

# FOREIGN TRIP REPORT

## A1. SUMMARY:

**Report Date:** January 23, 2002  
**Traveler:** Troy Culgan<sup>1</sup>

**Traveled with:**  
**Destinations:** Nauru Island, Republic of Nauru  
**Dates:** 01/02/02 to 01/11/02

## A2. PURPOSE:

This trip was part of the DOE<sup>2</sup> ARM<sup>3</sup> Program's continuing efforts to establish several ARCS<sup>4</sup> sites in the Tropical Western Pacific (TWP) region. The first ARCS was installed on Manus Island in Papua New Guinea (PNG) in the summer of 1996 and the second ARCS was installed on the Island of Nauru in the Central Pacific in the fall of 1998.

This particular trip had 2 major goals: **1)**ARCS2 repair task list: a)skyrad logger repair;b)MFRSR repair; c)TRH probe replace; d) Cimel repair; e)Install MPL laser diode ; **2)** NIES repair task list: a)Kipp & Zonen re-initialize; b)MFRSR repair; c)UPS control board replacement; d)TSI data collection problems investigate

## A3. ABSTRACT:

The Department of Energy's ARM program has begun phased operations of Cloud and Radiation Testbed facilities in the TWP. TWP science considerations require that several observation stations be sited across the Pacific Basin from Indonesia to east of the dateline. To meet these requirements the ARM program is developing ARCS, which will operate in a semi-autonomous mode for long periods in remote locations. We began operations of the first ARCS on the island of Manus in PNG in the fall of 1996 and installed the second ARCS for Nauru Island in the central area of the TWP in 1998. Regularly scheduled maintenance, improvement and calibration visits are required for both sites by ARM Operations.

This report outlines the latest BOM emergency maintenance visit, which consisted of Troy Culgan, The description for each activity item is based on daily reports prepared by Troy Culgan.

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<sup>1</sup> Technician, Australian Bureau of Meteorology

<sup>2</sup> U.S. Department of Energy

<sup>3</sup> Atmospheric Radiation Measurement

<sup>4</sup> Atmospheric Radiation and Cloud Station

## **B. REPORT**

### **Activities at Nauru Site (January 3 – January 11)**

#### **January 3**

##### **ARCS2:**

- Skyrad logger failure caused by water ingress at cable junctions of the cable for the UVB. Rectification action; cable replaced.
- MFRSR connectors showing signs of corrosion, this corrosion may be the cause of failure. The shadow band arm was rotating continuously on initial inspection. As yet the cleaning of the connection seems to have been unsuccessful, replacement of cable with ARCS3 cables may be necessary .
- Cimel, weather conditions did not permit a full assessment of the problem.

( ie. No sun.)

- Observers to change out TRH probe
- TSI data problems, Error message reads;

A Fatal exception error at 0028:C0244699 in VXD VMM (10)+00000699. The current application will be terminated.

Press any key to terminate or ctrl alt del to restart computer

##### **NIES**

- K&Z tracker; reloaded configuration using K&Z file on Chuck Longs laptop, which is in use at ARCS2. Configuration loss would seem to have been caused by the cable for the NIP getting caught somehow, looks like mystery. Some corrosion is apparent on the counter balance arms and securing hardware, corrosion is also evident at the 9pin connector for the K&Z.
- MFRSR also suffers from corrosion and some water ingress to connectors causing intermittent operation/ malfunctions.
- TSI data problems may have some cause in operator error with internet explorer program being left running.
- Ventilators condition. B&W-slow, PIR- stopped , PSP- ok
- Board for UPS on site.

## January 4

### ARCS2:

- Skyrad logger failure caused by water ingress at cable junctions of the cable for the UVB. Rectification action; cable replaced. Completed appears correct.
- MFRSR replaced with ARCS3 MFRSR logger board, motor, sensor and cables. Appears ok but will check alignment if there is sunshine.
- TSI laptop scheduled daily reboot. Checking the Lacie drive found that the TSI had stopped archiving data 22 Dec 2001 recommenced after reboot on 03 Jan 2002. Checking the data on the CD's ready for shipment found that the week 16 Dec 2001 until 22 Dec 2001 had no data , created a CD copy of that missing week from the data on the Lacie drive. All backlog of CD's will be shipped Monday .
- Cimel, weather conditions did not permit a full assessment of the problem. ( ie. No sun.)
- ARCS3 satphone operational using SIM card 901100C0A175

### NIES

- K&Z tracker; appears operational
- MFRSR appears operational
- TSI laptop scheduled daily reboot
- Ventilators condition: B&W- ok(**replaced fan**), PIR- ok (**replaced fuse**) , PSP- ok

## January 5

### ARCS2:

- MFRSR; rain seems to have affected this MFRSR as well, symptom motor continuously rotating. I have turn the unit off and stopped data acquisition, I will investigate when the weather is more favorable. MFRSR installed : sensor head serial number 00225, Logger board B0D2.
- Cimel, weather conditions did not permit a full assessment of the problem. ( ie. No sun.)

- MPL- not operational, worked with Connor Flynn with the following results

MPL Setting	.5watt	1.00 watt
STATUS	TMP1- 20.9 CUR1- 1.1 PWR1- .53 Mode- Pulse	TMP1- 20.9 CUR1- 1.64 PWR1- 1.00 Mode- Pulse

Q pulse seems ok

Open transceiver unit , no apparent output from laser head.

## NIES

- UPS repair completed, circuit board P/N 122-1266 replaced and unit assembled and set to work. Initial UPS status on turn on.  
Led condition
 

Load1	ON – Green
Load2	ON – Green
Inverter	ON – Green
AC In	ON – Green
Battery Level	ON – Red (percent less than 20%)
Load Level	ON – Green (one led)

 After several hours Battery level increased to indicate 100%( one red led, four Green – ON)
- Desiccant bags were already installed in junction enclosures with no signs of corrosion.

## January 6

### ARCS2:

- MFRSR; cleaned and dried all connectors during short break in weather, shadow band arm rotation is now correct, however data is still bad. Reset unit.
- Cimel, weather conditions did not permit a full assessment of the problem.  
( ie. No sun.)
- MPL- not operational.
- I-Van I/O block troubleshooting, it seemed that the 24 Volt dc supply was not referenced to earth. Replaced power supply unit with spare, UPS voltage now displayed on SAM laptop but spare power supply output only

4 Vdc. Inspected both power supplies found burnt components in the spare. Re-installed original unit after inspection found no obvious fault. SAM laptop display now normal fault apparently cleared, possibly a poor connection or bad join in power supply, no spare supply on site. (Acopian model number A24NT125)

## **NIES**

No work on site due to inclement weather.

### **January 7**

#### **ARCS2:**

- MFRSR; had just enough sun to check alignment and make adjustment. MFRSR correct.
- Cimel, weather conditions did not permit a full assessment of the problem. (ie. No sun.)
- MPL- not operational.
- Replace ventilator for PIR ser No 33061F3, repaired non functional ventilator(replaced fan)

## **NIES**

- MFRSR began to continuously rotate after inclement weather, all connectors checked for moisture or corrosion, none was evident. Further investigation proved water to be inside motor and on motor circuit board. Rectification action taken, board and motor cleaned and dried. MFRSR again operational.
- Cable repaired for Nip, replacement was not necessary.
- Recommend monthly replacement of desiccant bags in equipment enclosures.

### **January 8**

#### **ARCS2:**

- MFRSR; Original MFRSR sensor and logger board replaced. ARCS3 motor left in place. Logger Board serNo.B3F6 Sensor ser No 240
- Cimel; investigations found cable to zenith motor still faulty, repaired cable. Unit still faulty, belt slipping on zenith motor despite being set to give maximum tension on the belt. Nil spares on site. Collimator was pointing skyward when unit failed

hence it was full of water, do not if this is a problem for the instrument.

- MPL- not operational.
- MWR; replaced fan/heater assembly due to fan failure reported during observer daily checks.

## **NIES**

Retrieved data as requested and as per instructions provided by Chuck Long, CD's will be sent with the regular NIES and ARCS2 TSI data next week.

### **January 9**

#### **ARCS2:**

- Cimel- not operational- awaiting advice from mentor.
- MPL- check all internal connections of laser diode module, reassembled MPL. We have ignition, MPL appears operational.

MPL serial numbers

7300 Laser Diode Module	Ser No 3334	WD27546
MPS Scaler Control	Ser No 024S	WD23019
Computer System, Lidar Control	Ser No 009d	WD27537
Optical Transceiver	Ser No 009a	WD27536

## **NIES**

- Retrieved data as requested and as per instructions provided by Chuck Long, CD's will be sent with the regular NIES and ARCS2 TSI data next week.

### **January 10**

#### **ARCS2:**

- Cimel- not operational- advice from mentor, Return equipment to states for repair and calibration. Unit has been disassembled and observers will return.
- Reboot MMCR as per request Rex Pearson

## **NIES**

Due to Island power outage site has been powered down, power outage is expected to last 24-48 hours.

## C1. ITINERARY

### Itinerary for Troy Culgan

<u>From/To</u>	<u>Date</u>	<u>Purpose</u>
Australia/Nauru	Jan 02 – 03, 2002	Air travel to Nauru
Nauru	Jan 03 – Jan11, 2002	Nauru Site visit
Nauru/Darwin	Jan11 – 12, 2002	Air travel to Darwin (one night in Brisbane, )

## C2. Key Contacts

### Nauruan Government:

- Andrew Kaiurea – Nauru IDI (Administrative contact)
- Megan Aliklik, On-site observer
- Henry Harris, On-site observer
- Nicolas Duruburia, On-site observer
- Franklin Teimitsi – Nauru IDI (Observer)

### Australian Bureau of Meteorology:

- Troy Culgan