

University of Arizona RadCaTS: Custom Instrumentation Production

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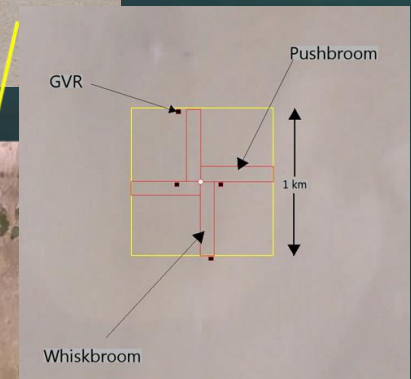
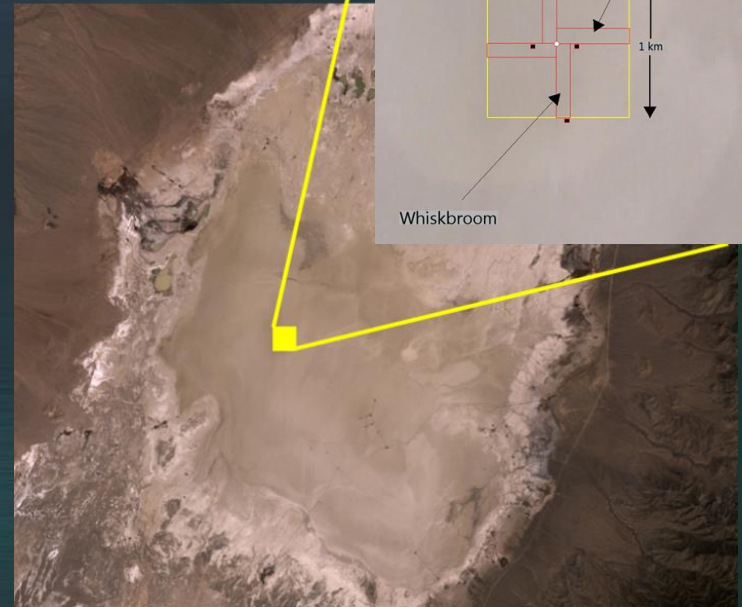
Your Guide to Campus and Tucson in March

Nik Anderson
Lunch Connoisseur



UA RadCaTS Goals

- Determine at-sensor radiance without needing ground personnel present at RRV dry lake bed.
- Provide more overpass opportunities by ensuring continuous site operation.
- Create, calibrate and improve custom instrumentation for deployment at RadCaTS.



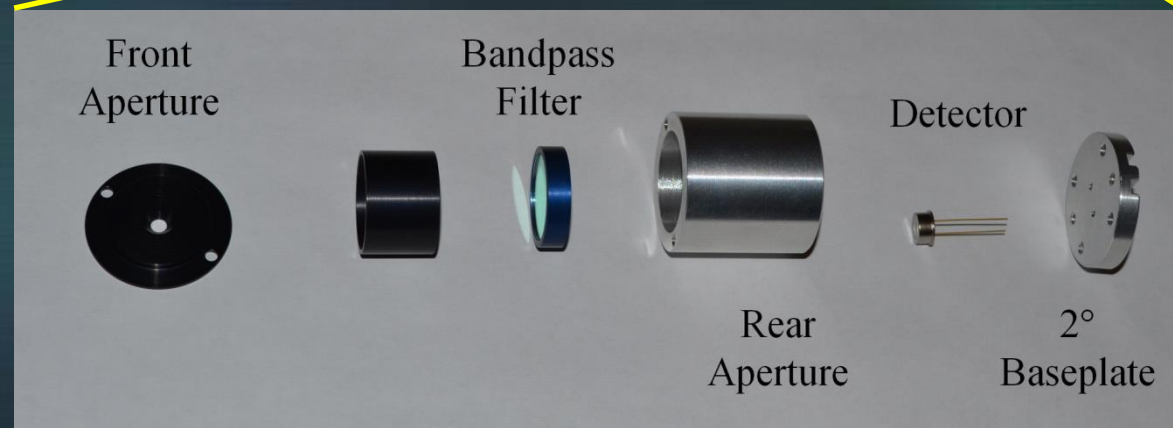
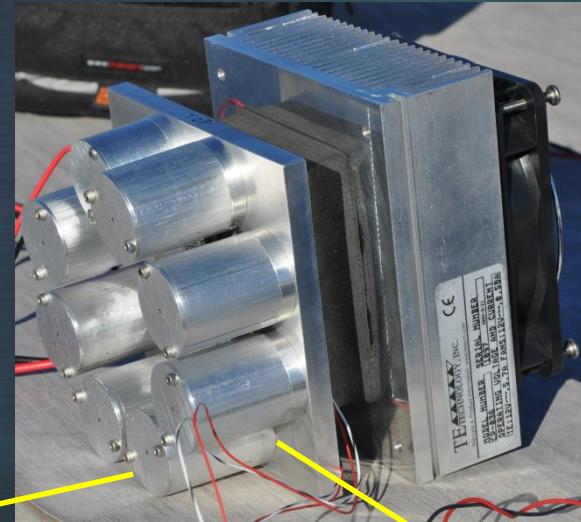
RadCaTS Methodology

- Surface reflectance (GVR)
- Atmospheric transmission and optical properties (Cimel sun photometer)
- Ancillary data (meteorological station)
- Satellite data uplink



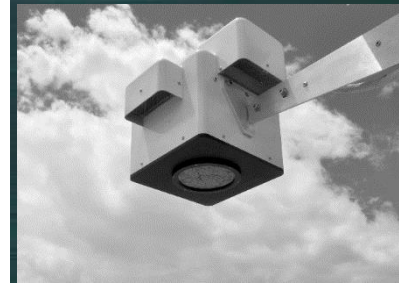
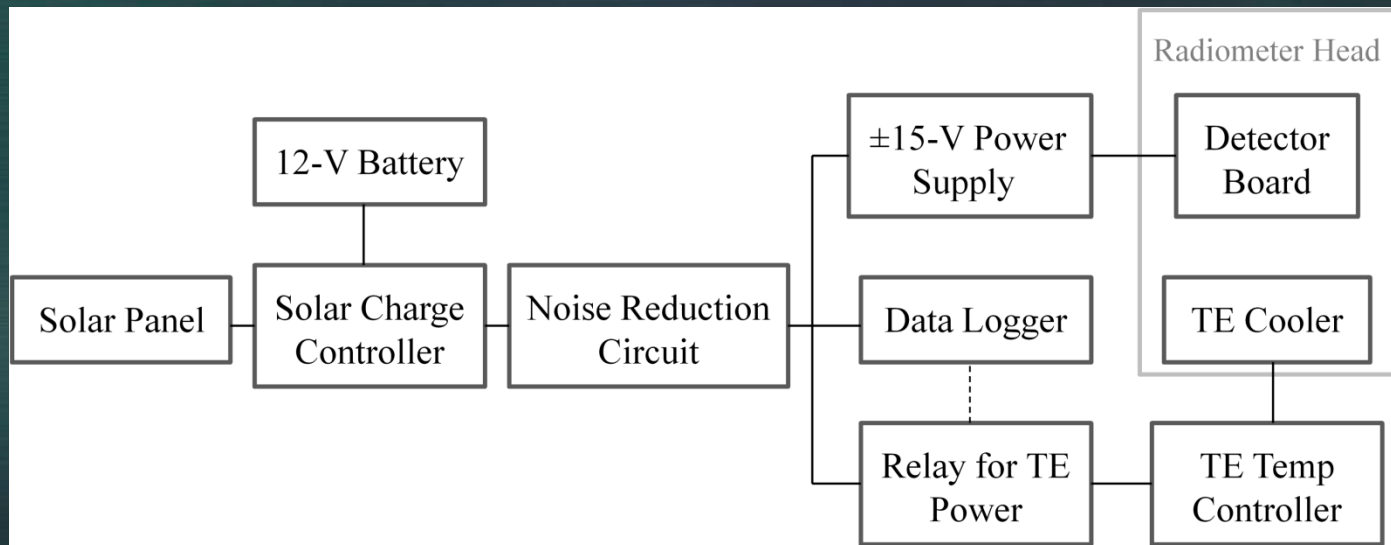
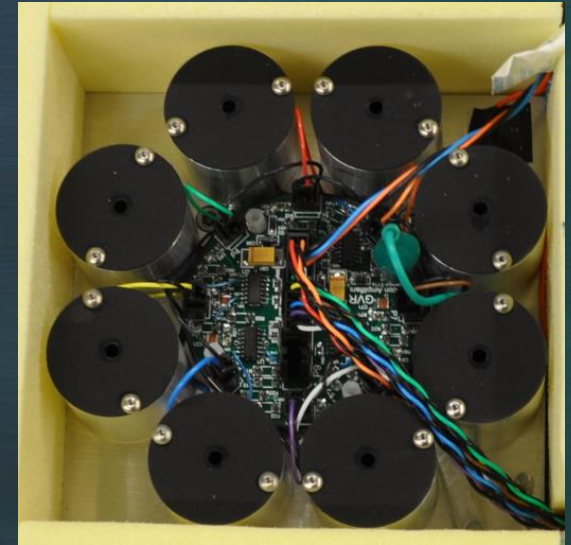
GVR Optical Characteristics

- Optically unpowered, aperture controlled 10° FOV.
- Filter-based radiometer.
- 2° tilt designed for each channel to view same area on the ground when installed at designed height.
- Eight total spectral bands from 400 – 1550nm.



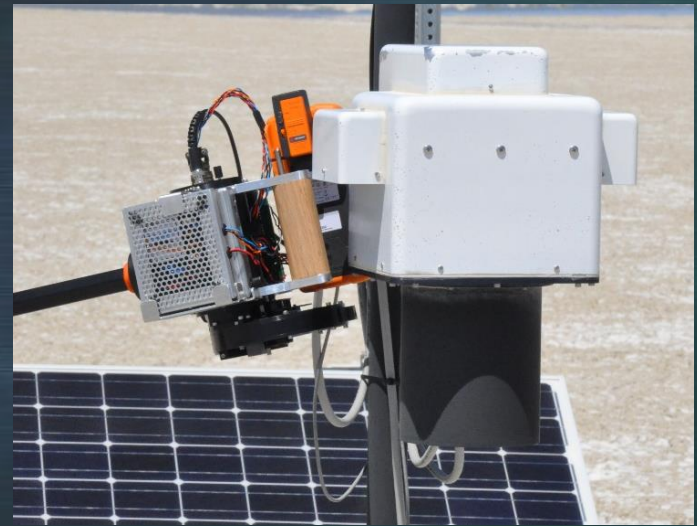
GVR System Architecture

- GVR critical components are temperature controlled with a TE controlled direct contact plate set for 25°C.
- Thermal control is relay controlled by logic in data logger program based on “clear daylight” signal levels.



GVR Deployment

- Five GVRs are deployed at RRV, GVR 21, 22, 23, 24 and 25.
- GVR 21 deployed May 2011, GVR 22 and 23 Nov. 2011, GVR 24 deployed Oct. 2014, GVR 25 deployed Feb 2017.
- GVR 22-24 have operational rates greater than 98% since deployment.
- Maintenance required for best results, we typically visit site every 8-12 weeks.
 - Clean glass cover on radiometer head.
 - Perform calibration checks with custom UA GVR transfer radiometer.
 - Check for visible issues, check data for potential upcoming issues.

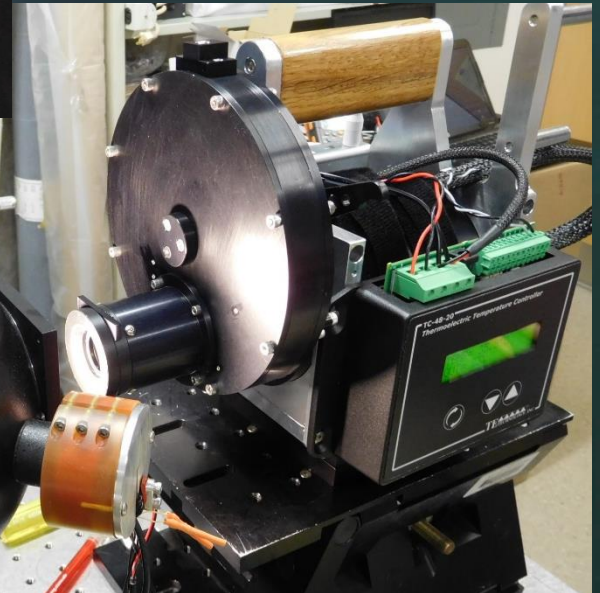
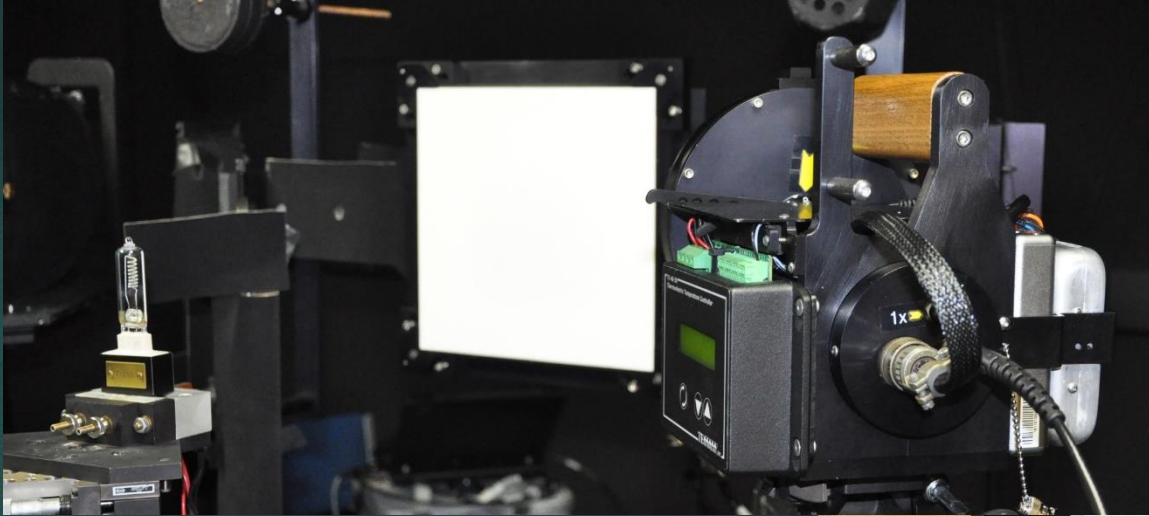


Performance Metrics – RadCaTS Transfer Radiometry

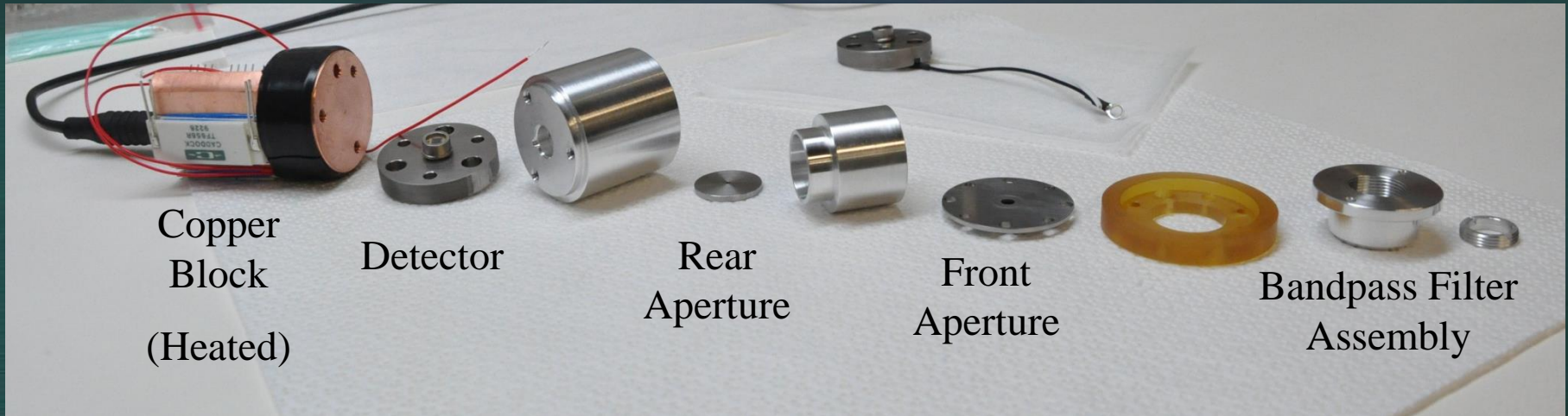
- An important threshold for performance of a TR is to perform better than a given system under test.
- RSG's CaTSSITTR-A radiometer is specifically designed for calibration of RSG GVRs, so data comparing the TR and the GVR is of the greatest interest.
- However, the CaTSSITTR-G produced for NASA GSFC will be for widespread use and comparison.
- For this purpose, general thresholds for TR acceptance were proposed which could be applied to any TR for field and lab calibration use related to RadCalNet:

SNR > 1000	Linearity error < 0.25%	Spatial stray light < 1%
Long-term (months) repeatability variation < 2%	Dark current variation < 0.001 X expected signal	Spectral stray light < 0.5%

CaTSSITTR – Calibration Test Site SI Traceable Transfer Radiometer

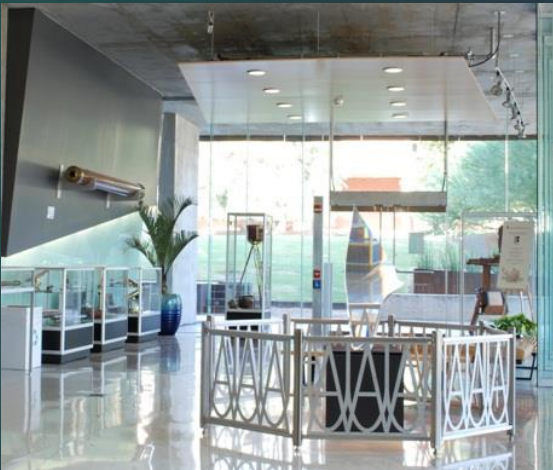


CaTSSITTR Internal Components



Meinel Building

- Bathrooms on every floor. Stairs are opposite of elevators.
- 4th floor is main ground level floor, 3rd floor gets to NW exit.
- Viewing of 1st floor optics shop from central stairway.
- Check out the museum of optics if you have time to wander around (<https://www.optics.arizona.edu/outreach/museum>).



Lunch Overview – Also on Handout



- 6 – Optical Sciences (you are here!)
- 2 – Student Union
- 3 – Starbucks
- 4 – University Blvd.
- 5 – Taco Bell
- 7 – Speedway Strip Mall

Close to Campus

- Student Union (2) has mainly a food court with several options.
- Starbucks (3) – very close if you need it!
- University Boulevard (4):
 - Dinner tonight at Pasco
 - Lots of other options, including dinner options



Close to Campus & A Loft

- Speedway Strip Mall (7)
 - 1702
 - Bentley's Coffee House
 - Greek House
- Other options near A Loft:
 - Trident Bar & Grill (N side of Speedway across from A Loft)
 - Boston Market (fast, rotisserie chicken, etc)



Taco Bell!

- 90% chance of finding Kurt Thome.



Tucson in March

- Hiking, Pima Air & Space Museum, Desert Museum, Saguaro National Park, Sabino Canyon, Sky Islands, etc, etc.

