



**North Slope of Alaska ARM Facilities  
Monthly Status Update  
Sandia National Labs**

**October 2019**

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## 1 North Slope Facilities Management Executive Summary

This monthly report is intended to communicate the status of North Slope ARM facilities managed by Sandia National Labs.

### Operations Team

- \* Joe Hardesty - ARM Alaska Sites Manager (SNL)
- \* Mark Ivey – ARM Alaska Sites Assistant Manager (SNL)
- \* Fred Helsel- Barrow and AMF3 Site Manager (SNL)
- \* Darielle Dexheimer- Tethered Balloon Operations (SNL)
- \* Valerie Sparks- ARM Project Office (SNL)
- \* Martin Stuefer- Rapid Response Team (UAF)
- \* Randy Peppler- ARM DQ Office Manager (OU)

## 2 Budget

FY2019 Financials (as of November 1, 2019)

	October	YTD
Carryover funds	\$5,060,472	
Funds Allocated YTD	\$2,000,000	
Carryover plus YTD funds	\$7,060,472	
Cost plus Baseline burdened amount	\$7,250,000	
Cost baseline burdened YTD amount	\$860,282	
Uncosted funds	\$6,200,189	
Current fiscal year commits	\$2,384,352	
Subsequent fiscal year commits	\$392,464	
Commits burdened amount	\$3,423,373	
Fully Burdened Staff Costs	\$530,000	\$530,000
Fully Burdened Contract Costs	\$330,000	\$330,000
Fully Burdened Total Costs	\$860,000	\$860,000

### **3 Summary of Current Management Issues**

#### **Management summary of current issues for October**

1. Return of the Todd! Todd Houchens supported the ARM MOSAIC team to install and start up radar and lidar systems on board the AVI PolarStern icebreaker and on the ice floe, after the ship had established its location in the ice. Todd will share a slide presentation with the Sandia ARM team on 25 November.
2. Heath Powers (ARM-LANL) will visit Sandia on 25 November to discuss operations and coordination to serve ARM.
3. Joe Hardesty and Mark Ivey switched roles officially on October 1.
4. Return of the stake-bed truck! The damaged GSA truck that was damaged by snow-removal equipment last year has been repaired and back in service at the NSA site.
5. The NWS hydrogen generator system was installed adjacent the ARM autosonde to enable sonde launches for the NWS. Upon review, the pressure system installed by NWS contractors required correction. Fred Helsel provided design recommendations, and the revised system is in review with the Sandia Safety/ES&H program for approval.
6. The TBS team completed campaign #3 of flights at SGP, see detailed report below.
7. Geotechnical study of the area where the new HSRL deck is to be installed shows that larger and specific types of pilings will be required to support the new deck than were expected (due to warmer permafrost and saline conditions from sea water intrusion). The engineers are working on recommendations for their design.
8. During 18-22 November, Todd Houchens will be in Oliktok to shut down the AMF3 Raman Lidar, and then be joined by Andrei Lindenmaier in Utqiagvik to replace the X-SAPR magnetron generator, and prep systems for the Arctic winter season.
9. We continue working with NOAA at Utqiagvik in consideration of their current construction for a much-needed upgrade/expansion to their Observatory. This includes consideration of construction road traffic impacts on measurements, maintaining road access during construction, installation of the NWS hydrogen generator system, and our plans for design and construction of the deck expansion (for the HSRL and shelter).
10. At Oliktok, ENI has told us that they now manage other lodging camps in the area of the AMF3, such that they should be able to accommodate any lodging needs for ARM going forward.
- 11.

### **4 Safety**

**AMF3** - No incident/Injury

**Barrow** - No Incident/Injury

## 5 Tethered Balloon Operations

### TBS Report for October 2019

Thirty-three hours of TBS flights were conducted at SGP from 9/30 – 10/9 on behalf of the VNATS IOP (AFC 069992) and ARM ENG regarding the TBS impactors. The regenerative drive and handbrake were both successfully tested and allowed TBS flights to occur in winds aloft in excess of 15 m/s. Flights in higher wind speeds led to the discovery of an issue with the balloon skirt partially collapsing in high winds resulting in a sudden loss of altitude. The issue with the skirt was resolved through a series of test flights leading to the shortening of the balloon skirt kite string by 4". The TBS SGP trailer was returned to Albuquerque at the end of the campaign for upgrades over the winter.

During the week of 10/14, the tether was spooled off the SGP winch and returned for load testing. The week of 10/21, the top and fenders of the new third TBS trailer were lined to allow adequate traction for workers during wet conditions; and the electronics box build was begun. No further work to the TBS trailers has been performed due to delays in a DOE-imposed relocation of the Sandia TBS work site.



Figure 1: TBS in flight at SGP during October 2019

### TBS Datastreams

- 1) tbsimctxq2
  - Proceeding under INST01268 for SGP and INST01282 for OLI. SGP awaiting Metadata development.
- 2) tbswind

- Proceeding under INST01269 for SGP and INST01281 for OLI. SGP ingest 100% complete. Data flow enabling 90% complete. Awaiting files to be available for data review. OLI ingest 100% complete, data flow enabling 75% complete. Awaiting DQ software.
- 3) tbsimet
- Proceeding under INST01267 for SGP and INST01283 for OLI. Ingest 85% complete. Erol and Brian are working to correct a code ingest issue.
- 4) tbsslwc
- Work to create a b-level SLWC datastream is proceeding under ENG0004130 which was created on 5/21/19. Last updated 6/3/19. Erol and Brian are working to correct a code ingest issue being tracked under tbsimet.
- 5) tbsdts
- Data for August 2019 AMF3 TBS campaign have been uploaded to OME. Analysis of DTS data from SGP October 2019 is almost complete and will be uploaded by 11/8/19.
- 6) tbsground
- Data are being collected under INST01272. Data flow is 100% enabled. INST awaiting instrument shutdown plan.
- 7) tbspops
- All the processed CPC and POPS data, including data from the October SGP campaign, have been uploaded to the DMF ftp.

## 6 North Slope Facilities

### AMF3

#### Current and Upcoming Site Visits

Fred Helsel, Al Bendure/SNL	Oct 24-27	Install automatic transfer switch for power system
Valerie Sparks/SNL	Oct 25	Annual firearms exchange

#### Current and Upcoming Field Campaigns/FCs

[AFC06968](#) - MACAWS Receiver Site (Pre-Campaign)

#### Site News

N/A

#### Site and Safety Issues

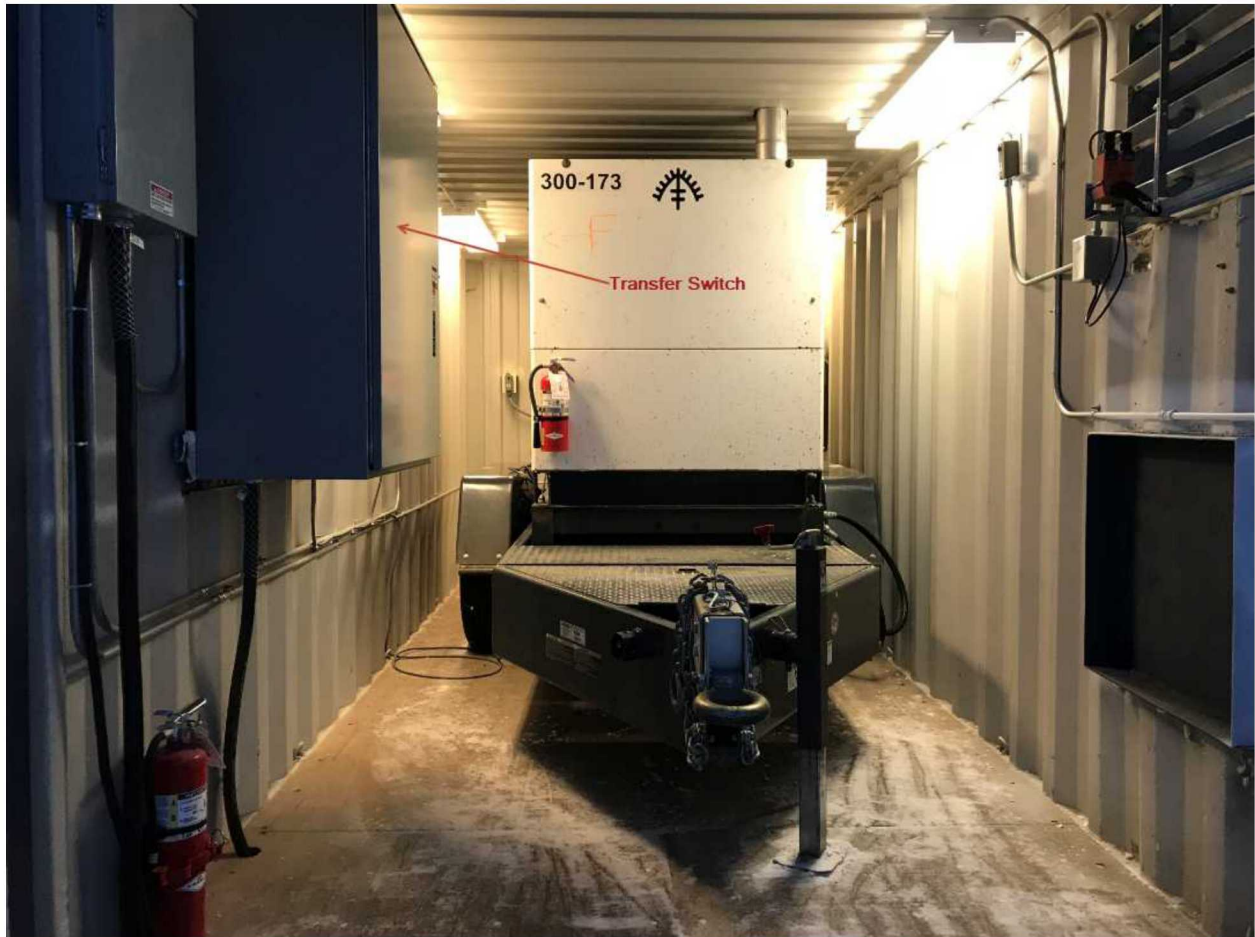
N/A

#### Unmet Needs

N/A

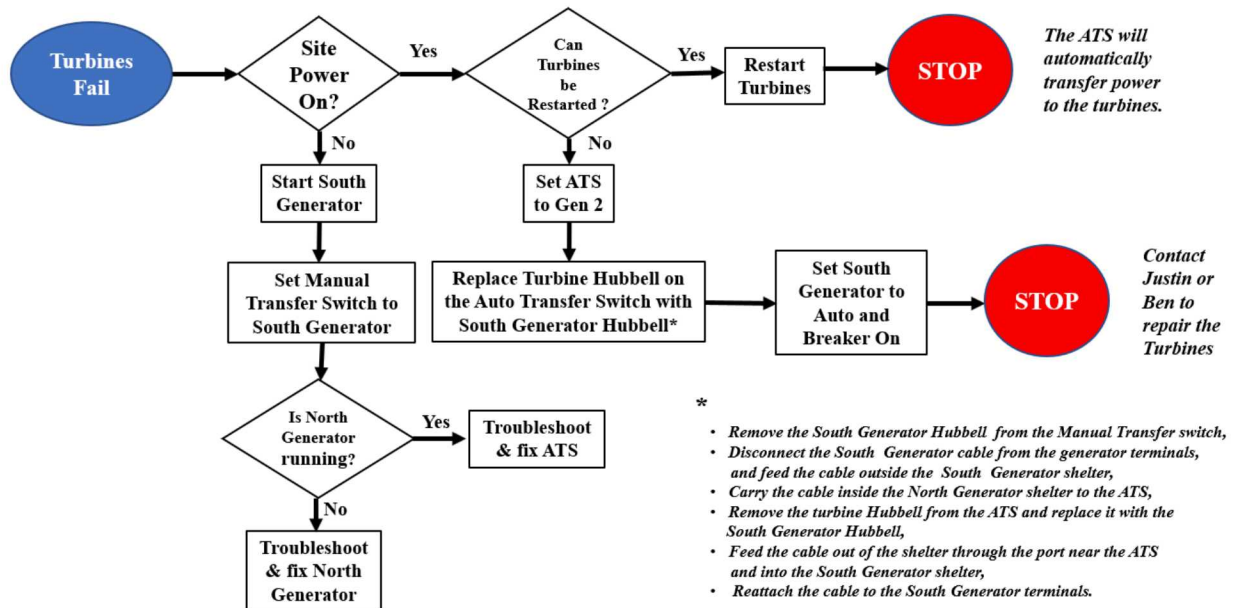
### Site Changes/Upgrades

Repaired transfer switch was installed and tested in the north generator shelter, in preparation for winter. The transfer switch's purpose is to start the north generator if the turbines fail.





## AMF-3 Power System Troubleshooting



October 26, 2019

## Servicing Diesel Generators with Automatic Transfer Switch

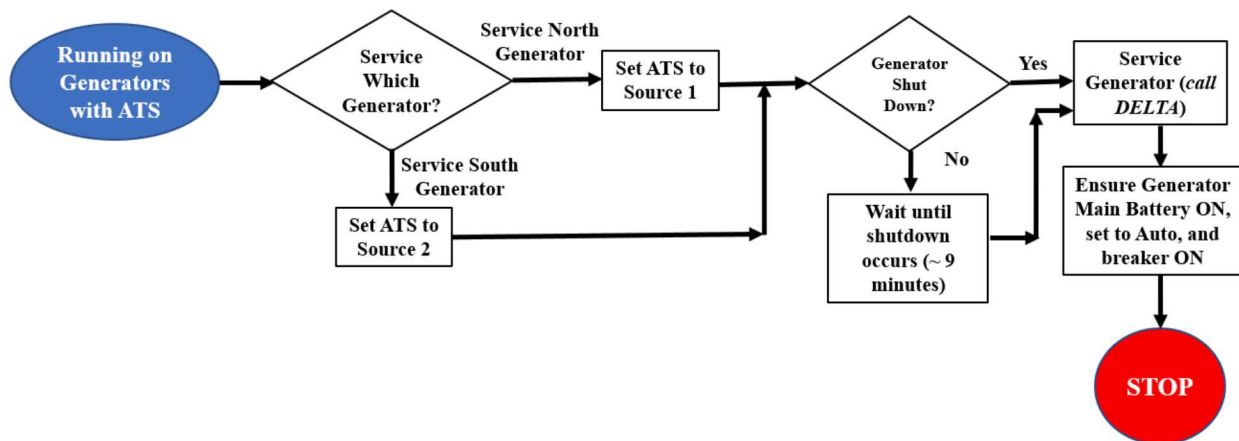


Fig 2: Diagram to assist Ops understand set design and troubleshoot if required

Site Staffing  
N/A



## NSA/Utqiagvik (Barrow)

### Current and Upcoming Site Visits

Fred Helsel/SNL	Oct 27-29	Site management visit
Valerie Sparks/SNL	Oct 26-29	Annual firearms exchange, site improvements

### Current and Upcoming Field Campaigns/FCs

[AFC06948](#) - Arctic Aerosol Sources & Mixing States 28 Oct 2018 to 20 Dec 2018 and Sep 2019 to Oct 2020 Kerri Pratt

[AFC06964](#) - BEAR-oNS 01 Jun 2019 to 31 Aug 2020 Rebecca Sheesley

[AFC06937](#) - How Snow Drives the Seasonal Evolution of Land and Sea Surface Albedos in the Alaskan High Arctic Spring (May-June) 2019, 2020 and perhaps 2021 Matt Sturm- **2019 field tasks completed**

[AFC07004](#) - NSA BC Loadings and Mixing State for MOSAiC - 30Sept2019 to 31Oct2020 Arthur Sedlacek

[AFC06900](#) - GNSS RO Atmospheric Profiling at NSA C1 - 15 Apr 2017 to 14 Apr 2020 Martin Stuefer

### Site News

Ford F350 is back in service after 12/26/18 accident; site operators are very happy with its return.



### Site and Safety Issues

N/A

**Unmet Needs**

N/A

**Site Changes/Upgrades**

The Hydrogen Generator's Pressure Safety Data Package, and Technical Work Document, are currently in review with Sandia's Subject Matter Experts (SMEs). However, a delayed response from the National Weather Service (NWS) has slowed down the process. The NWS SME's are currently in the field trying to install other hydrogen systems before winter sets in. Due to the delay, I have ask the NWS for more helium and was informed they do not have any funds to supply more helium. Thus, we may only have enough helium to launch NWS sondes into mid to late November. Note, that ARM sondes would not be affected, we have plenty of helium on hand for them.

**Site Staffing Issues**

N/A

## ***Appendices: Instrument Status – Provided by Martin Stuefer and Telayna Gordon***

### **- Appendix A: AMF3**

INFORMAL AMF3 INSTRUMENT STATUS REPORT FOR October 25 - November 01, 2019

BRIEF STATUS OF INSTRUMENTS AND SITE IN OLIKTOK AS OF 2019/11/01:

Facilities	Operational
Data Systems	Operational
Vehicles	Operational
Desktop Computers	Operational
SKYRAD - SKY Radiometer on Stand for Downwelling	Operational
MFRSR - Multifilter Rotating Shadowband Radiometer	Operational
GNDRAD - Ground Radiometer on Stand for Upwelling	Operational
MFR2.5m - Multifilter Radiometer at 2.5m height	Operational
MAWS - Automatic Weather Station	Operational
MET - Surface & Tower Meteorological Instruments	Operational
AMC - Soil, up/downwelling radiation measurements	Operational
ECOR - Eddy Correlation Flux System	Operational
MWR3C - Three Channel Microwave Radiometer	Operational
MPL - Micropulse Lidar	Operational
DL - Doppler Lidar	Operational
RL - Raman Lidar	Operational
CEIL - Vaisala Ceilometer	Operational
KAZR - Ka ARM Zenith Radar	Operational as per warno.arm.gov
BBSS - Balloon Borne Sounding System	Operational
TSI - Total Sky Imager	Operational
AOS - Aerosol Observing System	Partly Operational
AOSMET - AOS Meteorological Measurements	Operational
CO - AOS Carbon Monoxide Analyzer	Operational
CPC - Condensation Particle Counter	Operational
CAPS - Cavity Attenuated Phase Shift Extinction Monitor	Not Operational
ACSM - Aerosol Chemical Speciation Monitor	Not Operational
HTD-MA - Humidified Tandem Differential Mobility Analyzer	Not Operational
GHG - PICARRO	Operational
NEPH - Nephelometer	Operational
PSAP - Particle Soot Absorption Photometer	Operational
UHSAS - Ultra-High Sensitivity Aerosol Spectrometer	Operational
IMPACTOR - AOS Impactor	Operational
OZONE - AOS Ozone	Operational
CCN - Cloud Condensation Nuclei Particle Counter	Not Operational
LPM - Laser Precipitation Monitor	Operational
GEONOR - Geonor Weighing Gauge	Operational
SRS - Snow Depth Sensor	Operational
AERI - Atmospheric Emitted Radiance Interferometer	Operational
CIMEL - Cimel Sunphotometer	Operational
IRT - Infrared Thermometer	Operational
MET-AIR - DataHawk Unmanned Aerial System	Operational
TBS - Tethered Balloon System	Operational

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\* Oliktok Instruments in Detail: \*

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INFRASTRUCTURE --- Facilities --- Operational.

2019/10/26, CM-2019-AMF3-VSN-3078: Ops upgraded the power at the AMF3 facility by adding an automatic transfer switch (ATS) between the Capstone Microturbines and the North 80 kW CAT gen-set. Site operations and

Sandia personnel installed the ASCO 7000 series automatic transfer switch in the north generator shelter and prepped/ran all non-live cabling. Site operations switched the facilities load from the Capstone Microturbines to the South CAT 80 kW gen-set and powered down the Capstone Microturbines. Sandia personnel re-routed the turbine and north generator line power to the automatic transfer switch and then back to the manual transfer switch on the back of the generator shelters that supply the main power feed to the site. This will allow the auto transfer switch to function between the Microturbines and the north gen-set, but allow for a manual back up in case the auto transfer switch fails. In the case of a failure, the site can be manually switched to and operate off of the south gen-set. Upon completion of wiring, the Capstone Microturbines were brought back online and site operations swapped the facilities load from the south gen-set back to the turbines. All applicable lock out, tag out SOP was observed and followed. All site instrumentation were fully back online by 23:26 UTC.

INFRASTRUCTURE --- Data Systems --- Operational.

2019/11/01, CM-2019-AMF3-VSN-3086: HDD S/N NA7Q2E1A was filled, so it was replaced with HDD S/N NA7JSC4G between 20:55 and 21:00 UTC. Ops will ship HDD S/N NA7Q2E1A via USPS tracking # 9114 9023 0722 4423 3232 21.

2019/10/29, CM-2019-AMF3-VSN-3081: HDD S/N NA7Q2CGS was filled, so it was replaced with HDD S/N NA7Q2E1A between 15:35 and 15:40 UTC. Ops will ship HDD S/N NA7Q2CGS via USPS tracking # 9114 9023 0722 4423 3232 38.

2019/10/26, CM-2019-AMF3-VSN-3079: HDD S/N NA7Q2C9B was filled, so it was replaced with HDD S/N NA7Q2CGS at 15:50 UTC. Ops will ship HDD S/N: NA7Q2C9B via USPS tracking # 9114 9023 0722 4423 3232 38.

INFRASTRUCTURE --- Vehicles --- Operational.

INFRASTRUCTURE --- Desktop Computers --- Operational.

SKYRAD --- SKYRAD general --- Operational. Ingest Off Due to Development.

2019/09/08, DQPR-7946: OLI and NSA CR3000 programs with the modifications for tachometer fan RPM outputs were loaded onto the SKYRAD and GNDRAD loggers, but the ingest has been off since 8/24 at 18:54 UTC due to developers adding tachometer variables to the ingest. This is still a work in progress (see INST01416). The most recent DQPR status is "open - requires action."

2018/12/07, DQPR-7342: Visual checks of the global horizontal PSP should be made starting at about September 15, 2019, when skies are clear enough, to see if there is any shadowing from about 1 to 2 UTC. The most recent DQPR status is "waiting - for site visit."

SKYRAD --- PIR 1 shaded --- Operational.

2019/10/04, CM-2019-AMF3-VSN-3049/DQPR-7996: After the VM Upgrade to Windows 10 by system admins, mentors started to notice unrealistic values coming from the GNDRAD PIR (the SKY PIR 1 minute value was 7999 w/m<sup>2</sup>, for example). Site Ops connected the RSU to test and provided info to the mentors. The mentor wanted ops to try a different radiometer for the test. After the spare radiometer arrived, ops swapped out the first one but found similar results with the spare. Site ops had to use the test cable to replace the broken cable for GNDRAD, so they no longer had one to test the PIR1. Site Ops found a non-Arctic Grade cable in spares, and requested and received the connector pin configuration from the mentor. They then swapped out the Arctic Grade cable with the non-Arctic grade cable, and the PIR1 then started to provide data comparable to PIR2. This data was provided to the mentor. Site ops then replaced the spare radiometer with the originally installed PIR1 and compared data to find no difference. Ops provided this data to the mentor, who determined that the original PIR1 is working correctly after the cable replacement. This troubleshooting took place between 17:20 UTC on 09/18/19 and 23:30 UTC on 10/03/19. The most recent DQPR status is "open - requires action."

SKYRAD --- PIR 2 shaded --- Operational.

SKYRAD --- SOLAR Tracker --- Operational.

SKYRAD --- B&W diffuse --- Operational.

SKYRAD --- NIP --- Operational.

SKYRAD --- PSPg --- Operational.

SKYRAD --- MFRSR --- Operational.

TIPTWR --- GNDRAD general --- Operational. Ingest Off Due to Development.

2019/10/08, DQPR-7945/CM-2019-AMF3-VSN-3057: The GNDRAD data logger was set to an erroneous serial number due to a Campbell OS error, thus not allowing proper data ingestion. Ops removed the logger to upgrade the OS with the help of a UAF tech. It was determined that the logger would need to be sent to Campbell Scientific to be reset, as ops does not have factory level privileges to change the serial number setting on the logger. Ops

thus removed and replaced logger S/N 7033 with S/N 7026. The bad logger will be shipped via FedEx tracking # 814947681402, and can be tracked with RMA # 30899. This maintenance took place between 17:20 and 19:15 UTC. The most recent DQPR status is "open - requires action."

2019/09/08, DQPR-7945: Metrics were unavailable since 2019/08/26 at 01:27 UTC and are still missing. The ingest has been off due to developers adding tachometer variables to the ingest, and this still seems to be a work in progress. See INST01415.

TIPTWR --- MFR2.5m --- Operational.

TIPTWR --- PIRgnd --- Operational.

2019/10/07, CM-2019-AMF3-VSN-3048/DQPR-7997: The GNDRAD PIR started showing erroneous negative readings since 9/10/19 at 17:00 UTC. Site Ops connected the RSU to test and provided info to the mentors. The mentor wanted ops to try a different radiometer for the test, so one was sent to the site. After the spare radiometer arrived, ops swapped out the first one, but found similar incorrect PIR readings with the spare. While returning the system to its original configuration, the connector plug to the radiometer fell off the cable, so ops received the connector pin configuration from the mentor. Ops then replaced the cable, making sure that the connections were secure and correct. Finally, the GNDRAD started providing correct readings by 10/03/19 at 02:00 UTC. They then sent screenshots to the mentor to verify that the GNDRAD was performing appropriately. Mark Kutchenreiter was assigned DQR D191007.7. The most recent DQPR status is "in progress - assignments."

TIPTWR --- PSPgnd --- Operational.

MAWS --- Automatic Weather Station --- Operational.

MET --- METTOWER general --- Operational.

MET --- Barometer --- Operational.

MET --- TEMPERATURE / HUMIDITY --- Operational.

MET --- WIND INSTRUMENTS (SONIC) --- Operational.

MET --- PWD --- Operational.

MET --- AMC --- Operational.

ECOR --- ECOR --- Operational. Methane Sensor Removed for winter.

ECOR --- SEBS --- Operational.

MW RADIOMETERS --- MWR3C --- Operational.

LIDAR --- Micropulse LIDAR --- Operational.

LIDAR --- Doppler LIDAR --- Operational.

2019/07/11, DQPR-7860: The Doppler Lidar was not reporting data starting on 07/01. An instrument power cycle resolved the issue at around 23:00 UTC on 07/04. Rob Newsom was assigned DQR D190711.6. The most recent DQPR status is "in progress - assignments."

LIDAR --- Raman LIDAR --- Operational. External Chiller was repaired.

LIDAR --- CEIL --- Operational.

RADAR --- KAZR --- Operational as per warno.arm.gov.

Sonde --- BBSS --- Operational.

2019/10/31, CM-2019-AMF3-VSN-3084/3085: Technicians were unable to launch the 17:30 and 23:30 UTC balloons due to high wind conditions. Winds are >30 mph sustained and gusting >40 mph. Launches will resume when weather conditions permit.

2019/10/30, CM-2019-AMF3-VSN-3083: Technicians were unable to launch the 23:30 UTC balloon due to high wind conditions. Winds are >30 mph sustained and gusting >40 mph. Launches will resume when weather conditions permit.

2019/10/27, CM-2019-AMF3-VSN-3080: Technicians were unable to launch the 23:30 UTC balloon due to high wind conditions. Winds were >30 mph sustained and gusting >40 mph. Launches will resume when weather conditions permit.

IMG --- TSI --- Operational.

AOS --- General --- Partly Operational, Some Instruments Are Shut Down.

AOS --- AOSMET --- Operational.

AOS --- CO - Analyzer --- Operational.

AOS --- CPC (CPCU and CPCF) --- Operational.

AOS --- CAPS --- Not Operational. Instrument at Vendor.

2019/09/15, DQPR-5816: The 3-W CAPS is currently at the vendor undergoing tests. It appears that the blue channel (~ 450 nm) mirror is degrading and the vendor is trying to ascertain why and take corrective actions. The other 2 channels (red (630 nm) and green (550 nm) are good. Once the issue with the blue channel is understood and corrected, we should be able to undertake the swapping of the single channel ENA CAPS (1W-CAPS) with this unit and place the 1W-CAPS at OLI. The most recent DQPR status is "in progress - assignments."

2019/02/05, DQPR-5816: The 3W-CAPS (originally staged at OLI) is at the vendor due to hardware issues. As of 2019/02/04, the vendor has identified a long-running problem that has plagued this instrument. The problem is now solved and they will be doing in-house testing this week. The unit will be shipped out to BNL during the following week. Once received, BNL will confirm operation and performance before starting the physical swapping of the 1W-CAPS currently at ENA with this 3W-CAPS (along with the concomitant shipment of the 1W-CAPS to OLI).  
 AOS --- ACSM --- Not Operational. Removed from Service for Redeployment to AMF2.  
 AOS --- HT-DMA --- Not Operational. Instrument under maintenance.

2019/07/24, DQPR-7304: The instrument is still under maintenance. Some internal parts needed to be replaced before the cause for the RH issues we are seeing can be found. The most recent DQPR status is "in progress - assignments."

2019/05/31, DQPR-7304: The OLI HT-DMA unit was swapped with the AMF2 HT-DMA, and the AMF2 HT-DMA needs maintenance. Installation will be delayed until the proper operation of this unit has been verified.  
 AOS --- GHG-Picarro --- Operational.  
 AOS --- UHSAS --- Operational.  
 AOS --- NEPH --- Operational.

2019/10/07, DQPR-7985: Janek Uin was assigned DQR D191007.1. The most recent DQPR status is "in progress - assignments."

2019/10/02, DQPR-7985: The impactor, which controls the aerosol size cut at both 1 micron or 10 microns, failed because the drive shaft did not fully go into the 1 or 10 micron position. Thus, no actual sample was received by the nephelometers between 09/22/19 at 21:00 UTC and 00:00 UTC on 10/02/19.

2019/06/23, DQPR-7803: At 12:00 UTC on June 20th, both nephelometers began reporting missing data. Starting on June 21st, metrics were unavailable. However, data are available in FTPHome, so it is likely a data transfer or processing issue. The most recent DQPR status is "open - requires action."  
 AOS --- IMPACTOR --- Operational.

2019/11/01, DQPR-8047: AosimpactorM1.a1 has most of the metrics missing between 10/09 and 11/01; the only variable providing metrics is 'impactor state.' The most recent DQPR status is "open - requires action."  
 AOS --- Ozone --- Operational.  
 AOS --- PSAP --- Operational.

2019/10/07, DQPR-7986: DQR D191007.2 was assigned to Stephen Springston. The most recent DQPR status is "in progress - assignments."

2019/10/02, DQPR-7986: The impactor which controls the aerosol size cut for the PSAP failed. The drive shaft could not go into its 1 or 10 micron cutoff position. Thus, the measured PSAP signal was not an ambient signal between 09/22/19 at 21:00 UTC and 00:00 UTC on 10/02/19.  
 AOS --- IMPACTOR --- Operational.  
 AOS --- CCN --- Not Operational. Instrument Shut Down for the winter.

2019/09/19, CM-2019-AMF3-VSN-3036/DQPR-7952: During morning rounds, ops found CCN 200 flow ratio B and flow rate below specs, so they restarted the CCN 200 in dry mode and notified the mentor. The mentor checked the instrument and found a gross leak in side B. The counts on side B are 3 or 4 orders of magnitude off from channel A. The counts on the B OPC show a sizing corresponding more like ambient aerosol. Since it is now very close to the time ops generally ships the CCN200 back to BNL for the winter, ops just shut down the CCN and took pictures of all of the connectors (both electrical and air lines) so that it will be easier to start up the CCN again in the spring. The sample lines were capped, and the CCN power supply, bottles and sampling lines will remain at AMF3. Ops followed the shutdown procedure for the CCN200 to dry it out. Ops then shipped the instrument using the special CCN200 crate and pallet via FedEx 8149 4768 1354. The most recent DQPR status is "open - requires action."

Precip --- LPM --- Operational. Ingest Work in Progress.

2019/08/22, DQPR-7265: The instrument mentor team needs to work with the ingest team on this datastream. There were some changes in data logger files that need to be accommodated. Erol contacted Jen Delamere and



she will get him instructions on changes to make to the ingest. The most recent DQPR status is "in progress - assignments."

Precip --- GEONOR --- Operational. Ingest Work in Progress.

2019/08/22, DQPR-7267: The instrument mentor team finished this effort on instrument operations but the ingest is currently not working. Data are being collected. A more detailed data report does need to be filed. The most recent DQPR status is "in progress - assignments."

Precip --- SRS --- Operational. Ingest Work in Progress.

2019/10/30, CM-2019-AMF3-VSN-3082: The mentor requested that the 3 transducers be changed out with newer versions sent to the site. New desiccant was also placed in the transducers. Ops then checked and adjusted the leveling of the three sensors.

2019/08/22, DQPR-7266: Instruments are operational, but the ingest is currently not working (work is being tracked in INST01114). Data are being collected. A more detailed data report does need to be filed. The most recent DQPR status is "in progress - assignments."

Other --- AERI --- Operational.

2019/11/01, CM-2019-AMF3-VSN-3087: It was time for the monthly external filter change, so ops removed and replaced the filter between 23:30 and 23:50 UTC.

Other --- CIMEL --- Operational.

Other --- DataHawk Unmanned Aerial System --- Operational. Not a Full Time Instrument.

Other --- IRT --- Operational.

Other --- TBS --- Operational.

## - Appendix B- Barrow

INFORMAL NSA INSTRUMENT STATUS REPORT FOR October 25 - November 01, 2019

BRIEF STATUS OF INSTRUMENTS AND SITE IN Utqiagvik (C1) AS OF 2019/11/01:

Facilities	Operational
Data Systems	Operational
Vehicles	Operational
Desktop Computers	Operational
SKYRAD - SKY Radiometer on Stand for Downwelling	Operational
MFRSR - Multifilter Rotating Shadowband Radiometer	Operational
NIMFR - Normal Incidence Multifilter Radiometer	Operational
GNDRAD - Ground Radiometer on Stand for Upwelling	Operational
MFR10m - Multifilter Radiometer at 10m height	Operational
MAWS - Automatic Weather Station	Operational
MET - Surface & Tower Meteorological Instruments	Operational
AMC - Soil, Up/Downwelling Radiation Measurements	Operational
ECOR-twr - Eddy Correlation Flux System	Operational
SEBS - Surface Energy Balance System	Operational
MWR - Microwave Radiometer	Operational
MWRP - Microwave Radiometer Profiler	Operational
MWRHF - Microwave Radiometer High Frequency	Operational
GVR - G-band Vapor Radiometer	Operational
GVRP - G-band Vapor Radiometer Profiler	Operational
HSRL - High Spectral Resolution Lidar	Not Operational
MPL - Micropulse Lidar	Operational
CEIL - Vaisala Ceilometer	Operational
DL - Doppler LIDAR	Operational
KAZR - Ka ARM Zenith Radar	Operational
KaWSACR - Ka-Band Scanning ARM Cloud Radar	Not Operational
XSAPR - X-Band Scanning ARM Precipitation Radar	Not Operational
BBSS (Autosonde) - Balloon Borne Sounding System	Operational
AOS - Aerosol Observing System	Operational

CLAP - Continuous Light Absorption Photometer	Operational
CPC - Condensation Particle Counter	Operational
NEPH - Nephelometer	Operational
IMPACTOR - AOS Impactor	Operational
TSI - Total Sky Imager	Operational
TOWERCAM - 40m tower camera	Operational
Great White Camera	Operational
MASC - Multi-angle Snowflake Camera	Operational
LPM/LDIS - Laser Precipitation Monitor	Operational
SRS - Snow Depth Sensor	Operational
PIP - Precipitation Imaging Package	Operational
AERI - Atmospheric Emitted Radiance Interferometer	Operational
CIMEL - Cimel Sunphotometer	Operational
IRT - Infrared Thermometer	Operational
IOP - OYESNSA	Operational
IOP - RIVAL	Operational
IOP - GNSS	Operational

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\* Barrow Instruments in Detail: \*

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INFRASTRUCTURE --- Facilities --- Operational.

2019/10/31, CM-2019-NSA-VSN-5091: Ops installed a fire extinguisher and smoke/CO detector in the hydrogen generator shelter.

INFRASTRUCTURE --- Data Systems --- Operational.

2019/10/28, CM-2019-NSA-VSN-5088: Data disk S/N NA7Q2CAF was filled, so it was removed and replaced with S/N NA75FEW4 between 17:50 and 17:55 UTC.

INFRASTRUCTURE --- Vehicles --- Operational.

INFRASTRUCTURE --- Desktop Computers --- Operational.

SKYRAD --- SKYRAD General --- Operational. Ingest Off Due to Development.

2019/08/31, DQPR-7930: The ingest has been off since 2019/08/27 at 21:49 UTC. Ben Bishop added new Sunon fans with tachometer RPM outputs, updated the CR3000 program to provide ventilator (four each) RPM data, and updated the radiometer serial numbers and calibration coefficients in the logger program. Information for these activities will need to be entered into the CMDB by the site operator. The ingest upgrade for RPM data outputs needs to be performed. The GNDRAD (DQPR-7931) was also affected by the same activities. The most recent DQPR status is "open - requires action."

SKYRAD --- PIR 1 Shaded --- Operational.

SKYRAD --- PIR 2 Shaded --- Operational.

SKYRAD --- SOLAR Tracker --- Operational.

SKYRAD --- B&W diffuse --- Operational.

SKYRAD --- NIP --- Operational.

SKYRAD --- PSPg --- Operational.

SKYRAD --- MFRSR --- Operational.

2019/08/30, DQPR-7632: The mentors have not been able to remotely connect with the MFRSR. Requests to have outside access have not been responded to. The most recent DQPR status is "open - requires action."

2019/07/10, DQPR-7632: The mentor still sees shading in the evening between 04:00 and 06:00 UTC. This is probably due to the shadow being centered at 16:45 UTC instead of Solar Noon. He asks that ops hold off on doing anymore adjustments as he will try remote fixes first.

2019/06/14, CM-2019-NSA-VSN-4998/DQPR-7632: The weather was clear, so ops adjusted the MFRSR shadow band to bring it back to center between 16:45 and 16:55 UTC.

2019/04/03, DQPR-7632: Ben used a theodolite to align the base while he was on site. Walter used the gauge, aligned the head position, and confirmed the band shape. The head was leveled and checked at Solar Noon. It is difficult to set the 2nd stop banding.

2019/03/28, DQPR-7632: Christian Herrera is waiting for a somewhat clear day to verify band alignment. According to the FFT tests, there is also a slight shading problem in the mornings from ~17:00 - 19:00 UTC.  
SKYRAD --- NIMFR --- Operational.

2019/09/06, DQPR-7672: A spare NIMFR cable was received at UAF from the mentors. Data has been consistently ok and the current cable still looks to be in acceptable shape, so the new cable will likely be brought to the site on my or Ross' next trip up (end of September/October). If measurements start to drop in the meantime, the cable will be mailed to the site. The most recent DQPR status is "in progress - assignments."

2019/08/23, DQPR-7672: The NIMFR has not had the issue of normal broadband measurements dropping below 0 w/m<sup>2</sup> since 05/22, so maybe it is time to close this DQPR out. It would still be helpful to get a spare cable shipped to the site for any future issues. 2019/05/30, DQPR-7672: Ops was requested to check the connections and take pictures. These pictures were posted on the DQPR page. NIMFR power was removed between 23:30 and 23:40 so that ops could take pictures of the end connections. No corrosion was found on either ends of the connector. The cable had a minor weather crack just in the outer sheathing.

2019/05/21, DQPR-7672: The connector is currently secure in place. Jimmy has provided some photos of the instrument connector and the YESDAS data acquisition system.

2019/05/16, DQPR-7672: Detector temperatures seems to be consistently back to normal levels; however, there are still issues with the direct normal broadband measurements.

2019/05/08, DQPR-7672: Walter found the connector off of the instrument last Thursday morning and reattached it. This seems to have made the detector temperature rise back to normal values just past 19:00 UTC on 05/09.

2019/04/08, DQPR-7672: NIMFR direct normal broadband measurements are dipping well below 0 w/m<sup>2</sup> on many days since 3/11/19. See the daily and weekly data plots posted on the DQPR page for more information. The problem is ongoing.

TIPTWR --- GNDRAD general --- Operational.

2019/08/31, DQPR-7931: The ingest has been off since 2019/08/28 at 16:00 UTC. While on the site, Ben Bishop added new Sunon fans with tachometer RPM outputs, updated the CR3000 program to provide ventilator (four each) RPM data, and updated the radiometer serial numbers and calibration coefficients in the logger program. Information for these activities will need to be entered into the CMDDB by the site operator. The ingest upgrade for RPM data outputs needs to be performed. The most recent DQPR status is "open - requires action."

TIPTWR --- MFR10m --- Operational.

TIPTWR --- PIRgnd --- Operational.

TIPTWR --- PSPgnd --- Operational.

MAWS --- Automatic Weather Station --- Operational.

2019/10/29, CM-2019-NSA-VSN-5090/DQPR-8035: The MAWS tower temperature/humidity readings were found to be off since 10/22 ~ 03:00 UTC, so ops checked the tower and found that the HMT155 T/RH sensor in the aspirated radiation shield had fallen to the ground (the hinge of the cover had broken) and was sitting on the snow. The sensor was reinstalled at 2m using Deltec Strapping, and the broken part of the housing (aspirator lid) was taped for now until the new cover comes in. The filter cap was cleared as well. This maintenance was performed between 18:30 and 18:55 UTC. The mentor contacted RM Young to get a quote for the replacement part and will watch for data issues. The most recent DQPR status is "open - requires action."

MET --- METTOWER general --- Operational.

MET --- Barometer --- Operational.

MET --- TEMPERATURE / HUMIDITY --- Operational.

MET --- WIND INSTRUMENTS (SONIC) --- Operational.

MET --- PWD --- Operational.

MET --- AMC --- Operational.

ECOR --- ECOR-twr --- Operational.

ECOR --- SEBS --- Operational.

MW RADIOMETERS --- MWR --- Operational.

MW RADIOMETERS --- MWRP --- Operational. Replacement Computer Power Supply On the Way, VM Currently Running.

2019/10/29, DQPR-8008: The software looked to be running fine and was producing data files since 10/24, but there was still have a collection issue showing on DSView. It looks like the data files were not being transferred to ftphome for pickup due to permission errors on the scheduled task. Telayna changed the owner of the task to be

Madmin, and the script seems to have run just before 00:00 UTC on 10/29. The most recent DQPR status is "open - requires action."

2019/10/14, DQPR-8008: The power supply of the computer failed on 10/10. A new VM was setup and the correct configuration file was loaded on 10/11, however the measurements don't start when the software is started. Troubleshooting is in progress.

MW RADIOMETERS --- MWRHF --- Operational.

MW RADIOMETERS --- GVR --- Operational.

MW RADIOMETERS --- GVRP --- Operational.

LIDAR --- HSRL --- Not Operational.

2019/07/16, DQPR-7872: The HSRL was removed on 07/12 (CM-2019-NSA-VSN-5023) and shipped off-site for upgrades to be performed. Redeployment would not be until next year. Ingest and collections have been requested to be turned off. Alyssa Sockol created open-ended DQR D190722.1 to track the time until reinstallation. The most recent DQPR status is "waiting - for spares."

LIDAR --- MPL --- Operational.

LIDAR --- CEIL --- Operational.

LIDAR --- Doppler LIDAR --- Operational. Blower Needs to Be Replaced.

RADAR --- KAZR --- Operational. UPS Battery Pending Replacement.

RADAR --- KaWSACR --- Not Operational. RF Noise Sources Need to Be Calibrated and Installed.

RADAR --- XSAPR --- Not Operational. System is Reporting an Over Temperature Fault on the Transmitter.

2019/08/20, Email from mentor: A component failed on the pedestal, in the radome. A part and install instructions will be sent to the site. Data collections are currently off.

2019/04/19, Warno.arm.gov: The transmitter is faulting. A baseline scan strategy is being discussed. The radar team will work on the radar during the summer.

Sonde --- BBSS (Autosonde or Great White Manual Launches) --- Operational.

2019/09/20, DQPR-7944: The Autosonde upgrade (both Vaisala and NWS portions) was completed on 9-16-2019. Regular Autosonde launches resumed starting on 9-16-2019 17:30GMT using Hydrogen gas. The NWS techs switched the Autosonde back to helium gas on 9-17-2019 at 21:30GMT. We will continue to launch using helium until Sandia (Fred Helsel) gets appropriate approvals from their safety and fire personnel. While the Autosonde was out of service, site ops manually launched 05:30 and 17:30 GMT launches using the S01 MW41 system. The most recent DQPR status is "waiting - for spares."

2019/09/10, DQPR-7944: There was a logic board controller failure on the Autosonde when the techs were working on the system. A spare part has been sent to Anchorage and the techs flew down to retrieve it. The Autosonde will be out of service for the remainder of the week. As of 9/10/2019, we began using a manual system for ARM launches at 05:30 and 17:30 GMT.

2019/09/06, DQPR-7944: The Autosonde is scheduled to be upgraded to use hydrogen gas. This will require the Autosonde to be offline during an undetermined time period between Sept 7-9, 2019, during which time no launches will take place. Times will be updated when determined. Donna was assigned DQR D190906.4 to be filled out after the upgrade.

2019/09/05, DQPR-7941: Due to a Vaisala software problem, the Autosonde fails on the 3rd of each month 11:01GMT launch. This produces a corrupted file which kills the ingest. The ADC has been asked to please remove the files associated with this date and time for NSA C1 and restart the ingest. The most recent DQPR status is "open - requires action."

AOS --- General --- Operational.

AOS --- AETH --- Operational. Possible Collection/Ingest Error.

2019/10/07, DQPR-7837: It doesn't look like data has been ingested since the end of June, but there are no reports or anything that may indicate why. The most recent DQPR status is "open - requires action."

2019/07/03, DQPR-7837: Metrics become unavailable at 02:00 UTC on 06/28, and are still currently unavailable for aosaeht2spot.

AOS --- CLAP --- Operational. Possible Collection/Ingest Error.

2019/10/07, DQPR-7927: There is no ingested data past 9/13. Alyssa Sockol asks Rob or Tudor if they have any insight into the issue. The most recent DQPR status is "open - requires action."

2019/09/13, DQPR-7927: Data has caught up and is now available.

2019/08/31, DQPR-7927: DS View indicates an ingest error.

AOS --- CPC --- Operational. Possible Collection/Ingest Error.  
 2019/10/07, DQPR-7928: There is no ingested data past 9/13. Alyssa Sockol asks Rob or Tudor if they have any insight into the issue. The most recent DQPR status is "open - requires action."  
 2019/09/13, DQPR-7928: Data has caught up and is now available.  
 2019/08/31, DQPR-7928: DS View indicates an ingest and bundle error since 08/22 at 14:00 UTC.  
 AOS --- NEPH --- Operational. Possible Collection/Ingest Error.  
 2019/10/07, DQPR-7929: There is no ingested data past 9/13. DS View says there is missing input data. Alyssa Sockol asks Rob or Tudor if they have any insight into the issue. The most recent DQPR status is "open - requires action."  
 2019/09/13, DQPR-7929: Data has caught up and is now available.  
 2019/08/31, DQPR-7929: Data becomes unavailable since 08/24 at 14:00 UTC.  
 AOS --- IMPACTOR --- Operational. Possible Collection/Ingest Error.  
 2019/10/15, DQPR-7992: NOAA has checked on their end, and they have found that data are being uploaded every 1800 seconds, so the ingest should be checked. The most recent DQPR status is "open - requires action."  
 2019/10/03, DQPR-7992: The AOS Impactor has not produced any netCDF files since 09/13.  
 IMG --- TSI --- Operational.  
 IMG --- TOWERCAM --- Operational.  
 IMG --- Great White Camera --- Operational.  
 Precip --- MASC --- Operational.  
 Precip --- LPM/LDIS --- Operational.  
 2019/08/22, DQPR-7265: The instrument mentor team needs to work with the ingest team on this datastream. There was some change in data logger files that need to be accommodated in the ingest. Erol contacted Jen Delamere and she will send him instructions on changes to make to the ingest. The most recent DQPR status is "in progress - assignments."  
 Precip --- SRS --- Operational. Ingest Work in Progress.  
 2019/08/22, DQPR-7416: Erol is awaiting updates from the mentors. The instruments are operating and data are being collected, but the ingest needs updating. This case applies to both NSA and OLI. The most recent DQPR status is "waiting - for spares."  
 2018/11/10, DQPR-7416: Data are unavailable starting at 19:00 UTC on 10/19 because the raw data file format for the SRS at NSA (and OLI) has changed (see ENG0003770 for more detail). As such the ingest is not processing the new raw data files. The ingest will be updated to accommodate the new file format (INST01114). The most recent DQPR status is "waiting - for spares."  
 Precip --- PIP --- Operational.  
 2019/10/31, CM-2019-NSA-VSN-5092: Ops was asked by the mentor to restart the computer because remote access was not possible. Ops restarted the computer between 19:40 and 19:45 UTC.  
 Other --- AERI --- Operational.  
 Other --- CIMEL --- Operational.  
 2019/10/29, DQPR-8028/CM-2019-NSA-VSN-5089: Jimmy checked things out with the CIMEL on 10/28 between 23:05 and 23:35 UTC per CM-2019-NSA-VSN-5089 with a Go Sun Park procedure. The instrument moved fine, but the sun was not out at the time. The instrument is currently in auto mode and the time settings look correct. As for 10/22, there were intermittent periods of precipitation that we can see from our precipitation instruments and the MET present weather detector that may have prevented Cimel operation. 10/23 was clearer, so I'm not sure why there weren't data. We'll keep an eye on it, we can see the Cimel well from the User Deck camera. The most recent DQPR status is "open - requires action."  
 2019/10/24, DQPR-8028: Based on TSI images, the weather was favorable for Cimel operation on 10/22 (from 00:00 - 21:00 UTC) and 10/23, but there was no data collected from Cimel #1033. Ops was asked to please check the instrument performance.  
 Other --- IRT --- Operational.  
 IOP --- OYESNSA --- Operational.  
 IOP --- RIVAL --- Operational.  
 IOP --- GNSS --- Operational.

## Distribution

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