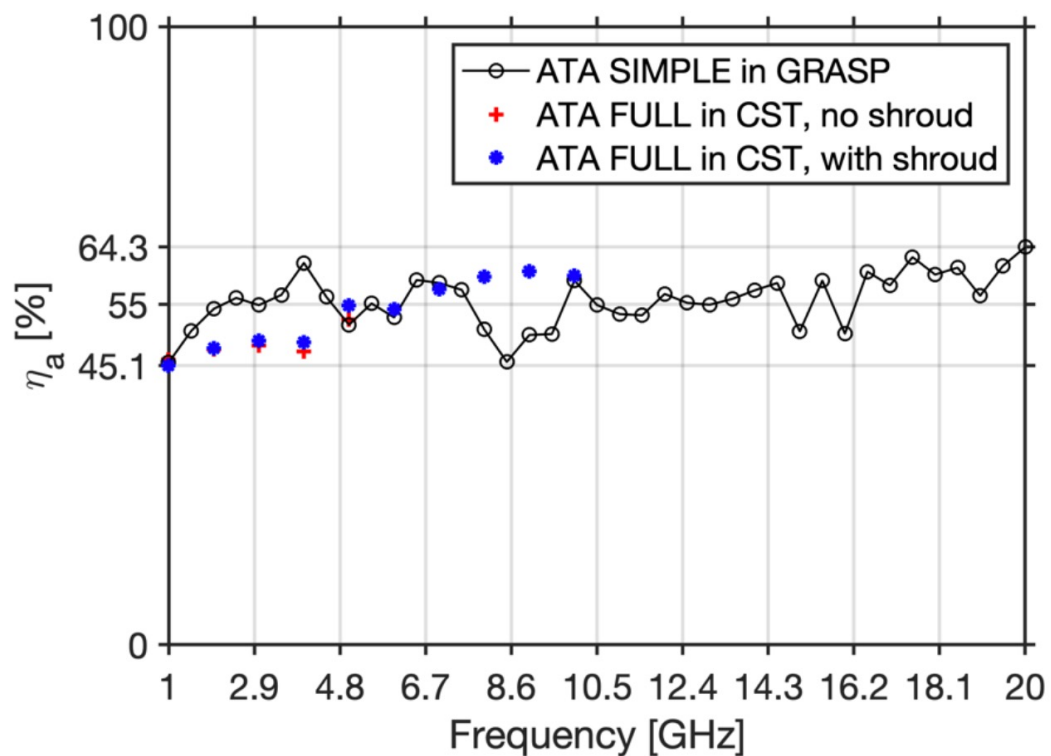
- Jonas Flygare from Chalmers designed a QRFH as part of his PhD.
- To test the QRFH in real world conditions I offered to install it on an ATA antenna.
- The QRFH is designed to fit in an existing Antonio Feed cryostat and matched to the ATA optics.





### In PF 60deg

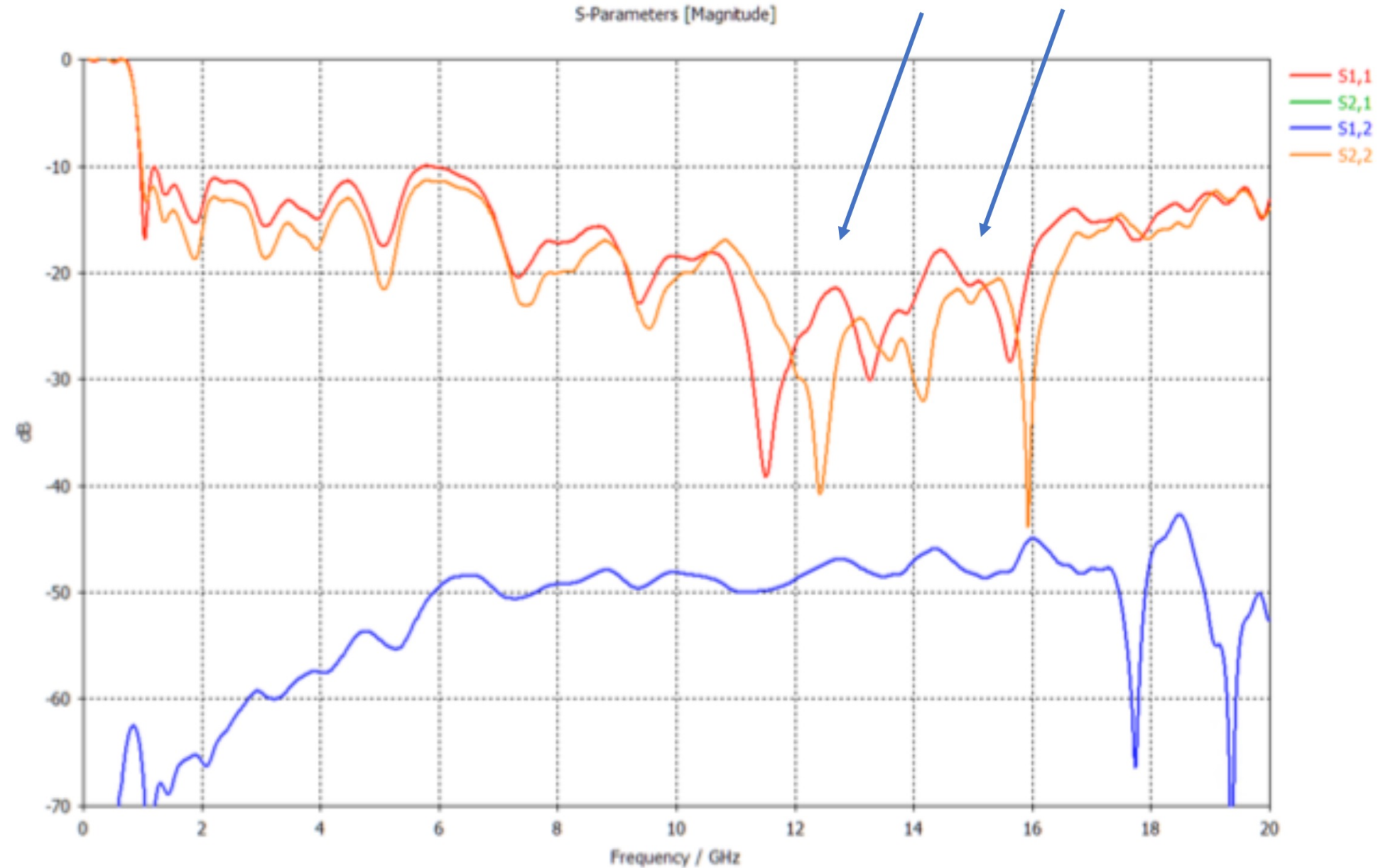
- $\eta_a$  average 60 %
- $\eta_{sp}$  average 95 %



# Quad-Ridged Feed Horn Prototype:

- 1-20GHz operational frequency range

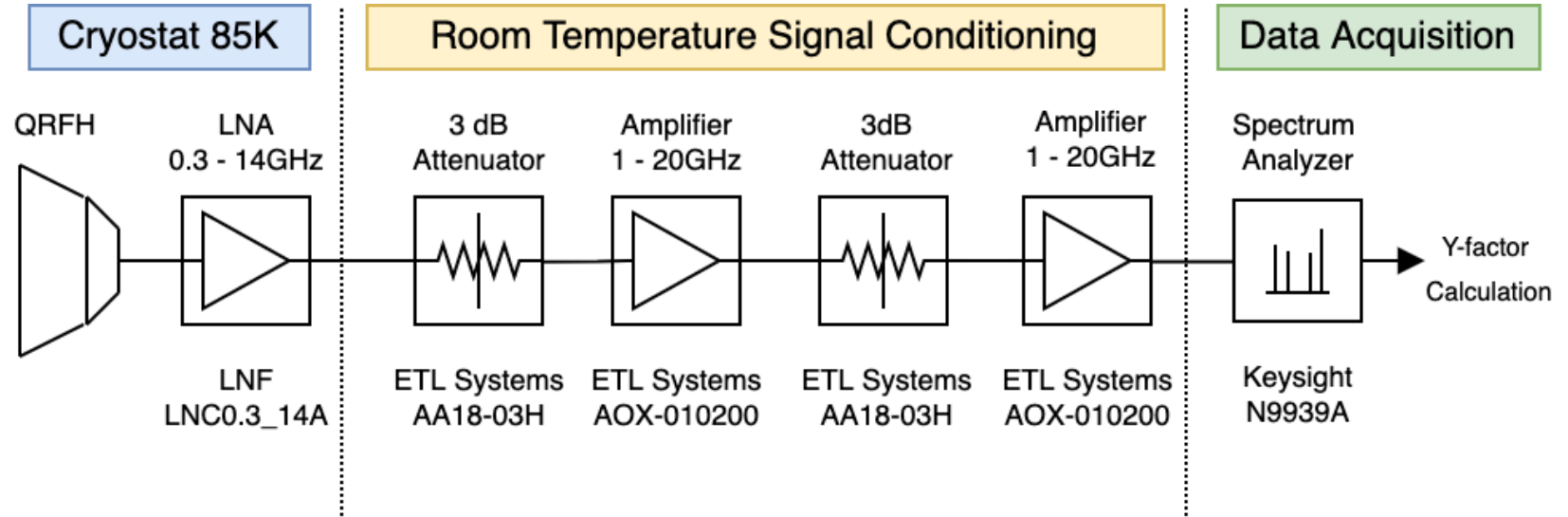
Will be closer to -10 dB





# Quad-Ridged Feed Horn Prototype:

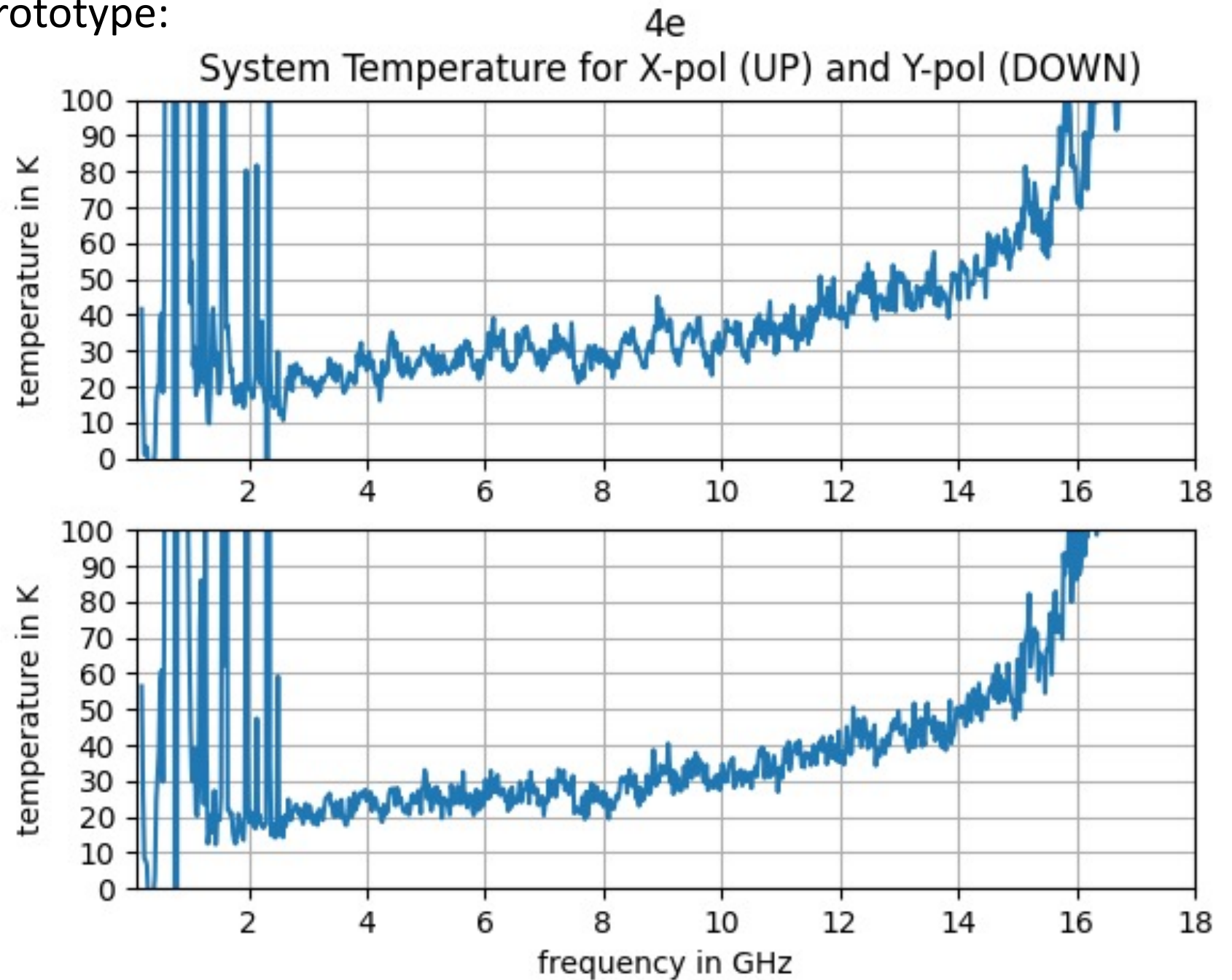
- Trec measurements



# Quad-Ridged Feed Horn Prototype:

- Trec measurements

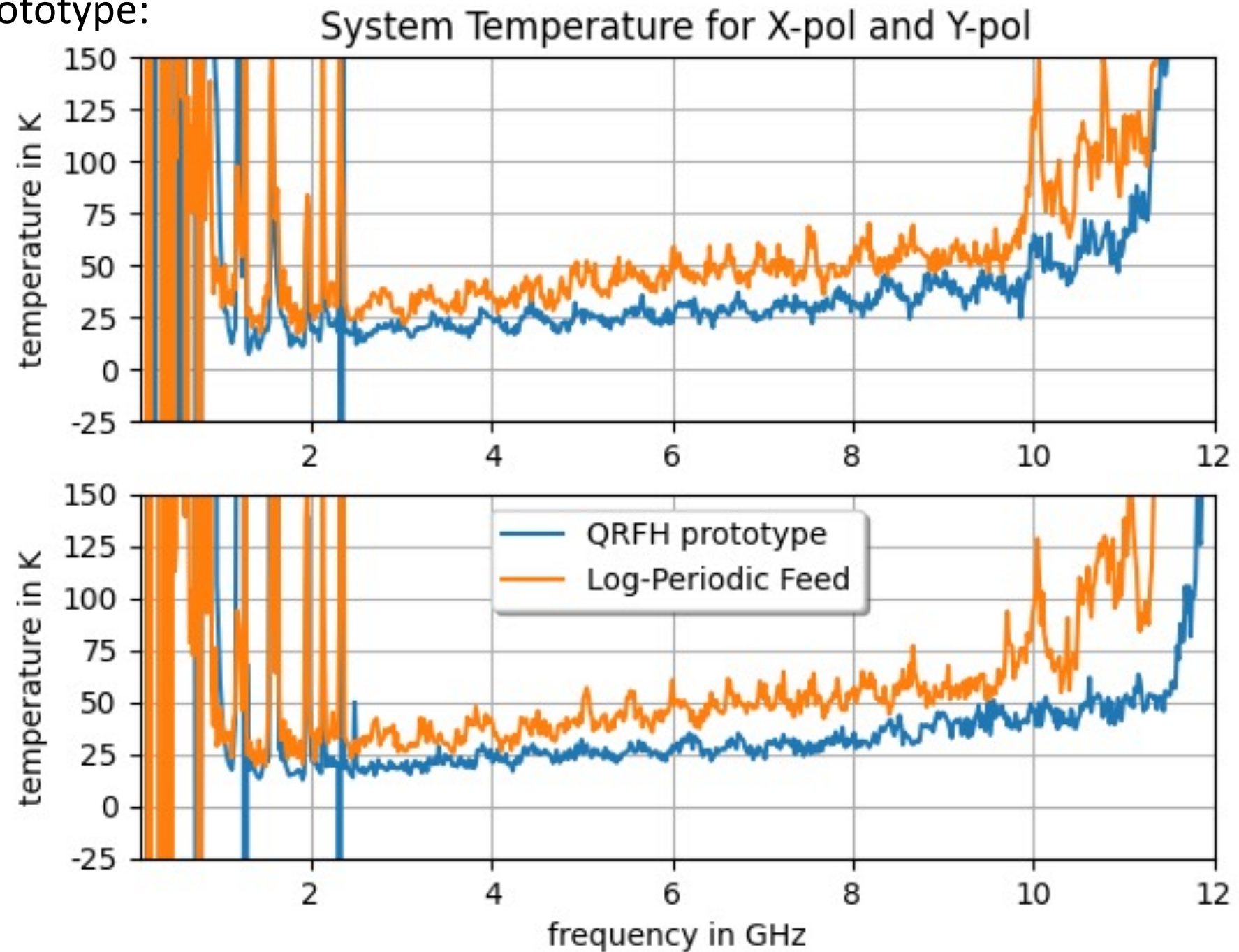
@ 80K receiver temp





## Quad-Ridged Feed Horn Prototype:

- Trec measurements





# Quad-Ridged Feed Horn Prototype:

- Test with Moon Tsys
- If operates well, used as replacement when performing maintenance on 4J and 3C



Current status of observations:

Observation Type	Sources	Backend	Observation Time	Disk Space Used
SETI Targets	Ross248, GJ273, HD173740	Beamformer	20 hours	30TB*
FRB	FRB20201124a	Beamformer	12 hours	90TB
Pulsar	J0332+5434	Beamformer	2 hours	6TB
Maser	W3OH	Beamformer	0.5 hours	2.5TB
Calibration	Quasars (3c84, 3c454.3, 3c273)	Correlator	11 hours	70GB
Tests (Phase Stability, Delay Slope tests)	Quasars (3c273, 3c286, 3c295, 3c48)	Correlator	38 hours	200GB

\* Note that we only used the central band for each LO for Beamformed observations performed in the last 2 days, due to limited disk space

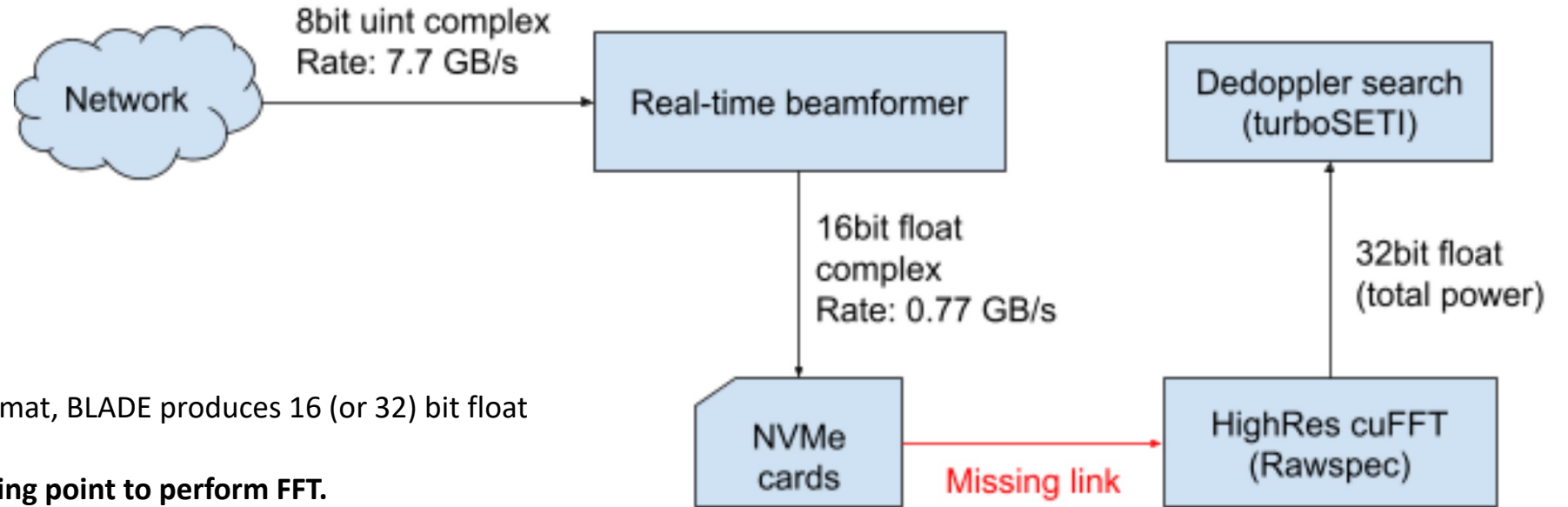
# Current status of DSP backend and next steps:

- Realtime Correlator:      Post processing software:
  - automate phase calibration [DONE]
  - verify delay engine with astrometry [bore side pointing] (medium priority)
  - automate data output (low priority)
- Realtime Beamformer:      Post processing software:
  - produce correct data format for turbo SETI (high priority)
  - verify, run tests on data format for turbo SETI (high priority)
  - produce multiple beams on the sky (high priority)
  - implement functions from correlator into beamformer (high priority)



# Current status of DSP backend and next steps:

- Beamformer mode, w/ 1 beam:
  - Operational recording mode.
  - Missing link between Beamformer (BLADE) output and High Res FFT



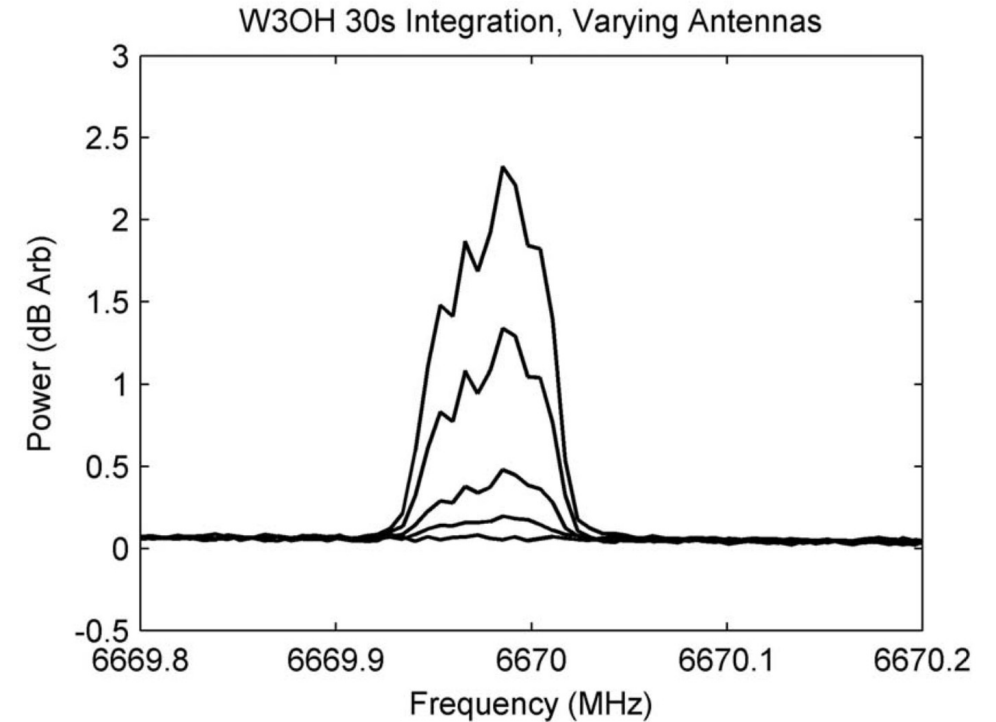
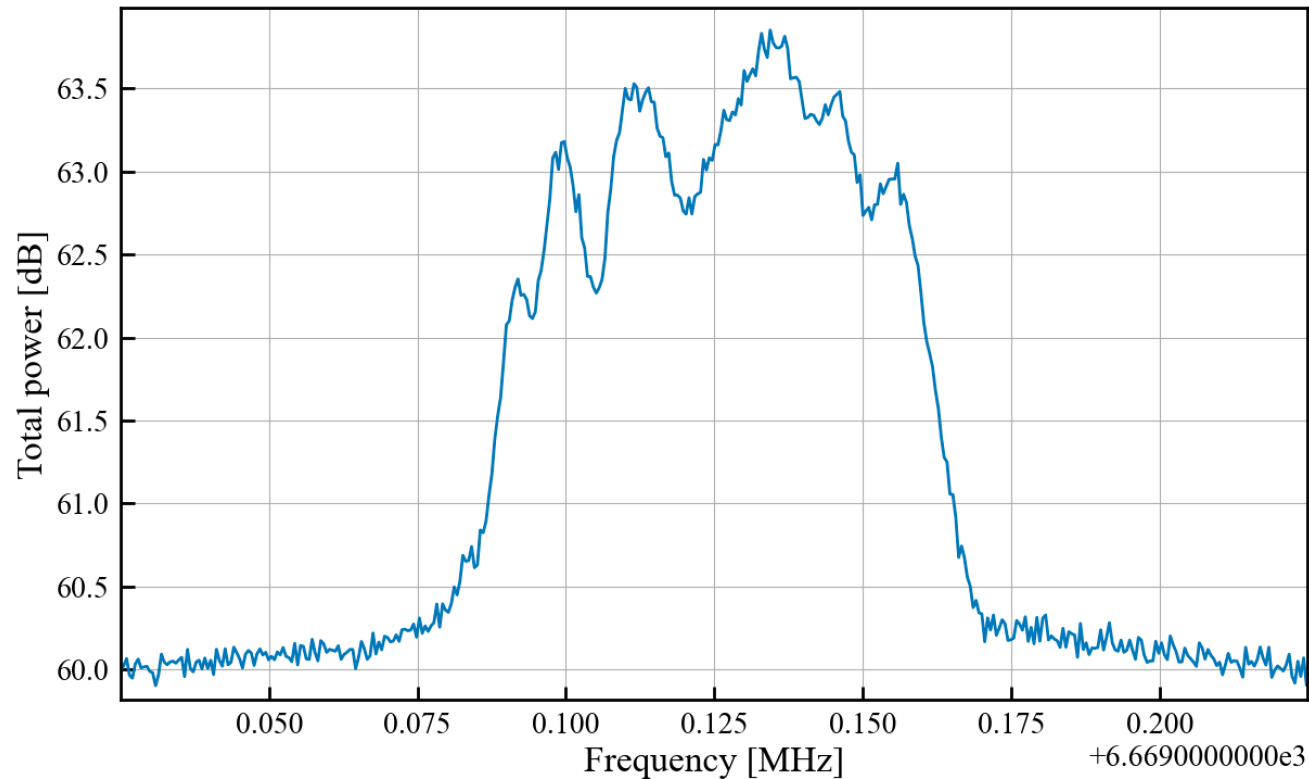
- Rawspec expects integer data format, BLADE produces 16 (or 32) bit float
- **Rawspec internally casts to floating point to perform FFT.**

As a current workaround, we have 2 options:

- Option 1: Add support for rawspec to ingest half-or-single precision floating point (more favorable)
- Option 2: Requantize Beamformer output to integer type (less favorable)

## W3OH maser (500 Hz resolution):

- @ 6.7GHz
- 20 antennas
- Beamformer



**Figure 17.** Composite of spectra from W3OH beamformer acceptance tests. In order of increasing SNR, the curves represent beams using 1, 2, 4, 8, and 12 antennas, and show a clear increase in SNR with more antennas. The source is a strong methanol maser. Power is plotted in decibels relative to the thermal noise floor of the measurement.