TWP ARCS-1 Site
RESET VISIT-3
Report
19 April - 02 May 1998
PNG NWS Momote Station, Manus Province and
PNG NWS Headquarters, Port Moresby,
Papua New Guinea

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1.0 INTRODUCTION:

The main goals of the TWP Operations RESET-3 Visit (routine) to ARCS-1 at Momote Airport on Manus, PNG were the following: 1) Instrument Calibration and Comparison Testing, 2) Instrument Change-Out, and 3) Replacement of the MPL.

This Report is organized according to the planned tasks or work units performed during the RESET Visit. Within these work units the activities accomplished is arranged chronologically. Most of the information was put together by the RESET-3 members based on the actual visit, daily reports.

2.0 TWP OPERATIONS / RESET MANAGEMENT:

Once an ARCS Site is established the Operations part of TWP is responsible for keeping the site running and reporting data. Operations also coordinates equipment retrofits at these established sites. This is accomplished by the local NWS personnel at the site, routine RESET visits and nonroutine RESET visits.

Routine RESET visits are scheduled on approximately six-month intervals and are focused mainly on routine maintenance, instrument calibration, instrument replacement, and training. A formal audit-in is performed upon arrival and audit -out before departure.

One **nonroutine RESET** visit is budgeted for each year. These visits are intended for technical nonroutine tasks such as emergency repairs, retrofits, or the addition of new instruments.

The work on a RESET visit is performed by the RESET Team, but many times in close coordination with the local on-site observers. The Team holds a daily tasking meeting each morning at the site using the proposed RESET visit tasking schedule. After each day's work, the team meets to summarize what was done and an assigned Team member writes a "Daily Report" to be e-mailed back to TWP personnel in the US. Because of the time-zone differences, necessary calls to instrument mentors in the US are done in the morning.

RESET-3 Members:

- Fred Helsel, TWP RESET Lead
- Doug Scott, TWP RESET Team Member
- Bill Porch, TWP RESET Team Member

PNG On-Site Observers:

- Geasa Stoesel, OIC
- Francis Anuma
- David Akia

Others On-site:

- Hastings Deering (H/D), generator maintenance man.

3.0 RESET PREPARATION:

Preparation for RESET visits requires a long lead time to line up reservations, visas, shots, medication, documentation, procedures, and training plans. Close coordination with AIS/ATSS, instrument mentors, and shipping personnel is critical well before the departure date. Prioritization and task rejection is a difficult and important part of RESET visit preparation.

TASKS PERFORMED:

A. Audit-In: (Scott)

4/20:

- Performed audit in.
- After the Investigation of the X-VAN, the following items are missing:
  - Portable Generator
  - Sun shade Tarp
- Brusag tracker was on the floor but appears all right.
- Located 90% of calibration equipment.
- Did not locate Mat Lab software and license.

Main Tasks

B. Instrument Calibration & Comparison Testing:

4/20:

- Started calibration of cal datalogger.

4/21:

- Set up Porch's porch at the sky stand.
- Finished calibration of the cal logger.
- Initial setup of the spare loggers for calibration.
- Installed spare PSP and NIP on the sky stand for comparison testing.
- The second box of radiometers and cables has not arrived; Dick Pearse is notified.

4/22:

- Calibrated spare RAD logger.
- Set up the SKYRAD and GNDRAD radiometers for comparison testing.
- Partially completed MFRSR Langleys.

4/25:

- The second box of radiometers arrived today.
- Calibrated FRNRAD datalogger.
- Finished the MWR calibration.

4/26:

- Calibrated the SKYRAD, GRNDRAD, and SPARE dataloggers.
- Started calibration of the SMET instruments, datalogger, and spare logger.
- Put new PSP, PIR, and NIP on the sky stand on cal logger for tracking data for comparison testing.
- Installed new configuration in the calibration logger for the new radiometers.

4/27:

- Worked on software for the chilled mirror.
- Began calibration of the ceilometer; power cord needed lengthening.

4/28:

- Calibrated Ceilometer.
- Calibrated IRT.

4/29:

- Performed overlap testing of the MPL.

4/30:

- Overlap testing of the MPL completed.
- Finished the SMET and datalogger calibration.
- Calibrated the SMET instruments, including the barometer.
- Reset the clock on the cal logger and sent the data to the ftp site.

5/01:

- The cal logger clock was 14 minutes 55 seconds fast when changed.
- Performed comparison checking on the spare SMET logger.

5/02:

- Removed the cal logger and radiometers from Porch's porch.
- Removed the spare NIP from the tracker.
- Turned the ground stand radiometers over to face downward.
- Completed comparison testing of PSPs, PIRs, and NIPs.

C. Instrument Change-Out:

4/25:

- The anemometers intended for changeout did not have the calibration coefficients with them. Their serial numbers are 18427/44669 and 10422/44693. Will not replace without further information.

4/29:

- Built new radiometer cables and installed new radiometers.

5/01:

- Radiometers as installed at end of RESET-3:

SKYRAD

	S/N	New Cal #
PSPD	29915F3	119048
PSPG	29916F3	125203
PIRD	30056F3	281690
PIRG	30084F3	278552
NIP	31347E6	121803

GRDRAD

	S/N	New Cal #
PIRDN	30131f3	265252
PSPDN	22913F3	123732

CAL

	S/N	New Cal #
PSP2	31284F3	116482
PIR	31303F3	287356
NIP	31348E6	117274 **Note**: mistakenly put in as 115340 on 4/29; changed 4/30

Additional Tasks

D. Replace MPL: (Scott)

4/20:

- Started recording temp and RH at MPL, using a hobo datalogger.
- Started old MPL laser; beam was not uniform B it had fringes. After an hour, it stopped varying.
- Replaced MPL laser supply, letting system run without taking data to check if supply drops out. It too had an irregular beam.

4/21:

- Monitored MPL operation, aligned scope to the ceiling port, reassembled the system, and performed the overlap correction procedure.
- Performed MPL tilt and thumping test and communicated to Flynn; no change.
- Configured MPL computer with an ftp and telnet account (OS-2 system config. Change).

4/22:

- Removed the large sun blocking disc from the MPL; the small shade disk is still operating. The MPL was missing screws and the mounting holes were worn out enough that the shade would not get completely out of the way. MPL shade compressor has a leak.

4/30:

- Reinstalled the MPL in the I-Van.
- Began collecting data at approximately 0630 4/30 GMT. System is on the network and ftp and telnet were tested.

5/01:

- The MPL data seems to have problems getting ingested. It gets to the /data_hold/raw/mpl directory.

5/02:

- Started ingesting and processing for the MPL.

E. Troubleshoot / Replace Solar Tracker: (Scott)

4/19:

- Upon first inspection, the Brusag tracker seems all right.

4/20:

- Tightened loose screw in the tracker support arm; system needs leveling and alignment.

4/21:

- Tightened and adjusted the arms of the tracker; noticed the support arm of the shade is cracked; will replace and align.

4/22:

- Replaced tracker arm on the Brusag.

4/23:

- The tracker is working correctly.

4/26:

- Performing on-going check of tracker alignment; still is performing correctly; believe replacing the arm corrected the problem.
- Options are to change out the tracker (do not think this is necessary) or send the spare tracker back to AIS for seal replacement.

5/02:

- Removed the flanges from the spare tracker for shipment.

F. Ceilometer Software Mods, System Installation, Replacement Computer: (Scott)

4/19:

- Hooked up the Ceilometer computer; then slowed the baud rate down to 24000; the computer then started taking data.

4/25:

- The ceilometer was not transferring its data from the c:/vceil/raw directory to the c:/send_dir.
- Looked at its setup and the logging settings seem correct.

5/02:

- Checked on ceilometer ingest process; seems to be transferring a single large data file once a day.

G. Install 3-Phase Monitor: (Helsel)

4/27:

- Began the installation of the 3-phase monitors.

4/29:

- Continued setting and installation of 3-phase monitors.

4/30:

- Finished setting and installing of the 3-phase monitors.

5/02:

- Checked on ceilometer.
- The ceilometer only gets its data taken once per day; Malone and Koontz working this.

H. Install New Software on MWR Computer: (Scott)

4/20:
- Installed new MWR software; experienced problems with the config file; did not get it working.

4/21:
- Configured MWR computer with an ftp and telnet account (OS-2 system config. Change).
- Reconfigured the MWR to run the original software; the new software did not work. Put it into TIP mode to let it run about one week in hopes of getting enough valid tip curves while we are here.

4/25:
- The MWR is now running the newly installed software. After it collects enough TIP data, not sure if the display is supposed to say LOS where it had TIP previously. We believe that the data for the 4/23 had enough valid TIPs. After ADaM ingests that data it will be put on the ftp site.

5/02:
- Checked on the MWR.
- The MWR has data in its send_dir; for some reason ADaM is not grabbing it.

I. Repair/Replace E-Van Air Conditioner: (Helsel)

Not Done.

J. H/D Routine GENSET Maintenance

4/22:
- Power went out Tuesday night at about 2100.
- The generator kept shutting off due to suspected overheating; we think this problem will be solved after Hastings Deering is here.
- After arriving at the site, we banged on the thermostat housing with a hammer, after a couple of iterations with the GENSET overheating, we got it to run continuously from around 9 am until almost 7 pm that night. It overheated right after we left the site. Grid power was restored right after it died in the evening.

4/26:
- Hastings Deering is on-site. Completed scheduled maintenance and changed out the thermostat. The generator still overheated, but Helsel noticed some leakage around the radiator cap. Got a new cap installed and also had a new thermostat delivered just in case. The mechanic stayed an extra day to finish the batteries and also to check the operation of the generator after the radiator cap was replaced.

- The GENSET has run for about 45 minutes and the temp is 174. This a lot longer than it ran after the thermostat was replaced without overheating. Will let it run overnight while the mechanic is still here to check on it. GENSET is still having cooling problems. Believe that the problem is in the temperature sensor. Hastings Deering is going to try and have one delivered to us this week so we can install it.

4/27:
- Continued work on the GENSET.

4/29:
- Used the GENSET as primary power to test solution of overheating problem.

K. Hook Up Dehumidifiers in Vans: (Helsel)

4/25:
- Started installation of the dehumidifiers (except in E-Van).

4/27:
- Repaired dehumidifier that was damaged in shipping.

L. Inspect SMET Tower Joint: (Scott)

4/26:
- Inspected SMET tower joint. Looked OK; has two 1/2 inch long bolts 180 degrees apart to secure the joint. One bolt was loose. Do not know if we should replace the bolts with the collar.

M. Check D-Van Power Supply: (Helsel)

4/21:
- Inspected DC charging power supply in the D-Van; power is supplied by the lighting circuit so system is turned ON and OFF by the light switch (installed by RESET-Special).

4/30:
- Rewired D-Van, charging power supply to a nonswitched circuit.

N. Change U-Van Door Lock Combination: (Helsel)

4/22:
- Changed the U-Van lock combination.
- Installed the bar lock on the X-Van.

O. Glue MPL Roof Glass to Port: (Scott)

4/26:
- Resealed the MPL port.

P. Replace MWR Screen: (Helsel)

4/30:
- Replaced the MWR heater unit.

Q. Change IRT Uplooking Range Setting (from -50/+50 to -60/+40): (Scott)

4/21:
- Installed site spare IRT in the new box with the rainshutter with heater for comparison testing.
- Changed range to -60 to +40 and changed scale factors to 25V/C.

R. Data Communication:

4/19:
- Attempted to connect to the FTP site: dmf.arm.gov.; not successful; may need some assistance; still able to e-mail CAL data.

4/21:
- Connected AdaM through the IMRSAT to dmf.arm.gov for date transmission ease.
- Transmitted a days worth of data from the MPL, MWR, Ceilometer, and the SKYRAD. (Check data at dmf.arm.gov; log-on as anonymous with your e-mail address as the password; data located in /pub/reset3/"instrument.")

4/23:
- Sent netcdf and raw data to the dmf.arm.gov ftp site. The data is for 4/22/98 GMT. Under each instrument there are directories for raw and netcdf; in these directories there is a folder with the date corresponding with the data collection date.
- The mfrsr has only raw data and also some data from 4/23; since the afternoon here was fairly clear, we thought that data would interest you.
- We have not shipped any mwr or smet data yet; we do this tomorrow.
- The config files for the dataloggers are located in the folders under the logger name. The data references the date the file was downloaded from the logger not the version of the ocnfig file.
- The ceilometer netcdf files are not appearing on ADaM. Malone and Koontz will be informed of this.
- Both the sky and ground instruments are pointing upward.

4/26:

- Uploaded the new calibration logger configuration file and the data file 4/25 to the ftp site.

4/29:

- Transferred MPL and Ceilometer data 4/28 to the ftp site in self-extracting, compressed files.
- Transferred MPL overlap data to the ftp site: 50 min. of data; 5 min. of data with telescope cover in place; 5 min. of data with the laser OFF and the cover removed; 5 min. of data with the laser OFF and the cover in place.
- Reset the telnet password on the MPL computer. Tested it with a connection from the ceilometer computer. The MPL will probably be down due to the overlap correction process from 0640-2400 04/29/98 GMT.

4/30:

- Transferred MPL overlap data to the ftp site: 2 hours of data; 5 min. of data with the telescope cover in place; 5 min of data with laser OFF and the cover removed; 5 min. of data with the laser OFF and the cover in place.
- Sent raw and netcdf data from the sky and ground dataloggers 4/28 and 4/29 to the ftp site. This data is compressed in a self-extracting file.
- Started data collection and processing on ADaM for the MWR. Checked data after a couple of hours and netcdf files were being created.

5/01:

- Sent data to the ftp sites for all instruments. Files are all in the RESET-3 directory and are all self-extracting, winzip files. It was a lot quicker this way. They are named “instrument”980401.exe. The data is from approximately 0500 4/30 - 0500 5/1 GMT.

5/02:

- Sent 4/30 0000 - 0400 GRNDRAD data to the ftp site.
- Sent INGEST files 5/1 2300 - 5/2 0300 data (GNDRAD and SKYRAD) to the ftp site for analysis.
- Sent GNDRAD and SKYRAD data to the ftp site for 5/2 0000 - 0600. This is in a self-extracting file called logger_980502.exe. Sent MPL raw and netcdf data to the ftp site. Filename mpl_989592.exe. This data is in a folder named pub/reset3/980502.

S. I-Van UPS:

4/22:

- I-Van UPS went down.
- Worked on troubleshooting the UPS in the I-Van. When we started the generator; the I-Van UPS would not stay up. The batteries seem too low to charge or else there is a problem with the inverter.
- Connected an extension cord from the D-Van UPS to the I-Van. This should explain the problem with the ceilometer computer since it probably ran all the way down when the GENSET overheated.
- Adjusted the output voltage of the GENSET; it was adjusted about 10% for some reason.

4/23:

- Diagnostics on I-Van UPS; e-mailed Ivey with a list of symptoms and alarm indications for him to confer with Clarey about.
- I-Van lost grip power (lights, AC, etc.). Troubleshooting indicates bad timer relay. It seems to get hot. This might be related to the other night when the power cycled ON and OFF several times in a couple of hours.

5/02:

- Replaced suspected faulty relay in the I-Van.

T. MFRSR:

4/25:

- The MFRSR band was adjusted at about 0000 GMT (10 am local time) on 4/24. It was checked again a couple of hours later and was off a little bit.
- Porch and Scott both have programs to use to calculate solar noon. Got two different answers. Need someone to do the calculation for 4/24/98 PNG time at 002 degrees 3.657' S 147 degrees 25.51' E and confirm what the correct time for solar noon is. One program listed it at 11:48 and the other listed it at 12:08. If neither one of these times was correct, we need the times for solar noon for the week of 4/26 for alignment check.

4/26:

- Checking the MFRSR alignment ongoing.

4/30:

- Replaced the MFRSR head with spare and realigned the stand at solar noon.
- Readjusted the band.

U. ADaM Tape Problems:

4/26:
- Worked on ADaM tape-drive alignment; passed information on to Malone and Koontz.

4/29:
- Removed the processed tape unit from EVE for shipping.

V. Visit High School: (Helsel)

4/30:
- Visited Naringel School; Porch gave a good talk.

W. Miscellaneous:

4/20:
- Purchased a vinyl tarp for the shade stand.
- Rechecked the Mat Lab documentation; the software and license is not with the manuals.

4/22:
- The transformer in the Lead Lag Controller blew in the E-Van; need to bypass the Lead Lag Controller by putting a thermostat directly on the AC unit.

4/26:
- Fred assembled and supervised Stoesel family kite flying.
- Bypassed the lead lag controller in the E-Van and mounted an analog thermostat.

4/29:
- Solved I-Van status reporting problem to MACS. Believe there is an intermittent problem with the NDU in the I-Van. The humidity in the D-Van is normally running around 50%.
- Removed drop shipper operations from the MPL and MWR computers. Turned OFF the instruments and processing in ADaM.

5/01:
- Packed equipment for shipment.

5/02:
- Commented-out some references to the dataloggers in the root cron job. This should fix the missing data problem. The ingest files look correct now.
- Cleaned the vans.

X. ARCS-1 Site Audit-Out: (Scott)

- Upon departure from the site, took an inventory to identify the changes made during the RESET Visit and listed resupply issues to be addressed upon our return.

5.0 NEXT RESET VISIT:

The following items should be considered for inclusion in the task planning for the next RESET visit:

- Investigate the X-Van for missing items; this visit the generator was gone and the sun shade tarp was missing.

- Items Needed at Site:

    1. Reference temperature probe.
    2. Psion palm computer for interacting with ceilometer and loggers.
    3. Tarp for top of awning (purchased temporary replacement).
    4. Spare PIR, only PSP & NIP (this changed after new radiometers arrived after first week.
    5. Mat lab software (only license was found).
    6. Screws for MPL shutter.
    7. Screws for Radiometer shields.
    8. Cardboard target to fit on MPL window for alignment.
    9. Power cords for spare loggers.
    10. Spare timer switch on power for I-Van.
    11. MFRSR angle plate (without this limited to checking alignment at solar noon).
    12. Leveling bubble for MFRSR.
    13. Spare band and/or set-screw for MFRSR.
    14. Compass for aligning windvanes.
    15. Balloons or rubber gloves for temperature probe calibration.
    16. Alligator clips.
    17. Complete assortment of stainless steel screws and nuts (nonstainless steel are corroding).
    18. Lab jack for MPL overlap test.
    19. Digital level for instrument leveling other than MFRSR.
    20. Printer driver for Laser Jet II.
    21. VHS head cleaning tape.
    22. Spare Node Data Unit (NDU).

- Need new design of tracker arm for ARCS-2 and replacement for ARCS-1.
- Need replacement Lead Lag Controller thermostat in E-Van.
- Repair MPL Shade compressor (has leak).
- Need procedure for calibrating MFRSR.

6.0 LESSONS LEARNED:

The following observations were made by the RESET members that should be considered for future TWP installations and operations:

- Use ftp sites for data exchanges.

7.0 ATTACHMENTS:

- Audit-In/Out Form