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

July 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 July 29, 2016)

	June	YTD
Carryover funds	$4,562,140	
Funds Allocated YTD	$5,638,000	
Carryover plus YTD funds	$10,200,140	
Cost, burdened amount	$5,637,494,	
Uncosted Funds	$4,562,646	
Commits, burdened total	$2,591,289	
Current fiscal year uncommitted funds	$1,971,357	
Subsequent fiscal year (SFY)commits	$569,429	
Total uncommitted funds, including SFY commits	$1,401,928	
Fully Burdened Staff Costs	$417,570	$2,764,583
Fully Burdened Contract Costs	$356,111	$2,872,911
Fully Burdened Total Costs	$773,681	$5,637,494

Current Fully Burdened Commitments	$3,160,289
Projected Costs Plus Commitments on 9/30/2016	$10,000,000

3 Safety

AMF3– No Incident/Injury

Barrow - No Incident/Injury

4 Instrument Status – Provided by Martin Stuefer

AMF3

INFORMAL AMF3 INSTRUMENT STATUS REPORT FOR July 22, 2016 - July 29, 2016 BRIEF STATUS OF INSTRUMENTS IN OLIKTOK AS OF 2016/07/29:

DATA SYSTEMS Operational
SKYRAD - SKY Radiometer on Stand for Downwelling Operational
MFRSR - Multifilter Rotating Shadowband Radiometer Not Operational, no collections.
GNDRAD - Ground Radiometer on Stand for Upwelling Operational
MFR3m - Multifilter Radiometer at 3m height Not Operational, no collections.
MET - Meteorological Instruments on tower 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
RWP - Radar Wind Profiler Operational
KAZR - Ka ARM Zenith Radar Operational
KaWSACR - Ka-Band Scanning ARM Cloud Radar Operational
TSI - Total Sky Imager Operational
MASC - Multi Angle Snowflake Camera Not Operational
AERI - Atmospheric Emitted Radiance Interferometer Not Operational
BBSS - Balloon Borne Sounding System Operational
CIMEL - Cimel Sunphotometer Operational
GHG-PICARRO Operational

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* Oliktok Instruments in Detail: *
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INFRASTRUCTURE --- Facilities --- Operational.

INFRASTRUCTURE --- DATA SYSTEMS --- Operational.
2016/07/28, CM-2016-AMF3-VSN-1624: The data disk was full and has been replaced.
2016/07/22, CM-2016-AMF3-VSN-1622: The data disk was full and has been replaced.

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.
7/23: Collections are failing and no data since 7/23, 3:00UT.

TIPTWR --- GNDRAD general --- Operational.

TIPTWR --- MFR3m --- Not Operational.
7/23: Collections are failing and no data since 7/23, 3:00UT.

TIPTWR --- PIRgnd --- Operational.

TIPTWR --- IRTgnd --- Operational.

TIPTWR --- PSPgnd --- Operational.

MET --- METTOWER general --- Operational.

MET --- CMH --- Operational.
2016/07/28, DQPR-5428: It was observed that starting from 2016/07/12 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.
Troubleshooting is ongoing. 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, the spare needs to be received from NSA to OLI.

MET --- Barometer --- Operational.

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

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

MET --- PWD --- Operational.

MET --- AMC --- Operational.

ECOR --- ECOR --- Operational.

ECOR --- SEBS --- Not Operational.
7/23: SEBS collections are failing and no data since 7/23, 3:00UT.

MW RADIOMETERS --- MWR3C --- Operational.

2016/06/20, DQPR-4873: The vendor reported on March 15 that they could not identify the IRT sensor problem yet, and there are no further updates to date. They continue with tests at the vendor's facility in Germany. An open-ended DQR will be submitted to communicate the IRT problems tracked in DQPR-4873. The RH and Temperature data were noisy.
The pressure also has troubles (noisy, drop outs) up to 4/7. A new Vaisala RPG sensor was installed 12/08. The new software is installed and after a few initial hiccups is working. This worked and the radiometer is now correctly detecting the station.

LIDAR --- MPL --- Operational.
2016/07/30, CM-2016-AMF3-VSN-1626: A LHD fault alarm occurred, and the laser and control head were powered down for approximately 10 minutes to allow for cooling (7/30, ~7:25 UT). Technicians powered laser back on and restarted data collection. The cause of overheating was due to excessive ambient heat in shelters.
2016/07/26, DQPR-5453, Laser initialization failed on July 21, 2016.
Diode energy level was found to drop suddenly on July 12, 2016 at 21:00 UTC, so it was initially suspected that the laser diode had failed.
However, the inability to communicate with the instrument suggested that it was not the cause of the failure. After some troubleshooting with site ops, it was found out that the MPL communication cable was loose.
It was re-connected and measurement resumed on July 22, 2016 around 16:00UTC. A DQR D160726.1 has been submitted by Paytsar Muradyan.

LIDAR --- Doppler LIDAR --- Operational.

LIDAR --- Raman LIDAR --- Operational.
2016/07/15, DQPR-5019: Starting late on 11/25/2015, the pulse energy became bad and then most of the data became unavailable afterwards. It appears that the first amplifier in the front laser bench has been damaged. The entire laser system was shipped to the vendor in California for repair. IM John Goldsmith reports that the repaired system is now back at Oliktok Point. On 2016/07/14 at 23:30 UT, the raw data started flowing. Ingest has been turned back on. There are DQRs documenting bad/missing data up through 2015/12/31 1200 UTC. A DQR will be submitted for any additional missing data by John Goldsmith.

LIDAR --- CEIL --- Operational.

RADAR --- RWP --- Operational.

RADAR --- KAZR --- Operational.

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

IMG --- TSI --- Operational.

IMG --- Multi Angle Snowflake Camera --- Not Operational.
20116/07/21, the software was stopped. ENG0003187 submitted for summer shut down and relocation of instrument.

Other --- AERI --- Not Operational.
2016/06/27, DQPR-4655: IM Denny Hackel has performed instrument tests at the University of Wisconsin- Madison Space Science and Engineering Center (SSEC). The dewar/detector needed to be sent back to the vendor for analysis. AERI-114 has been integrated into the M-AERI backend. The alignment took a few more days of effort than anticipated. The repaired cooler and dewar/detector are working. A preliminary 3rd Body test checks out. A non-linearity characterization and end-to-end ice body verification test need to be performed. The AERI-114 interferometer was re-installed and powered up (6/24) however, the AERI laptop went bad. An AERI VM will be installed instead to get everything operational again.
Work is in progress.

Other --- BBSS --- Operational.
2016/07/30, CM-2016-AMF3-VSN-1625: Software stopped responding at approximately 16:36 AST as flight 750729162 was nearing the end of its flight. The technician rebooted computer and software. Launch will resume in the morning.
2016/07/24, CM-2016-AMF3-VSN-1623: Technicians were unable to launch the afternoon (23:40 UT) balloon due to high wind conditions. Launches will resume when weather conditions permit.

Other --- CIMEL --- Operational.

Other --- GHG-Picarro --- Operational.

Barrow

INFORMAL NSA INSTRUMENT STATUS REPORT FOR July 22, 2016 - July 29, 2016 BRIEF STATUS OF INSTRUMENTS IN BARROW (C1) AS OF 2016/07/29:

DATA SYSTEMS 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
METTOWER - Surface Meteorological Instrument on tower Operational
AMC - Soil, up/downwelling radiation measurements Operational
ECOR-twr - Eddy Correlation Flux System Operational
ECOR-PtBRW - Eddy Correlation Flux System Not Operational
MWR - Microwave Radiometer Operational
MWRP - Microwave Radiometer Profiler Not Operational
MWRHF - Microwave Radiometer High Frequency Not 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
KAZR - Ka ARM Zenith Radar Operational as per http://radar.arm.gov
KaWSACR - Ka-Band Scanning ARM Cloud Radar 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
CLAP - Continuous Light Absorption Photometer Operational
CPC - Condensation Particle Counter Operational
NEPH - Nephelometer Operational
TOWERCAM - 40m tower camera Operational
TSI - Total Sky Imager Operational
AERI - Atmospheric Emitted Radiance Interferometer Operational
BBSS - Balloon Borne Sounding System Operational
CIMEL - Cimel Sunphotometer Not Operational
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* Barrow Instruments in Detail: *
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INFRASTRUCTURE --- Facilities --- Operational.

INFRASTRUCTURE --- DATA SYSTEMS --- Operational.
2016/07/26, CM-2016-NSA-UAF-4084: There was an error with the data disk.
It was removed, replaced, and checked for further issues.
2016/07/25, CM-2016-NSA-UAF-4083: The data disk was full and has been replaced. A number of 28 disks are available in the spares.

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 --- Operational.

SKYRAD --- NIMFR --- Operational.

TIPTWR --- GNDRAD general --- Operational.

TIPTWR --- MFR10m --- Operational.

TIPTWR --- PIRgnd --- Operational.

TIPTWR --- IRTgnd --- Operational.
2016/07/25, DQPR-5259: Data were missing after 4/24, 18:35 UT, then data were consistently bad until 6/3, 19:10 UT. Adam notes that after the maintenance and installation of the spare IRT (5/31) the data jump back up on 6/3 when the signal cable was reinstalled and the wiring corrected (CM-2016-NSA-UAF-4054). Since then the data are more in line when compared to the ULH but there were some large differences. The data improved around 6/13. The problem seems to have resolved by itself. DQR
D160624.2 has been submitted and DQPR closed.

TIPTWR --- PSPgnd --- Operational.

MET --- METTOWER general --- Operational.

MET --- CMH --- Operational.
2016/07/29, DQPR-5363: The CMH data looked to have recovered as of 6/24; but dropped again from 7/3 to 7/6. IM Jenni related the issues to mirror temperature control, or sensor contamination. However, the problem with the data noise seems to continue even after cleaning the mirror on 6/14.
Two DQR's D160715.2 (for noise) and D160715.3 (for the dropout) have been submitted.

MET --- Barometer --- Operational.

MET --- TEMPERATURE / HUMIDITY --- Mostly Operational.
2016/07/08, DQPR-5393: The data drop out on 6/5 and since then, the 40M dewpoint and RH readings have been fairly different from the other levels at times. Most notable is the opposite trending on 6/17 when it is off the charts over 110% RH. It is most likely a contamination issue.
The sensors will be removed during the annual change-outs in late summer/early fall. The DQPR status was set to 'waiting for spares'.

MET --- WIND INSTRUMENTS (SONIC) --- Mostly Operational.
2016/07/06, DQPR-5419: 40m wind data are missing since 6/28 most likely due to lost configuration. The anemometers will be upgraded with the Vaisala WMT700 model in the future.

MET --- PWD --- Operational.

MET --- AMC --- Operational, no ingest.

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

ECOR --- ECOR-Pt. Barrow --- Not Operational.
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.
2016/07/25, DQPR-5432: MWR data is missing for the period 2016/07/03
0800 UTC to 2016/07/05 1347 UTC. A DQR D160715.1 submitted by Maria Cadeddu and DQPR closed.

MW RADIOMETERS --- MWRP --- Not Operational.
2016/07/25, DQPR-5297: The instrument is offline, all data for the MWRP go missing at 0800 UTC 5/14. It was suspected that the instrument had a bad cable, causing data errors that caused the software to abort. A new cable from Radiometrics was received and replaced. However, there is still an error. According to Maria, the latest LV1 surface files indicate bad surface T/RH values. She requested Walter to replace the rotronic T/RH sensor. The sensor was replaced on 2016/07/19 however it did not solve the problem. The voltages associated with the surface sensor are very high and generating bad data. After communicating the issue with Radiometrics, the instrument is removed and will be shipped to Radiometrics to make sure there are no other issues.
2016/05/26, DQPR-5220: It looks like the IRT readings have adopted an oscillatory behavior. Walter reviewed the mirror and everything looks normal. The DQPR was linked to DQPR-5297. Waiting for cable (DQPR 5297).

MW RADIOMETERS --- MWRHF --- Not Operational since 6/24, 17:00 UT.
2016/07/29, DQPR-5434: Starting from 2016/06/24 1700 UTC, DSView shows error "Failed to get new ftp object: Net: FTP connect: No route to host".
2016/05/12, DQPR-4165: The data had started coming since 2016/03/24. But the 150 GHz channel was showing high noise levels probably because of an external source of interference. Subsequently, the data went missing since 2016/06/24. The DQPR status will be set to 'In Progress' until the source of interference is eliminated. The DQPR assignment will stay open until a path forward for the MWRHF can be determined.

MW RADIOMETERS --- GVR --- Operational.

LIDAR --- HSRL --- Operational.

LIDAR --- MPL --- Operational.

LIDAR --- CEIL --- Operational.

LIDAR --- Doppler LIDAR --- Operational.

RADAR --- RWP --- Operational.

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

RADAR --- KaWSACR --- Operational in testing mode per http://radar.arm.gov.
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.

RADAR --- XSAPR --- Not Operational as per http://radar.arm.gov.
2016/07/19, 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 was turned off until then. DQR will be submitted by Adam Theisen.

AOS --- AETH --- Operational.

AOS --- CLAP --- Operational.

AOS --- CPC --- Operational.

AOS --- NEPH --- Operational.
2016/06/09, DQPR-5304: All impactor data were missing from 5/16, 1900 UT until 5/18, 0600 UT. The data were not ingested in the
nsaaosimpactorX1.v1 DataStream. The impactor is working and the problem is most likely an ingest issue. The instrument mentor was asked to verify if the problem is related to ingest issue.

IMG --- TOWERCAM --- Operational.

IMG --- TSI --- Operational.

Other --- AERI --- Operational.
2016/07/29, DQPR-5234: The IRT sky temperature has been getting progressively noisier over the past couple of months. The problem seems to be related to the hatch. IM Jonathan suggests to better screen for invalid data due to hatch events. Additionally, there was a suspicion that the temperature occasionally shows both a high and low bias embedded within the noise. Inter-comparisons between the AERI measurements and radiative transfer calculations based on the ARM sonde profiles do not indicate this bias. The noise issue has been being tracked for AWR by the Data Quality office. The DQPR was closed without requiring a DQR submittal or solution assignment.

Other --- BBSS --- Operational.

Other --- CIMEL --- Not Operational.
2016/07/27, CM-2016-NSA-UAF-4085: The instrument was put off auto mode due to rain forecast for the next two days (7/27, 18:15 UT).
2016/07/28, DQPR-5261: Walter reported that CIMEL unit 252 has a failed wet sensor. It was decided to de-activate the auto mode until the faulty rain sensor was ordered and replaced. Meanwhile, the instrument was turned on (7/21) for a few days before turning off (07/28) due rain forecast (CM-2016-NSA-UAF-4082 and CM-2016-NSA-UAF-4085). The replacement wet sensor has been sent to Barrow and it is expected to arrive on 2016/08/02.

5 North Slope Facilities

AMF3

Current and Upcoming Site Visits

SNL/ BNL, AOS Install	August 1-10
SNL/PNNL/UAF, UAS Flights	August 6-21
LBNL, move GHG to AOS	August 8-12
SNL, move MASC to field	August 15-26
Baylor IOP	August 15- September 20
SNL VIP/IH/ES&H Visits	August 22-27

Current and Upcoming IOPs

ICARUS
Black Carbon on the North Slope (Baylor)

Site Issues

Raman Lidar was repaired and back on line since 07/14/2016.
MASC needs to be moved from the shelter deck to the field- plans are being laid out through ENG0003187

Unmet Needs

Due to the cancellation of the PNNL contract with Chenega for a Capstone 65KW turbine generator, AMF3 still lacks a viable source of power.

Site Upgrades

Site data system was upgraded thanks to the SDS team the week of July 25th.

Site Safety

Site Staffing Issues

A new observer has been hired, Ben Bishop, his first rotation begins August 8.

Tethered Balloon Operations

TBS Report for July 2016

Barrow: 7/21 – 7/23

The helikite was flown to 500' AGL with the POPS and miniSASP on the old steel runway in Barrow on 7/21/16. All sensors seemed to function as expected. We learned a lot about EMI from the iMet radiosonde used to transmit the POPS data. We will have to separate the sonde and POPS by at least 18". 500' is really not enough altitude to see a big difference in the aerosols but proof of concept went well. The onshore wind in Barrow seemed to be providing very clean air, particle counts were low, ~50 total. Allison McComiskey, Hagen Telg, and Jim Waddell from NOAA were all onsite.

It was determined that the miniSASP was incorrectly calibrated an essentially not operable. It was returned to Boulder with Hagen Telg. He plans to update the calibration and housing and to have the miniSASP able to fly during ICARUS in October 2016.

We were unable to fly all day in Barrow on 7/22 due to a low ceiling. The FAA waiver for balloon operations did not authorize balloon flights when the ceiling was below 1000' AGL. On 7/23 we were able to fly to 500' twice in the early afternoon, then transfer the POPS from the small enclosure (that was used with the helikite at Barrow), to the more weathertight, larger enclosure for the aerostat at Oliktok. After the transfer we tested the POPS on the roof across the street from the ARM duplex and troubleshot issues with the hardware based on Fan Mei's and Hagen's analysis of the data.

Figure 1: Helikite in flight with POPS in Barrow

Figure 2: Helikite on NSA Flatbed truck preparing for launch at Barrow

We flew to Oliktok on 7/24 with our equipment and arrived onsite around 5 pm. We prepared equipment on 7/25 while wind speeds were high.

On 7/26 while the POPS was on the ground we noticed it did not appear to be writing any data to the onboard thumb drive. After investigating this for a while and discussing with Fan we realized the onboard CR2032 battery had died so the data being written was in a folder named as January 1970 (rather than the correct date). We swapped the battery but the date remained incorrect because it requires someone to login and update the date and time. Fan thought we should go ahead and run the POPS on the TBS because we could try to work out the timestamp from another instrument.

We are not able to view the POPS data in real-time when we are running the DTS until our second radio arrives. We put the POPS on the tether along with 6 tethersondes, 7 SLWCs, 3 wetness sensors, and the DTS and floated the balloon at 3,000'. We floated for ~ 2.5 hours before bringing the POPS to the ground upon Allison McComiskey's arrival onsite. She wanted to investigate the effects of the balloon trailer generator on the data. We saw some very large particle counts around the generator, > 500. This effect seemed to dissipate even 6' above the generator so we will probably just note on the TBS log going forward when the POPS is within 6' of the ground. We will also change the CR2032 every ~10 hours of operation. We did see some strange periods where the data spiked very high, like particle counts of 8,000, and there was nothing in the lowest 2 bins. It was unclear if this was EMI or generator-related. We will investigate further on 7/27.

Handix (the POPS manufacturer) plans to network into the POPS on 7/27 in order to update the date and time (thanks to the ANL network folks being onsite). Fan and Handix will work over the next few weeks to determine a procedure so that the TBS crew can set the date and time on the POPS in Oliktok. The TBS plans to fly on 7/27 and 7/28 in Oliktok and then return the POPS to Fan at the end of this campaign.

Barrow

Current and Upcoming Site Visits

SNL/Vaisala, Barrow Autolauncher Maintenance	August 15-19
Baylor IOP Maintenance	August 22-23
SNL, VIP/IH/ES&H Visit	August 22-25

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 2 - Task order under CPA 1260749 for labor
ECOR Tower –Labor - Task order under CPA 1260749 for labor – POP Ends June 30, 2016
Sea Ice Effects on Arctic Climate, Rain sample collection - Dartmouth University – POP Ends Dec 2016
Extra repairs on radar systems – POP Ends June 31, 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.
TICFIRE Measurement in the Arctic - University of Quebec – Sept 2016 – May 2017

Site Issues

Polar Bears tore down cables on Point ECOR system sometime during the week of December 30th, 2015; we believe foxes chewed cables during that same time. The power cables remained intact due to armoring last year, and the data was retrieved. An electric bear fence is scheduled to be put in place in the near future; the wires will be replaced during that time.

Data systems were replaced, tested and verified operational the week of July 11th. A wireless network system was installed during that time in the Great White, Duplex, and Maintenance Building.

Unmet Needs

Auto Launcher deck contract has been awarded and is currently being fabricated, a decision will be made by August.

Berg is scheduled to be onsite to evaluate and provide an accurate cost estimate for installation of the Autosonde Deck Platform.

Site Safety

ES&H safety visit scheduled for August.

Site Staffing Issues
None

Distribution

ARM	
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