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

December 2016

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1 North Slope Facilities Management Executive Summary and Major Issues

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

Operations Team

* Mark Ivey- ARM Alaska Sites Manager (SNL)
* Fred Helsel- AMF3 Site Manager (SNL)
* Dan Lucero- Barrow 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

FY2016 Financials (as of December 16, 2016)

	November	YTD
Carryover funds	$3,729,525	
Funds Allocated YTD	$2,146,000	
Carryover plus YTD funds	$5,875,525	
Cost, burdened amount	$1,578,724	
Uncosted Funds	$4,296,802	
Commits, burdened total	$1,656,809	
Current fiscal year uncommitted funds	$2,639,993	
Subsequent fiscal year (SFY)commits	$1,103,722	
Total uncommitted funds, including SFY commits	$1,536,271	
Fully Burdened Staff Costs	$188,000	
Fully Burdened Contract Costs	$239,000	
Fully Burdened Total Costs	$427,000	$1,579,000

3 Safety

AMF3– No Incident/Injury

Barrow - No Incident/Injury

4 Instrument Status – Provided by Martin Stuefer

AMF3

INFORMAL AMF3 INSTRUMENT STATUS REPORT FOR December 16, 2016 - December 23, 2016

BRIEF STATUS OF INSTRUMENTS IN OLIKTOK AS OF 2016/12/23:

Data Systems Operational

SKYRAD - SKY Radiometer on Stand for downwelling Operational

MFRSR - Multifilter Rotating Shadowband Radiometer Not Operational

GNDRAD - Ground Radiometer on Stand for Upwelling Operational

MFR3m - Multifilter Radiometer at 3m height Not Operational

MET - Meteorological Instruments on Tower Partly Operational

AMC - Soil, up/downwelling radiation measurements Operational

ECOR - Eddy Correlation Flux System Operational

MWR3C - Three Channel Microwave Radiometer Partly Operational

MPL - Micropulse Lidar Operational

DL - Doppler Lidar Operational

RL - Raman Lidar Operational

CEIL - Vaisala Ceilometer Operational

RWP - Radar Wind Profiler Operational as per http://radar.arm.gov

KAZR - Ka ARM Zenith Radar Operational as per http://radar.arm.gov

KaWSACR - Ka-Band Scanning ARM Cloud Radar Operational as per http://radar.arm.gov

TSI - Total Sky Imager Not Operational

MASC - Multi Angle Snowflake Camera Operational

AOS - Aerosol Observing System Partly Operational

AERI - Atmospheric Emitted Radiance Interferometer Partly Operational

CPC - Condensation Particle Counter Operational

ACSM - Aerosol Chemical Speciation Monitor Operational

HTDMA - Humidified Tandem Differential Mobility Analyzer Operational

GHG - PICARRO Operational

NEPH - Nephelometer Operational

BBSS - Balloon Borne Sounding System Operational

CIMEL - Cimel Sunphotometer Not Operational

PIP - Precipitation Imaging Package Operational

CCN - Cloud Condensation Nuclei Particle Counter Not installed at site yet.

MET-AIR - DataHawk Unmanned Aerial System Partly Operational

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* Oliktok Instruments in Detail: *

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INFRASTRUCTURE --- Facilities --- Operational.

INFRASTRUCTURE --- DATA SYSTEMS --- Operational.

2016/12/22, CM-2016-AMF3-VSN-1800: HDD SN NA7Q2CH3 was full, so it was replaced with HDD SN NA7875TM. HDD SN NA7Q2CH3 will be shipped via USPS tracking # 9114 9014 9645 0952 4697 27.

2016/12/20, CM-2016-AMF3-VSN-1797: HDD SN NA76M5N3 was full, so it was replaced with HDD SN NA7Q2CH3. HDD SN NA76M5N3 will be shipped via USPS tracking # 9114 9014 9645 0952 4697 34.

2016/12/17, CM-2016-AMF3-VSN-1796: HDD SN NA7Q2CGS was full, so it was replaced with HDD SN NA76M5N3. HDD SN NA7Q2CGS will be shipped via USPS tracking # 9114 9014 9645 0952 4697 41.

2016/12/16, CM-2016-AMF3-VSN-1794: HDD SN NA7Q2CNR was full, so it was replaced with HDD SN NA7Q2CGS. HDD SN NA7Q2CNR will be shipped via USPS tracking # 9114 9014 9645 0952 4697 58.

SKYRAD --- SKYRAD general --- Operational.

SKYRAD --- IRT --- Operational.

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 --- Not Operational, Removed for the Winter.

TIPTWR --- GNDRAD general --- Operational.

TIPTWR --- MFR3m --- Not Operational, Removed for the Winter.

TIPTWR --- PIRgnd --- Operational.

TIPTWR --- IRTgnd --- Operational.

TIPTWR --- PSPgnd --- Operational.

MET --- METTOWER general --- Operational.

MET --- CMH --- Not Operational.

2016/12/09, DQPR-5428: Jenni Kyrouac has submitted an open-ended DQR (D161118.6) documenting this on-going issue, and it has been reviewed and accepted by the PRB. The most recent DQPR status is “in progress-assignments.”

2016/11/14, DQPR-5428: Joshua asked Jenni if there has been any update from the manufacturer, and states that CMH behavior has been fairly consistent since late October. Jenni responded that there has been no response from the manufacturer yet, and there are no available spares.

2016/10/21, DQPR-5428: IM Jenni Kyrouac responded that she is awaiting response from the manufacturer regarding the dew point/RH problem. As Josh notes, as of 2016/10/19, the CMH is completely stagnant. Jenni will want to check the error message on Monday, and she suspects a dew point assembly circuitry problem.

2016/10/20, DQPR-5428: Josh Remitz posted about maintenance performed after site technicians noticed CMH temperature readings were over 90c this morning. Site technicians went out to the field and physically inspected the instrument unit, finding nothing out of the ordinary. CMH relative humidity continues to read higher than 100%.

2016/09/15, DQPR-5428: Starting from 2016/07/12 the CMH data (dew point, RH and vapor pressure) dropped to unusually low values. Aspirator and mirror were cleaned and instrument power was cycled but the problem did not resolve. IM Jenni reports that no error messages are reported by the instrument and calibration info looks ok. Data have recovered after the most recent self-check. The manufacturer was contacted for suggestions. Instrument recovered, then dropped out again on 7/24. An RMA was received from the manufacturer to send the instrument for service. Spare CMH from NSA was sent to OLI and the faulty CMH was replaced with the spare from NSA. Power was restored to the replacement instrument on 08/02, 22:45 UTC. Dew point and RH were observed to be off 08/05 and 08/06. Technicians cleaned the instrument's mirror and ran through the calibration process starting on 08/08 at 22:00 UTC. Issue reoccurred on 8/6. Data drop out on 8/9 for a few hours. Problem is ongoing as on 9/1. IM Jenni will contact the manufacturer.

MET --- Barometer --- Operational.

MET --- TEMPERATURE / HUMIDITY —— Operational.

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

MET --- PWD --- Operational.

MET --- AMC --- Operational.

ECOR --- ECOR --- Operational.

ECOR --- SEBS --- Operational.

MW RADIOMETERS --- MWR3C --- Partly Operational (Data Spikes).

2016/10/14, DQPR-4873: The DQO/DQO-SSG/PRB has updated the DQPR status to "waiting- for spares."

2016/10/12, DQPR-4873: IM/VAP Maria Cadeddu responded that the vendor is testing the IRT sensor, but has not yet provided a timeline for return.

LIDAR --- MPL --- Operational.

LIDAR --- Doppler LIDAR --- Operational.

LIDAR --- Raman LIDAR --- Operational.

2016/12/21, CM-2016-AMF3-VSN-1798: The laser energy was beginning to drop, so flash lamps were replaced on the rear bench, an alignment was performed, and power measurements were made. The rear bench was drained and moved to the front bench for system operation. The outage times for the maintenance are approximate, but the date is correct.

LIDAR --- CEIL --- Operational.

RADAR --- RWP --- Operational as per http://radar.arm.gov/.

RADAR --- KAZR --- Operational as per http://radar.arm.gov/. No Ingest.

2016/12/02, DQPR-5585: Data is only available up to 2016/09/10. The most recent status of this DQPR is “waiting - for spares.”

RADAR --- KASACR --- Operational as per http://radar.arm.gov/.

2016/12/15, DQPR-5848: Starting on 2016/09/27 at 19:30 UTC, there looks to be an issue with how the ingest is setting the transition flag, and getting the sweeps for the HSRHI data. The number of sweeps in the HSRHI files start

to shift between 1-3, when the shifting should not start until 4. Some examples of the azimuth and transition flags are posted below. The most recent status of this DQPR is “open — requires action.”

2016/10/12, DQPR-5704: The data looks saturated at times. It looks like we are still getting some returns, so it does not seem that the transmitter is going out. This is occurring in both RHI (Range Height Indicator) and PPI (Plan Position Indicator) plots at random times. This was brought up during the data review, but it looks to be an ongoing problem. See DQPR for attached plots. IM Joseph Hardin replied that this might just be an issue of terminology, but that he does not see any saturation, nor missing data. Adam Theisen posted previous scan plots for reference. He noted that it is probably a terminology issue, but if you look at the previous RHI scan, there is a large difference in the background reflectivity, as well as a jump in the Zdr (differential reflectivity) values. Joseph replied that we tend to refer to these particular plots as having an increased noise floor. There is something subtler going on here that we are attempting to track down. It does seem to be very infrequent (once a day or less per mode). The most recent DQPR status is "open- requires action."

RADAR --- KaWSACR --- Operational as per http://radar.arm.gov/. No Ingest.

2016/12/09, DQPR-5705: Adam Theisen added that the latest data from the DMF is from 09/19. The most recent DQPR status is “open - requires action.”

2016/10/12, DQPR-5705: WSACR is sometimes showing some degraded/missing data. In the PPI (Plan Position Indicator) plots, there are missing data between 60-90 degrees. In the RHI (Range Height Indicator) plots, there are missing data throughout the scans. In the RHI, the background Zdr signal drops out, and the values in the echo region are high compared to bracketing scans. The most recent DQPR status is "open- requires action."

IMG --- TSI --- Not Operational, Removed for the Winter.

IMG --- MASC --- Operational, Ingest in progress.

AOS --- General --- Partly Operational (Data Dropouts).

2016/12/21, DQPR-5858: This DQPR has been linked to DQPR 5815, and the most recent status of this DQPR is “open - requires action.”

2016/12/20, DQPR-5858: OLI and SGP both have virtual machines for the AOS computers, and both are showing data dropouts on multiple instruments at the same time. These dropouts can be as short as a couple of seconds, or up to 30 seconds or more. In OLI there are missing data lines at the same time in the files for the WXT520, which is on Unit 1, and the CPC3772, CPC3776, and Dryneph, which are on Unit 2. There are no dropouts on the Wet Neph. SGP shows dropouts in the data files of the WXT520, which is on Unit 1 and the TAP, CPC3772, and the Dry Neph at the same time. At both sites, the dropouts seem to have started at the beginning of the deployments. There are no other error indications that the data is not being received from the instruments. Brent Kolasinski is looking into the VMWare logs and expects to consult with VMware support.

AOS --- aosmet --- Operational.

AOS --- UHSAS --- Operational.

2016/12/01, DQPR-5716: IM Cynthia Salwen is working on the raw file recovery now, and there was another bunch of files from 2016/10/11 19:00 to 2016/10/12 15:00 that were renamed and worked on as well. She suggested putting them in the ftphome on the unit 2, where the UHSAS files are normally picked up, or she could them in her home directory where she has transferred files before. IM Annette responded that she does not know how to get

the files transferred to the DMF. She suggested that Cynthia contact Tonya Martin at PNNL, specifying the filenames, extensions, etc. The most recent status of this DQPR is “waiting - for spares.”

2016/11/28, DQOR-5716: Joshua asked Janek if there was any update on the raw file recovery effort for those couple days in early October 2016.

2016/10/24, DQPR-5716: Joshua King updated the DQPR status to “waiting for spares.” He agreed with Adam that this DQPR was prematurely closed out with PRB approval of the connected DQR D161011.4. However, that DQR was not directly related to the file copy issue documented in Janek’s comments within the DQPR. Thus, he put this DQPR into a waiting state until the raw file work Janek proposed (and re-ingesting by DMF personnel?) can be carried out. Janek responded that he is working on getting the new SGP AOS ready, and will process the raw files afterwards (end of next week).

AOS --- CPC --- Operational.

AOS --- CAPS-PMEX --- Partly Operational.

2016/12/15, DQPR-5816: Joshua asked Art what kind of timeline he needs for further investigation. Art responded that we are currently collecting data on particle-free ambient air via a HEPA filter. We are doing so to confirm that the molecular interference is coming from NO2, to identify the wind directions which bring in the NO2, and to collect enough data in the current configuration to figure out if one channel could serve as the molecular interference monitoring channel. This monitoring channel is likely to be the blue channel, which will allow us to correct the green channel. Upon Art’s return to BNL next week, he will look at the data to see if the statistics will allow for this. The most recent DQPR status is “open - requires action.”

2016/12/02, DQPR-5816: Arthur added that only the red channel will be free of NO2 signal contamination. Therefore, the red channel data are fine. This DQPR has been linked to DQPR 5806 and DQPR 5807, and the most recent status of this DQPR is “open - requires action.”

2016/12/01, DQPR-5816: Since the CAPS takes a measurement of the molecular extinction every 20 minutes, and subtracts this quantity from the total extinction measured during normal operation, the only way to consistently generate a negative extinction is to have a baseline (acquired on particle-free air) that is larger than the total extinction. The only way this could happen is if a time-varying molecular species is present. Further investigation has suggested that locally sourced anthropogenic emissions of NO2 is the likely origin of these episodic periods. There are 3 pieces of evidence that NO2 is the culprit: firstly, optical extinction under particle free conditions (which are achieved with a HEPA filter) reveals that these episodes characterized by negative extinction also exhibit a wavelength dependence in light absorption that parallels the known absorption spectrum of NO2 (see 2nd attached file on DQPR page); secondly, negative signals are tightly correlated with CO, a known tracer from combustion activities; lastly, the local prevailing wind direction is from the north, where there are sources of diesel emissions. Taken together, this is strong evidence for the presence of NO2 emissions impacting the OLI AOS. Using a calibration for the green, it is estimated that the NO2 loading is over 1.2 ppb. The CAPS simply measures optical extinction, irrespective of whether the extinction is molecular or particulate in origin. The CAPS takes a particle-free background reading every 20 minutes in an effort to account for variations in molecular extinction caused by changes in the molecular composition of air masses. However, the large absorption cross-section of the NO2, and shifts in particle loadings thwart the background correction scheme employed by the CAPS instrument. Since we don’t have a NO2 measurement at the OLI site to determine NO2 to be the culprit, IM Arthur Sedlacek has asked the AOS technicians to install a HEPA filter in the CAPS sampling line to confirm that the behavior described above is due to molecular species, and not particles. Arthur will also contact the manufacturer about the idea of converting the blue channel to a particle-free green channel. In this way, we will have a constant measure of NO2, thereby enabling the green aerosol channel to be corrected for these episodes. In the long term, we may want to terminate aerosol extinction measurements via the CAPS at Oliktok, or, live with the issue, and simply flag data as bad (unusable) when the wind direction is from the north, where the desalination plant is located. Other long-term options include adding a fourth channel to the CAPS that measures NO2 full-time, using an NO2 scrubber on the front end of the CAPS (this is a consumable, and particle loss issues would have to be determined), or procuring a separate way of locally

measuring NO2. This observation does raise the question as to what is precisely present in these plumes. It is possible that other molecular species (e.g., hydrocarbons) could be present locally, and have the potential of impacting other instruments. Several informative graphs have been posted to the DQPR.

AOS --- ACSM-- Operational.

AOS --- GHG-Picarro Operational.

AOS --- HTDMA --- Operational.

2016/12/16, CM-2016-AMF3-VSN-1795: After the replacement MCPC unit was installed, the mentor noticed the instrument was still having a valve issue. Technicians went through various tests, and found that the disc housing the limiting peg had become loose, and was no longer allowing the valve to fully close. Technicians repositioned and tightened the disc with the limiting peg so the valve was able to fully close.

2016/12/16, DQPR-5805: Janek replied to Joshua's request for turning on ingest/collection, asking for DMF to wait until the valve is fixed. Operators discovered something with the valve that could be the cause for the flows we are seeing, and it will be tested today. The most recent DQPR status is "in progress - assignments."

2016/12/15, DQPR-5805: Joshua King asked the DMF team if collection/ingests could be turned back on given Janek's comments from yesterday.

2016/12/14, DQPR-5805: The MCPC was successfully installed, and is showing counts. The scanning works nicely, but the humidifier sheath RH is low. This is probably due to a stuck internal valve, which we will test.

2016/12/06, DQPR-5805: After numerous tests on the MCPC have failed to pinpoint the cause for zero counts, a spare MCPC is being shipped in, and the old one returned for maintenance. Janek Uin has an assignment to write an open-ended DQR D161208.2, and the most recent status of this DQPR is "waiting - for spares."

2016/11/29, DQPR-5805: Beginning at around 20:00 UTC on 2016/11/21, HTDMA size distributions and aerosol concentrations have flatlined at 0/cm^3 (see attached graph). IM Janek Uin responded that the MCPC was flooded, and the temperature in the AOS dropped to the levels where the HTDMA RH is too low. The MCPC was drained, and we are waiting to see if that worked. We are looking into insulating the HTDMA, and raising the AOS temperature. The most recent status of this DQPR is "open - requires action."

AOS --- UHSAS --- Operational

AOS --- NEPH --- Operational.

AOS --- IMPACTOR --- Operational.

AOS --- OZONE --- Operational.

AOS --- TRACEGAS --- Partly Operational (Bad Data Quality).

2016/12/22, DQOR-5864: Gas temperature is giving a bad threshold value. The most recent DQPR status is "open - requires action."

Other --- AERI --- Partly Operational.

2016/11/23 DQPR-5630: Denny added that the short periods of data NA, occurring 1-4 times a day, happen on all AERIs when they lose connection to the interferometer. The vendor, ABB, has been trying to fix this issue for a while. He noticed on 2016/11/02 that data collection stalled around 14 UTC for the day. It looks like a call to acquire data from the interferometer didn't return until the 0z restart. The error is similar to the previous stalling of killing executables, however, the error appears in a different section of code. He plans to add a "while" or "for" loop that will run for up to 20 minutes, and fail if a call doesn't return. This way, the software will restart upon failure. The most recent status of this DQPR is "open- requires action."

2016/10/21, DQPR-5630: Adam Theisen reported that these short periods of data NA are still occurring anywhere from 1-4 times per day, and data are NA for 20-40% for each hour this occurs. He attached a link to DQ metrics: http://bit.ly/2edFbQB .

2016/10/13, DQPR-5630: The AERI-110 at Barrow with a VM was also having a similar problem, so Denny updated the code on that VM as well.

2016/10/12, DQPR-5630: Denny added an os.P_NOWAIT option to the code, checking that the process exited. We will have to monitor this for 3-4 weeks to see if this corrects the timeouts or not.

2016/10/11, DQPR-5630: IM Denny Hackel says that the software is stalling because a process' exit code is not being returned after it is killed. He has not seen this issue before, so it might be due to running the software on the VM, or a new intermittent feature of Windows. On September 21st, it took about 6 hours for the exit code to be returned (see DQPR for the code log). when the interferometer is unresponsive, we have had to kill the control and calibration software, and restart. After 4 tries without success, we reboot the interferometer internal and AERI computers. We will look into alternative calls to kill processes, and/or figure out why the exit code isn't being returned. The process isn't found in task list, but can be seen under cygwin running "ps -a." You cannot kill the process from the cygwin window either.

2016/09/30, DQPR-5630: After coming back online the AERI had numerous periods of data NA. All periods have been less than 24 hours so far. Adam asks the instrument mentors if the problem is related to the switch to a VM (virtual machine)?

Other --- BBSS --- Operational.

2016/12/22, CM-2016-AMF3-VSN-1801: Due to an impassable oil rig moving down the road, the AMF3 was inaccessible during the morning hours, and technicians were not able to launch the morning's SONDE. Technicians will continue launches in the afternoon hours once they reach the site.

2016/12/21, CM-2016-AMF3-VSN-1799: The SPS unit, SN H27504, on the BBSS system needed to be switched over to a private network. With the help of Tim Grove, technicians were able to get the SPS unit on the BBSS system switched over to a private network.

Other --- CIMEL --- Not Operational.

Other --- PIP --- Operational, working on Data Ingest to DMF Archives.

Other --- CCN --- Not at the site yet.

2016/12/20, DQPR-5447: Janek received the power supply, and he is letting the instrument run to confirm the previous issue. He is currently not seeing the wide size distribution at high super saturations, and has a spare OPC at hand to install if needed.

2016/12/06, DQPR-5447: Janek added that we are awaiting a spare CCN power supply to turn the instrument on as to provide data to DMT. The most recent DQPR status is “waiting — for spares.”

2016/11/17, DQPR-5447: Nothing has changed, and Janek is discussing with others on how to approach DMT.

2016/10/24, DQPR-5447: Email distribution flag changed - distribution will exclude site operations. Janek received no reply from DMT, but will try again. The most recent DQPR status is "waiting- for spares." The DQPR requires an end date to close it.

2016/10/13, DQPR-5447: An issue with one of the OPCs (Optical Particle Counter) was discovered. The OPC's particle size distribution is very wide, and does not match the other OPC under the same conditions. Contacting DMT.

2016/09/12, DQPR-5447: Janek Uin reports that the CCN was calibrated and proper operation verified before shipping the instrument to the OLI site (Linked DQPR-5290). A difference in concentrations between the columns at 1% supersaturation was discovered after calibration.

Other --- DataHawk Unmanned Aerial System --- Partly Operational.

2016/12/08, DQPR-5833: For most flights throughout the entirety of the ingested oliaafdatahawkmetF3.a0 data record, there were frequent, short-duration dropouts to 0 hPa in the measured pressure field. See the illustrative examples attached to the DQPR. This DQPR will be left open to explore the need for a suspect DQR on the ingested ‘pressure’ field throughout the entirety of the oliaafdatahawkmetF3.a0 data record. The most recent status of this DQPR is “open - requires action.”

Barrow

INFORMAL NSA INSTRUMENT STATUS REPORT FOR December 16, 2016 - December 23, 2016

BRIEF STATUS OF INSTRUMENTS IN BARROW (C1) AS OF 2016/12/23:

DATA SYSTEMS Operational

SKYRAD - SKY Radiometer on Stand for Downwelling Operational

MFRSR - Multifilter Rotating Shadowband Radiometer Not Operational

NIMFR - Normal Incidence Multifilter Radiometer Not Operational

GNDRAD - Ground Radiometer on Stand for Upwelling Partly Operational

MFR10m - Multifilter Radiometer at 10m height Not Operational

METTOWER - Surface Meteorological Instrument on tower Operational

AMC - Soil, up/downwelling radiation measurements Not Operational

ECOR-twr - Eddy Correlation Flux System Not Operational

ECOR-PtBRW - Eddy Correlation Flux System Not Operational

MWR - Microwave Radiometer Operational

MWRP - Microwave Radiometer Profiler Not Operational

MWRHF - Microwave Radiometer High Frequency Operational

GVR - G-band Vapor Radiometer Operational

HSRL - High Spectral Resolution Lidar Operational

MPL - Micropulse Lidar Operational

CEIL - Vaisala Ceilometer Operational

DL - Doppler LIDAR Operational

RWP - Radar Wind Profiler Operational as per http://radar.arm.gov

KAZR - Ka ARM Zenith Radar Operational

KaWSACR - Ka-Band Scanning ARM Cloud Radar Not Operational in testing mode as per http://radar.arm.gov

XSAPR - X-Band Scanning ARM Precipitation Radar Not Operational as per http://radar.arm.gov

AOS - Aerosol Observing System Not Operational

CLAP - Continuous Light Absorption Photometer Not Operational

CPC - Condensation Particle Counter Not Operational

NEPH - Nephelometer Not Operational

TOWERCAM - 40m tower camera Operational

TSI - Total Sky Imager Not Operational

AERI - Atmospheric Emitted Radiance Interferometer Operational

BBSS - Balloon Borne Sounding System Operational

CIMEL - Cimel Sunphotometer Not Operational

PIP - Precipitation Imaging Package Operational

TPS - Total Precipitation Sensor Not Operational

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* Barrow Instruments in Detail: *

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INFRASTRUCTURE --- Facilities --- Operational.

INFRASTRUCTURE --- Data Systems --- Operational.

2016/12/19, CM-2016-NSA-VSN-4199: The APC 3000 UPS battery alarm went off, so operators removed and replaced the 8 batteries.

2016/12/19, CM-2016-NSA-VSN-4197: A data disk was filled, so it was replaced, packaged, and mailed out. There are 30 more data disks available.

SKYRAD --- SKYRAD General --- Operational.

SKYRAD --- IRT --- Operational.

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 --- Not Operational, Removed for the Winter.

SKYRAD --- NIMFR --- Not Operational, Removed for the Winter.

TIPTWR --- GNDRAD general --- Partly Operational (missing data)

2016/12/21, DQPR-5860: There has been some missing data since 14:00 UTC on 2016/11/10: up long hemispheric, up long hemispheric max, and min. Missing data was proceeded by incorrect data that exceeded their max limits. The most recent DQPR status is “open - requires action.”

TIPTWR --- MFR10m --- Not Operational, Removed for the Winter.

TIPTWR --- PIRgnd --- Operational.

TIPTWR --- IRTgnd --- Operational.

TIPTWR --- PSPgnd --- Operational.

MET --- METTOWER general --- Operational.

MET --- CMH --- Operational.

MET --- Barometer --- Operational.

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

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

MET --- PWD --- Operational.

MET --- AMC --- Not Operational, no ingest.

2016/12/20, CM-2016-NSA-VSN-4200: The logger lost power, so by mentor request, all soil probes (1-12) were disconnected. The cable ends were bagged and sealed.

2016/12/19, CM-2016-NSA-VSN-4198: The IM gave input about the logger failure. Operators removed and replaced the battery, and turned it back on. Within 1 minute, the battery failed.

2016/12/16, CM-2016-NSA-VSN-4196: Operators received input from the mentor about the direct short, so they disconnected the connector 10-11-5-6-7, then power cycled the power supply. The logger (NL120) ran for almost a minute, and then shut down.

2016/12/15, DQPR-5835: Foxes have again eaten the set of sensor wires that were repaired in early November. Walter asked if the mentor can identify the set of wires to disconnect from the logger to prevent shorting and to collect from other sensors. The most recent status of this DQPR is “open — requires action.”

2016/12/14, DQPR-5835: On 2016/11/14, old data from Aug-Oct were re-sent. That data has been cleaned up, and bundled back on.

2016/12/09, DQPR-5835: All data is missing since 2016/11/22 at 18:00 UTC. DSView shows that no data has been collected from the instrument since this day, and the bundle is flagged as “getting old data.” The most recent status of this DQPR is “open - requires action.”

2016/11/03, DQPR-5694: This DQPR has been linked to DQPR 5756, and DQR D161011.3 has been submitted and reviewed by PRB. The most recent status of this DQPR is “in progress - assignments.”

2016/10/11, DQPR-5694: Joshua responds to IM Ken Reichl that after conferring with others at the Data Quality Office, the best action is to create another DQR about this behavior, like the one that exists for OLI. Joshua has assigned an open-ended, "transparent" DQR to Ken. He then asks what the relevant time period was for this issue within the NSA C1 AMC data record. The status of this DQPR is "in progress-assignments."

2016/10/10, DQPR-5694: Joshua King adds that vmc from sensor 4 was missing from 14:30 UTC 2016/07/12- 15:30 UTC 2016/09/25. Since returning 2016/09/25, vmc has been decreasing to below 0.3. He is asking mentors if they have thoughts on what is causing this behavior. An attached image can be found on the DQPR page. IM Ken Reichl responds that this is an issue outlined in DQPR-4793 for the analogous site, OLI. The instrument reports soil data as 9999999, or a non-numerical character (for data SGP) for soil systems. The AMC systems may report missing data during warm seasons for instruments that are not sufficiently calibrated. The OLI datastream has an open-ended DQR D151023.3. Ken asks if he should make one for the NSA data as well, and is the DQR system the best way to characterize this issue?

2016/10/09, DQPR-5694: Vwc (volumetric water content) 4 is missing for the entire period starting 16/07/12 to 16/09/25.

ECOR --- ECOR-twr --- Partly Operational (missing data)

ECOR --- ECOR-Pt. Barrow --- Not Operational, End of Season.

2016/12/12, DQPR-4322: Power supply problems prevented us from collecting any data this past autumn, and the ECOR/SEBS system has been removed for winter on Dec 7th to prevent further bear damage. The most recent status of this DQPR is “in progress - assignments.”

2016/12/09, DQPR-4322: Adam Theisen added that the ingest appears to still be off.

2016/12/02, DQPR-5153: Reliable communication was not established, and the ECOR/SEBS system will be removed from the Point next week for the rest of the winter to prevent polar bear damage. The most recent status of this DQPR is “in progress - assignments,” and DQR D150810.2 has been reviewed and accepted by the PRB.

2016/11/21, DQPR-4322: Despite being able to communicate with the Point sometimes, no data shows up in the Archive. David will ask if the ingest is running.

2016/10/07, DQPR-5153: IM David Cook explains that we are continuing to experience communications problems with the new pair of radios. The mentor is in the process of gathering information to help the vendor diagnose the problem.

2016/10/07, DQPR-4322: IM David Cook says that the ECOR/SEBS system was reinstalled and running at approximately 2400 CST on 9/28/2016. However, reliable radio communication has not been established with the instrument system, and manual data collection may be needed as the radio communication problem is actively being investigated.

2016/09/23, DQPR-4322: The SEBS re-installation is scheduled for September 26-30, 2016.

2016/07/25, DQPR-5153: Data was recovered from the ECOR computer from 2015/06/14 to 2015/09/28. Data again went missing at 1830 UTC 2015/12/30. DQR D160711.3 has been submitted for ECOR.

MW RADIOMETERS --- MWR --- Operational.

MW RADIOMETERS --- MWRP --- Not Operational. The MWRP was shipped to Radiometrics.

MW RADIOMETERS --- MWRHF --- Operational.

2016/09/30, DQPR-4165: The 150 GHz channel was showing high noise levels probably because of an external source of interference. Adam inquires if there is a path forward to solve the interference issues? The current DQPR status is “in progress- assignments “, and it is open-ended. DQRs D140610.1 and D160426.3 have been reviewed and accepted by the PRB.

MW RADIOMETERS --- GVR --- Operational.

LIDAR --- HSRL --- Operational.

LIDAR --- MPL --- Operational.

LIDAR --- CEIL --- Operational.

LIDAR --- Doppler LIDAR --- Operational.

2016/12/23, CM-2016-NSA-VSN-4201: Tim Grove requested instrument reboot for software updates, so the computer was rebooted.

RADAR --- RWP --- Operational.

RADAR --- KAZR --- Operational.

RADAR --- KaWSACR --- Not Operational in testing mode per http://radar.arm.gov.

2016/10/23, CM-2016-NSA-VSN-4158: The Ka Band chiller overflowed, and we suspect it is because of a faulty pump. The unit was shipped to SGP until repair paperwork can be generated. The chiller (S/N 10080330) was removed and drained, and we are awaiting a spare, or for this unit to be rebuilt.

2016/03/12, DQPR-4041: After much coordination with the pedestal manufacturer and while working with the instrument mentors, the azimuth DSA was re-programmed. Once a reprogrammed Azimuth DSA was installed and verified the Elevation DSA was also found to be faulty. It was replaced with another unit and the system now accepts azimuth and elevation commands. The most recent DQPR status is “waiting- for spares.”

RADAR --- XSAPR --- Not Operational as per http://radar.arm.gov.

2016/08/04, DQPR-4841: The elevation servo amplifier failed, the radar cannot scan in elevation. The radar will be upgraded by the end of this year, and will be turned off until then. A DQR was submitted and reviewed by PRB. The DQPR status is “in progress” due to it being open-ended. Adam Theisen's DQR D160719.1 has been reviewed and accepted by the PRB.

AOS --- General --- Not Operational, No Ingest.

2016/10/27, DQPR-5524: Joshua King asks if there is any update on the raw data file update work that Annette outlines in her 2016/09/23 comment? The most recent status of this DQPR is "in progress - assignments."

2016/09/23, DQPR-5524: Annette Koontz says that NOAA will provide a csv text file with measurements for the instruments that are running. We will need to generate a new ingest for this new raw data format, and work is expected to start sometime in October 2016. The goal is to make the nsaaos*X1.a1 files look identical to the existing nsaaos*.a1 for the instruments contained in this new raw file.

2016/09/22, DQPR-5524: Joshua King requests that this DQPR be escalated to PRB attention.

2016/08/29, DQPR-5524: Beginning at 12:00 UTC on 08/18/2016, data for all ingested NSA X1 AOS data products are missing. It looks like a collection issue. On switching to new data acquisition system, some bugs were found especially with the new instruments that came online. Also, there was a power outage on site on 8/21 and the instruments do not seem to be back up. There are some issues with data acquisition timing, as some instruments are wind-sectored and turn off/on with WD and WS. Chemical filter measurement is the main concern as data collection works differently for this instrument. According to IM Anne, Aethelometer compact disk card (8 GB) fills up with 1 second data frequency. The card filled up, causing the instrument to stop collecting data, and thus, other problems ensued. If there are changes in the raw data, BCR will be needed to do the ingest updates. According to Joshua King, this seems to be affecting the flow of data from all NSA X1 AOS instrument systems and ingest issue is related to a lack of nsaaosX1.00 raw data files since 08/18. This DQR is linked to DQPR 5561 and 5562.

AOS --- AETH --- Not Operational.

AOS --- CLAP --- Not Operational.

AOS --- CPC --- Not Operational.

AOS --- NEPH --- Not Operational.

IMG --- TOWERCAM --- Operational.

IMG --- TSI --- Not Operational, Removed for the Winter.

Other --- AERI --- Operational.

Other --- BBSS --- Operational.

Other --- CIMEL --- Not Operational.

Other --- PIP --- Operational.

Other --- TPS --- Not Operational.

5 North Slope Facilities

AMF3

Current and Upcoming Site Visits

Fred Helsel, Bruce Edwardson/SNL, modify generator hooch January 17-23

Current and Upcoming IOPs

Black Carbon on the North Slope (Baylor)

Site News/Issues

NA

Unmet Needs

AMF3 still lacks a permanent source of power.

Site Upgrades

Todd Houchens (SNL), and Joe Hardin (PNNL) were up the week of December 12th to complete radar calibrations.

Todd replaced flash lamps on the Raman Lidar

Site Safety

NA

Site Staffing Issues

NA

Tethered Balloon Operations

All previous Supercooled Liquid Water Content (SLWC) sonde data from the TBS has been processed using a methodology based on the SLWCs being deployed on free weather balloon launches. A literature review was conducted and an appropriate methodology to calculate supercooled liquid water amount from the SLWCs while flying on the TBS was developed. All data from October 2015 – November 2016 was reprocessed using the new methodology. The SLWC data is being compared with data from the MWR and KAZR at Oliktok.

All SLWC data collected by the TBS to date is summarized below:

1) October 2015: 10/27/15 09:29 – 12:55
   10/28/15 09:24 – 17:10
   10/29/15 10:41 – 17:33
   NOTES: 1 SLWC
   - SLWC data collection was limited due to interference from UC Boulder DataHawk (resolved by altering TBS tethersonde software).
   - Times are in AKDT due to clock set on ARM TBS desktop.
   - 10/29/15, where snow started and then heavier snow started, seemed to coincide with sharp decreases in SLW.

2) April 2016: 4/19/16 00:34 – 03:54 GMT
   4/19/16 21:16 – 23:59
   NOTES: 1 SLWC
   - Used helikite so generally below cloud base and low SLW measured.

3) May 2016: 5/14/16 22:20 – 5/15/16 03:59
   5/15/16 16:55 – 5/16/16 01:04
   NOTES: 4 V8 SLWC & 1 iMet SLWC
   - High amounts of SLW measured (1.4 g/m^3)
   - Can view different amounts of SLW in cloud with altitude
   - Have concurrent DTS data

4) June 2016: 6/6/16 18:54 – 6/7/16 01:49
   6/10/16 17:23 – 6/11/16 00:44
   NOTES: 6 V8 SLWC & 1 iMet SLWC
   - Still significant amounts of SLW measured (.6 g/m^3) – but interesting to compare that there is less than May
   - 6/10/16 is the ONLY DAY we have overlapping data from the DataHawk (we flew together on 6/11 but temps were well above 0)
   - 6/6/16 may be interesting to model because I noted in the log that as the cloud layer dissipated from 22:00 onward 'patchy wisps' of clouds were

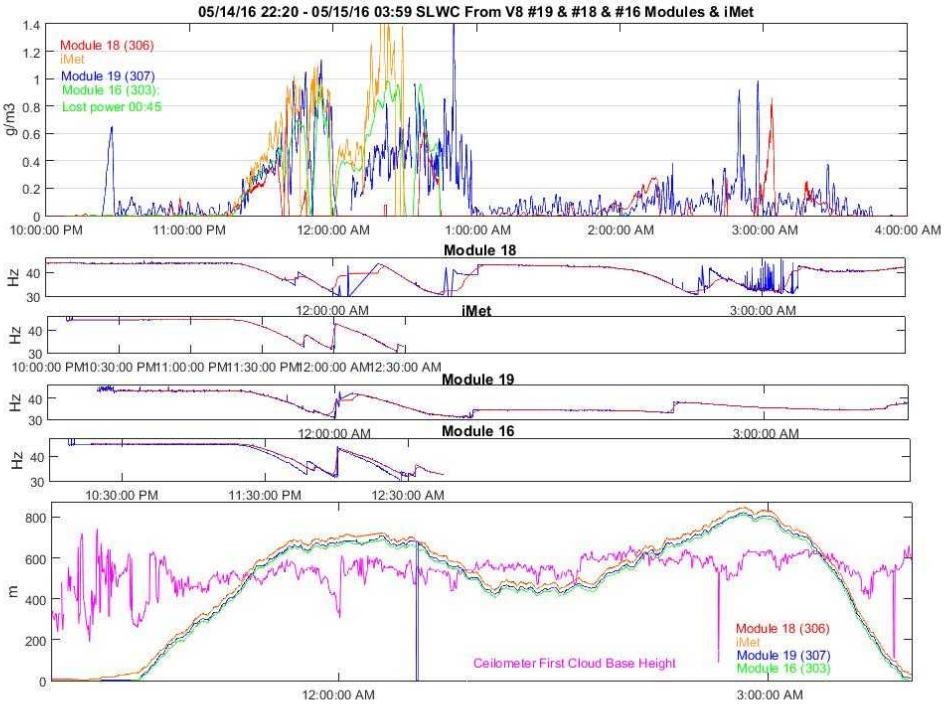
consistently passing across the tether. The ceilometer did not detect this but interestingly it seems like maybe the SLWCs did.

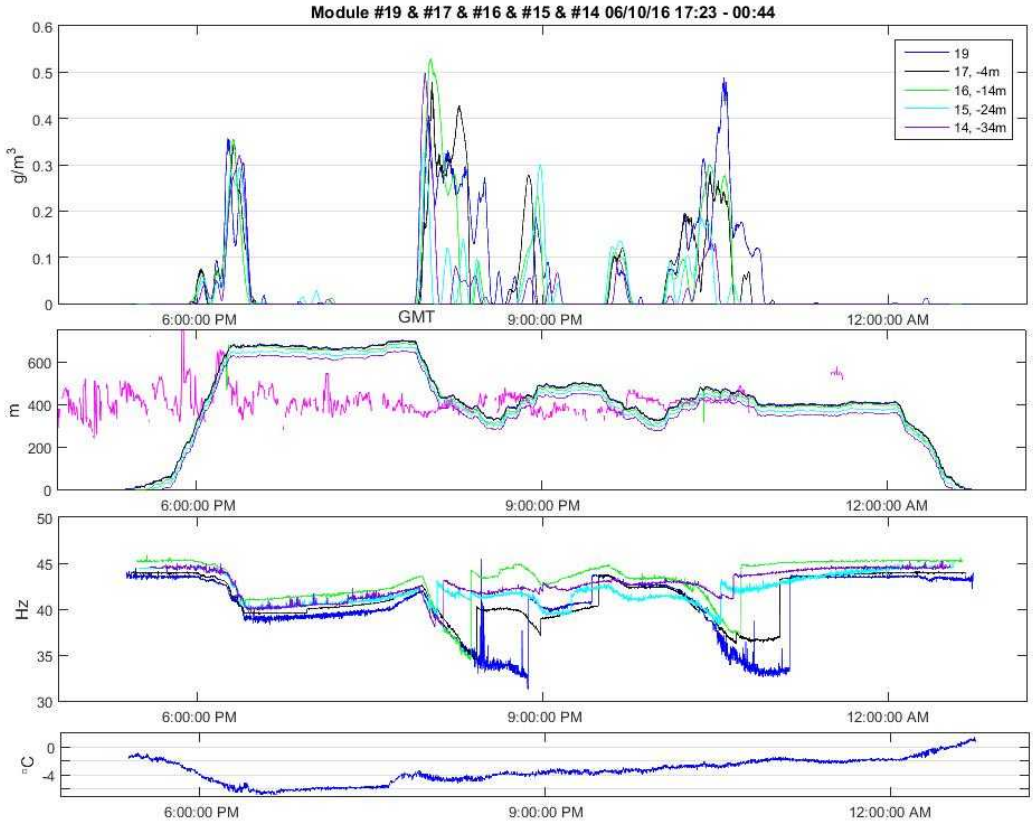
- Have concurrent DTS data.

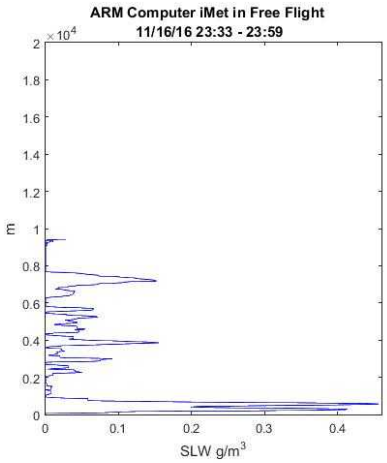
5) October 2016: 10/15/16 17:30 – 10/16/16 01:17
10/17/16 20:48 – 22:27
10/20/16 18:59 – 10/21/16 01:59
NOTES: 1 SLWC & 1 iMet SLWC
   - Interesting to compare that there are similar SLW amounts to October 2015
   - Have concurrent DTS data

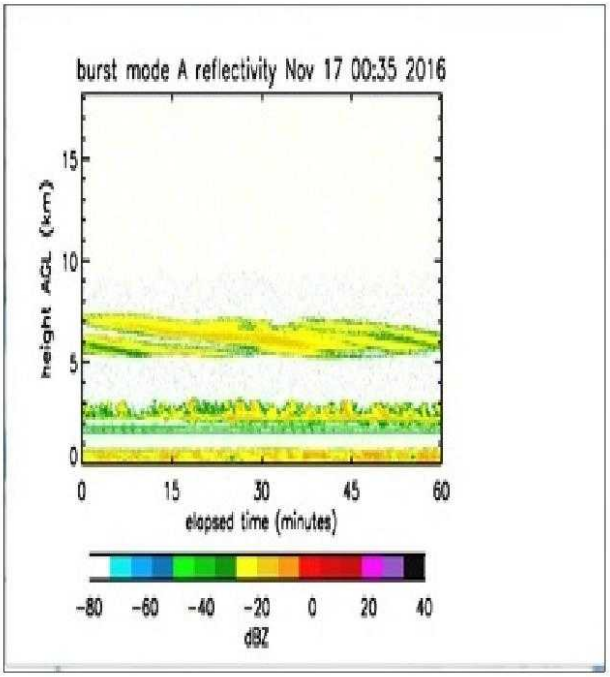
6) November 2016: 11/15/16 22:13 – 11/15/16 23:30
11/16/16 01:52 – 03:00
11/16/16 03:04 – 03:40
11/16/16 23:30 – 11/17/16 01:22
11/17/16 17:54 – 21:52
NOTES: 2 iMet SLWCs
   - First use of autoreeler so altitude varied
   - Compared 11/15 with MWR
   - Initial comparison plots of free flight (11/16 23:30 – 11/17/16 01:22) look promising against KAZR reflectivity, but still need to correct the SLWC data for frequency drift.

A few sample plots:









Barrow

Current and Upcoming Site Visits

NA

Current and Upcoming IOPs

COSMOS, Soil Moisture Probes, - Task order under CPA 1260749 for labor – POP Ends - 2016
SNPP/NPOESS Ground Truth Sonde Launch, Phase 5 – Started Oct 1, 2016
Sea Ice Effects on Arctic Climate, Rain sample collection - Dartmouth University – POP Ends Dec 2016
Seismic Probes for NSF– POP Ends, Oct 31, 2018
Carbon Aerosol/Methane Gas, - Task order under CPA 1260749 for labor – POP Ends – 2018
Multi-faceted Approach to Characterizing Potential Radiative Forcing on the NSA using Two Coastal Sites, Baylor – June 2016 – Sept 2017.

Site Issues

The electric fence used to deter polar bears failed and the bears knocked over the fence, gaining them access to the ECOR. The ECOR instrumentation was retrieved and put into warm storage for the winter; it will be determined at ARM's annual ASR Meeting if the ECOR system should remain at current location.

ECOR System

Damaged fence

Unmet Needs

Auto Launcher deck arrived; it is currently stored for installation next Spring.

Site Upgrades

NA

Site Safety

NA

Site Staffing Issues

NA

Distribution

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