SAT Calibration Requirements on South Pole Infrastructure

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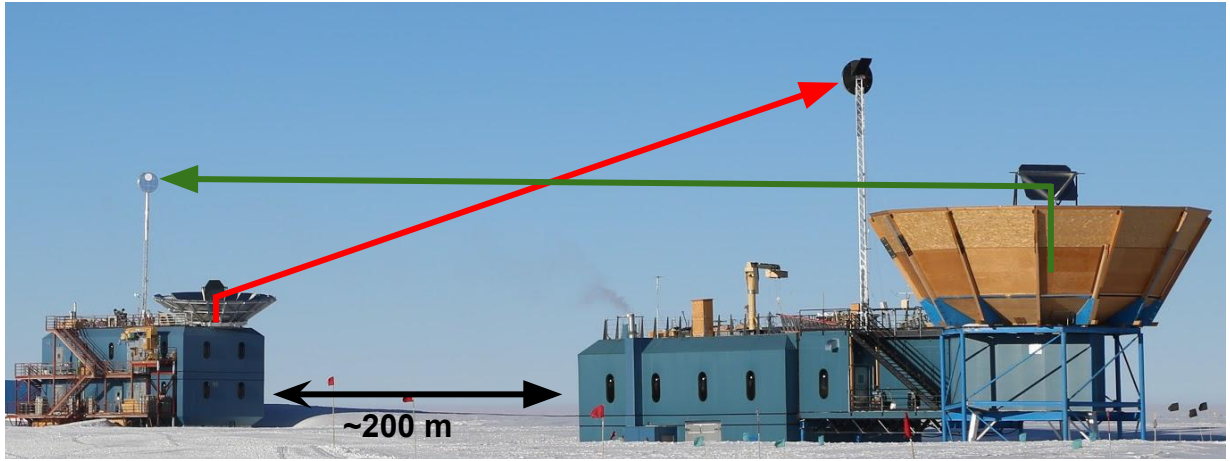
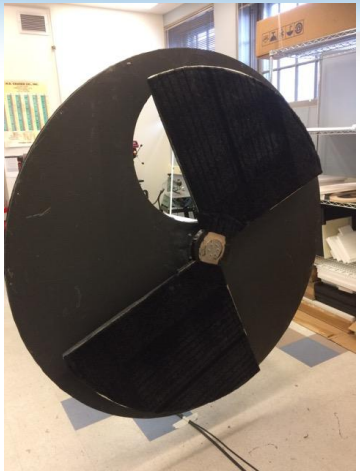
SAT Calibration Hardware

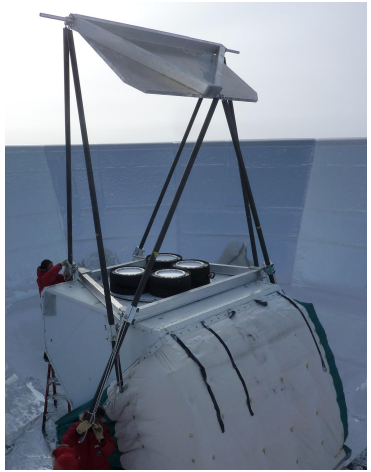
Things to measure	Hardware
Main beams	Near-field beam mapper
	Large thermal chopper
Sidelobes	Far-field flat mirror
	Mast
TQU beams/pol angles	Amplified microwave source (+ rotating polarized stage)
	Sparse wire grid, dielectric sheet
Bandpasses	Fourier Transform Spectrometer
	Optical filters
	Narrowband source
Time constants	
Optical efficiency	Aperture-filling thermal load
Magnetic sensitivity	Helmholtz coil
Vibration sensitivity	Accelerometers
RFI sensitivity	RF sources
Pointing	Star camera

Far-field measurements





Thermal chopper 24” aperture



Far-field flat mirror

Use a redirecting flat mirror and source on mast

Far-field calibration requirements

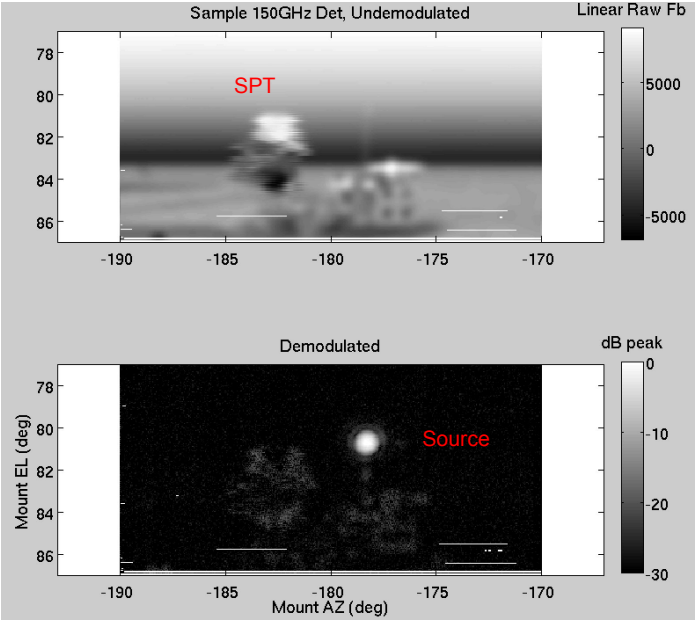
Each SAT needs a clear line-of-sight to a mast/source ~200m away (distance somewhat flexible)

Mast should extend to [TBD] degrees above clear horizon as viewed with mirror

Mase can be raised/lowered

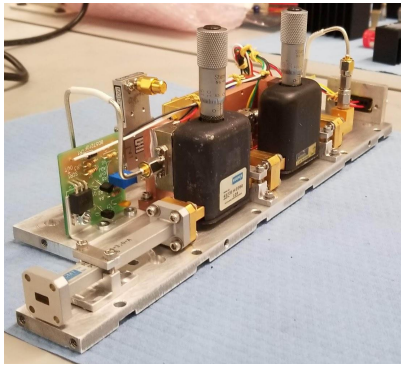
Expect to perform calibrations with many (all?) SATs simultaneously

SAT and mast building need to communicate, including data (e.g. TTL signal)



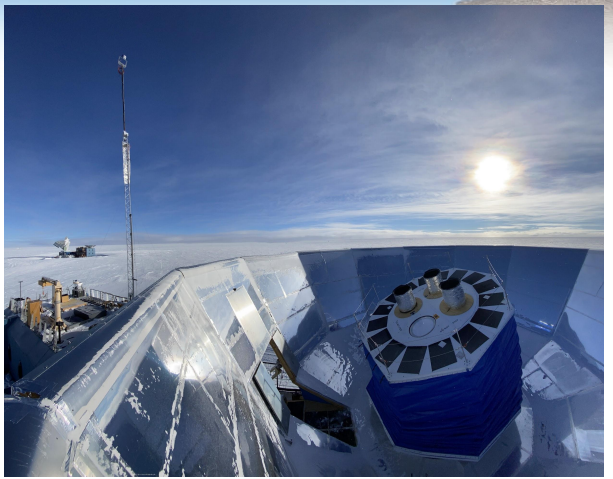
Tyler St. Germaine

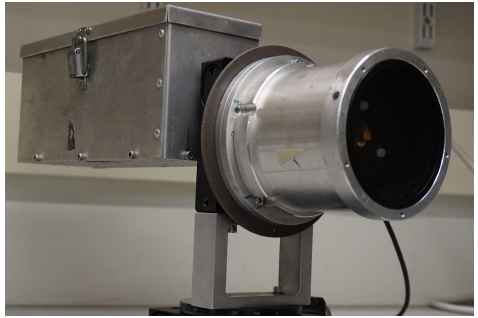
Sidelobes, Pol, Bandpass



Amplified broad spectrum noise source

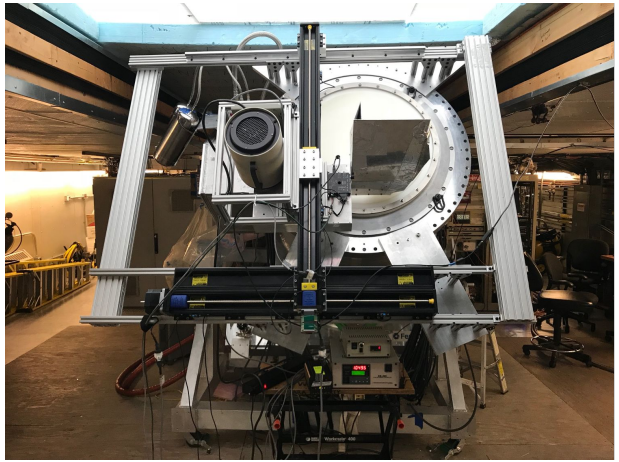
Far sidelobe measurements





Rotating polarized source (referenced to gravity)

FTS



Additional requirements

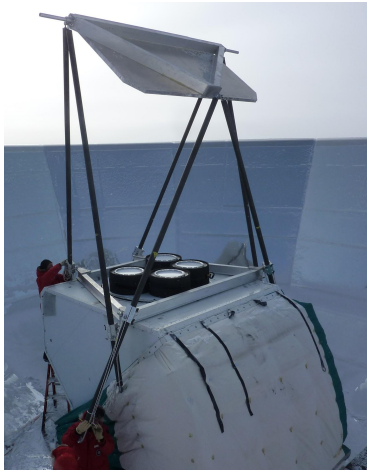
For far-sidelobe measurements, each SAT needs to see a mast/source on the same building. Mast should be extendable to higher than the far-field measurement [TBD].

Calibrators (far-field flat, thermal load, FTS, etc.) need to be taken from lab into the ground shield, and then mounted on the SATs

- Clearance around lab doors and stairs
- Ground shield door
- Lifting strategy

Communication to apparatus (and people!) on the mount from inside

Far-field flat mounting



Far-field flat mirror

Mirror Mounting Jib Crane (telescoping)