Ceilometer Battery Changeout

I. Purpose:

This field calibration procedure outlines how to replace the ceilometer battery.

II. Cautions and Hazards:

- Do not view the ceilometer beam directly with magnifying optics (i.e., binoculars, telescopes, etc.).

III. Requirements:

- Triangular key
- Battery

IV. Procedure:

A. Steps:

1. Open ceilometer housing with special triangular key.
2. Inspect to see if lights are blinking, and check for internal damage.
3. Flip toggle switches (equipment power, window conditioner, and battery) to **OFF** position.
4. To be extra safe, disconnect power cord to ceilometer (if possible).
5. Inspect replacement battery for leaking electrolyte, white powder residue, and corroded terminals.
6. Unscrew battery front panel.
7. Carefully remove gel cell battery using the battery removal strap. **Note: In freezing temperatures, there is a danger of battery rupture if the battery is completely discharged.**
8. After noting the polarity of the connectors, remove terminal connections being careful to avoid shorting the terminals with the battery connected.
9. Remove the tape on battery removal strap, and tape it on the replacement battery with the positive terminal at the open ends of the strap.
10. Replace old battery with new battery making sure that the polarity is correct.
11. Reseat the new battery in the ceilometer, and screw the face plate back on.
12. Reconnect power to the ceilometer, and flip all three toggle switches to the on position.

13. Close outside cover.
14. Check to see if the ceilometer is producing data and the low battery warning has gone. If the communication port has hung up, the computer may need to be rebooted.
15. If problems persist, contact mentor for further corrective measures.

V. References:

1. William Porch, Manual Translation, August 16, 1995.

VI. Attachments:

1. Ceilometer Calibration Form, FM(CEI)-001.
2. Example of Completed Ceilometer Calibration Form
3. Example of VCEIL Configuration File

Attachment 1: Ceilometer Calibration Form FM(CEI)-001

ARCS Ceilometer Field Calibration Form

I. Calibration information

This is a (check which):	Calibration	Calibration Check	Field Calibration
			X

Date:	GMT Begin Time:	GMT End Time:	ARCS #

Instrument / System:	TWP OMS Part Number:	TWP OMS Serial Number:
Ceilometer	CT25K	

Location (eg. PNNL, Manus):	Participant(s):	Issued by:	Signature(s):

Reference Instrument(s):	TWP OMS Part Number(s):	TWP OMS Serial Number(s):
Bushnell Range Finder	200400-010578 model 400	
Tape Measure		

II. Initial Values

Angle Correction ain degrees:

Sensor/Element:	Reference Distance (m)	Reading	Reference	Reading	Reference	Reading

Manus: 331 m to telephone poles about 100 m from trees
235 m to trees, 134 m to ARCS fence, 52 m to ceilometer from fence + 15 m for height
Nauru: 45 m to balloon launch

III. Final Values

UNCHANGED:

Sensor/Element:	Reference Distance (m)	Reading	Reference	Reading	Reference	Reading

Did you remember to reset ceilometer to angle_cor "on", port "data",and Message Type 2

IV. Calibration Change (if applicable)

Offset (m) [Distance Correction Factor]:

Document(s) Referenced:
PRO(CEI)-001.001
PRO(CEI)-002.001

Document(s) Updated:
PRO(CEI)-002.004

PROBLEMS:

NOTES:

Attachment 2: Example of Completed Ceilometer Calibration Form

ARCS Ceilometer Field Calibration Form

I. Calibration information

This is a (check which):	Calibration	Calibration Check	Field Calibration
			X

Date:	GMT Begin Time:	GMT End Time:	ARCS #
7/6/00	0:14	1:28	2

Instrument / System:	TWP OMS Part Number:	TWP OMS Serial Number:
Ceilometer	CT25K	P270015

Location (eg. PNNL, Manus):	Participant(s):	Issued by:	Signature(s):
Nauru	Porch		

Reference Instrument(s):	TWP OMS Part Number(s):	TWP OMS Serial Number(s):
Bushnell Range Finder	200400-010578 model 400	
Tape Measure		

II. Initial Values

Angle Correction ain degrees: 1

Sensor/Element:	Reference Distance (m)	Reading	Reference	Reading	Reference	Reading
ceilometer	45	50				

Manus: 331 m to telephone poles about 100 m from trees
235 m to trees, 134 m to ARCS fence, 52 m to ceilometer from fence + 15 m for height
Nauru: 45 m to balloon launch

III. Final Values

UNCHANGED: X

Sensor/Element:	Reference Distance (m)	Reading	Reference	Reading	Reference	Reading

Did you remember to reset ceilometer to angle_cor "on", port "data",and Message Type 2: **yes**

IV. Calibration Change(if applicable)

Offset (m) [Distance Correction Factor]:

Document(s) Referenced:	Document(s) Updated:
PRO(CEI)-001.001	
PRO(CEI)-002.001	

PROBLEMS:

Difficult to hit launcher. Kept getting no clouds or below it.

NOTES:

Attachment 3: Example of VCEIL Configuration File

CEILO>get algorithm
NOISE SCALE: 1.7
MINIMUM SUM: 30
MINIMUM EXTCO: 6.0

CEILO>get data_acq
AUTOADJUSTMENTS: ON
DATA-ACQ. INTERVAL: 15 SEC.
RECEIVER
GAIN: H
BANDWIDTH: N
SAMPLING RATE: 10 MHz
TRANSMITTER
LENGTH OF PULSE: L
POWER OF PULSE: 215
QUANTITY OF PULSES: 64K
COMPENSATION
COARSE COMPENSATION: 10
FINE COMPENSATION: 29

CEILO>get factory
FACTORY
BEAMSPLITTER: 100%
IN LASER: 185
OUT LASER: 1040
COARSE COMP.: 13
FINE COMP.: 125
PROFILE DC: NONE
REC INDEX: NONE
RECEIVER TEST VALUE: 550
CLEAN WINDOW: 275mV

CEILO>get message
MESSAGE

ANGLE CORRECTION: ON

HEIGHT OFFSET: 0 m

NOISE H2 COMPENSATION: ON

PORT: DATA

PROFILE SCALE: 100%

TYPE: 2

UNITS: METERS

MODE: AUTOSEND

WARNING DELAY: OFF

CEILO>get port

MAINTENANCE PORT BAUDS: 2400, E71

DATA PORT BAUDS: 9600, E71

DATA PORT INTERFACE: RS-232

YOU ARE USING: DATA PORT

CEILO>get info

CT25K 2.01a 1999-01-28

CTLIB 2.01 1998-02-26

CTCLI 2.01 1998-01-30

CEILO>get status

VOLTAGES (UNIT 0.1V)

P12 128 M12 -127 P5G 54 M5G -56 VCA 238

P13 132 M13 -132 P5R 50 M5R -51 BAT 134

P18 176 PHV 2092 PFB 30 P65 753 CHA 135

RECEIVER TRANSMITTER

GAIN H PLEN L

BAND N PQTY 64K

SAMP 10MHz OUT 1029mV

SENS OK SENS 98%

COMP 010 029 IN 215

TEMPERATURES ENVIRONMENT

BLOWER +34C WINDOW 185mV 67%

CPU +44C RADIANCE 45mV

LASER +40C ANGLE +1DEG

LENS +41C HUMIDITY NONE

OUTSIDE +30C

INHEATER OFF OUTHEATER OFF BLOWER OFF

CEILO>get unit_id

UNIT ID: N