

ARCS PROCEDURE: Author: W. Porch	CEILOMETER FIELD CALIBRATION (CALF)	PRO(CEI)-002.004 6 February 2002 Page 1 of 10
---	--	---

Ceilometer Field Calibration (CALF)

I. Purpose:

The field calibration procedure is based on the ability of the instrument to tip parallel to the ground. Comparison with MPL heights during the low-cloud situations is informative, however the relative low resolution of the MPL makes this comparison only a qualitative performance check.

II. Cautions and Hazards:

- Do not view the ceilometer beam directly with magnifying optics (e.g., binoculars, telescopes, etc.).
- Perform this procedure every time the RESET team visits the site.

III. Requirements:

- Crescent wrench
- Maintenance cable (if maintenance terminal used)
- PRO(CEI)-001. Maintenance Terminal Procedure (if maintenance terminal used)
- Laser range finder or other distance measure

IV. Procedure:

A. Steps:

1. Connect the Maintenance Terminal (see ceilometer maintenance terminal procedure: PRO(CEI)-001.) or select "terminal and open windows terminal" from ceilometer computer.
2. Type "**open**" enter, and then "**set message angle_cor off**" to disable angle correction for a distance measurement.
3. If maintenance terminal used, type "**set message port maintenance**" and "**close.**"
4. Loosen the two mounting bolts on the ceilometer tipping mount and point ceilometer at fixed target a known distance away (trees at Manus and ballon launch structure at Nauru).
5. If the beam is too low or the target is too close, error 4 (obstructed beam) shows as the first character on the data line from the maintenance terminal. This occurs at Nauru, and the third field represents the distance to the target (45 m).

ARCS PROCEDURE: Author: W. Porch	CEILOMETER FIELD CALIBRATION (CALF)	PRO(CEI)-002.004 6 February 2002 Page 2 of 10
--	--	--

6. When a distant target is selected and a 1 shows as the first character on the data line, the distance (within 15 meters) shows as the second set of four (4) numbers on the data line from the maintenance terminal.
7. If the distance shown differs from the measured difference by 30 m or more, realign and try again. If the difference is still greater than 30 m, log difference and contact instrument mentor. (Note: the beam divergence is very small (0.6 mradians), so that larger targets, like buildings, are easier to hit but the distance will vary depending on where the beam hits the target.
8. Download ceilometer configuration PRO(CEI)-010; the filename format is **ceiymmdd.cfg**.
9. Reopen the maintenance port and type “**set message angle_cor on**” and “**set message port data**” and “**close.**”
10. Check to see that data is being transferred to the data terminal.
11. The final configuration for the ceilometer is:
 - “set message units meters”
 - “set message type MSG2”
 - “set message profile type h2_noise ON”
 - “set message angle_cor ON”
 - “set message port data”
12. Record the date, start-time, end-time, and any comments into the general comments section of the ARCS Calibration Form FM(CEI)-001.

V. References:

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

VI. Attachments:

1. Ceilometer Calibration Form (FM(CEI)-001).
2. Example of Completed 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 <input type="checkbox"/>	Calibration Check <input type="checkbox"/>	Field Calibration <input checked="" type="checkbox"/>	
	Date:	GMT Begin Time:	GMT End Time:	ARCS #
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Instrument / System:	TWP OMS Part Number:	TWP OMS Serial Number:		
<input type="text" value="Ceilometer"/>	<input type="text" value="CT25K"/>	<input type="text"/>		
Location (eg. PNNL, Manus):	Participant(s):	Issued by:	Signature(s):	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
Reference Instrument(s):	TWP OMS Part Number(s):	TWP OMS Serial Number(s):		
<input type="text" value="Bushnell Range Finder"/>	<input type="text" value="200400-010578 model 400"/>	<input type="text"/>		
<input type="text" value="Tape Measure"/>	<input type="text"/>	<input type="text"/>		

II. Initial Values

			Angle Correction in degrees	<input type="text"/>		
Sensor/Element:	Reference Distance (m)	Reading	Reference	Reading	Reference	Reading
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

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:	<input type="text"/>					
Sensor/Element:	Reference Distance (m)	Reading	Reference	Reading	Reference	Reading
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

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 Form

ARCS Ceilometer Field Calibration Form

I. Calibration information

This is a (check which):	Calibration <input type="checkbox"/>	Calibration Check <input type="checkbox"/>	Field Calibration <input checked="" type="checkbox"/>	
	Date: <input type="text" value="7/6/00"/>	GMT Begin Time: <input type="text" value="0:14"/>	GMT End Time: <input type="text" value="1:28"/>	ARCS # <input type="text" value="2"/>
Instrument / System: <input type="text" value="Ceilometer"/>	TWP OMS Part Number: <input type="text" value="CT25K"/>	TWP OMS Serial Number: <input type="text" value="P270015"/>		
Location (eg. PNNL, Manus): <input type="text" value="Nauru"/>	Participant(s): <input type="text" value="Porch"/>	Issued by: <input type="text"/>	Signature(s): <input type="text"/>	
Reference Instrument(s): <input type="text" value="Bushnell Range Finder"/> <input type="text" value="Tape Measure"/>	TWP OMS Part Number(s): <input type="text" value="200400-010578 model 400"/>	TWP OMS Serial Number(s): <input type="text"/>		

II. Initial Values

	Angle Correction ain degrees	<input type="text" value="1"/>				
Sensor/Element:	Reference Distance (m)	Reading	Reference	Reading	Reference	Reading
<input type="text" value="ceilometer"/>	<input type="text" value="45"/>	<input type="text" value="50"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

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:	<input checked="" type="checkbox"/>					
Sensor/Element:	Reference Distance (m)	Reading	Reference	Reading	Reference	Reading
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

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

ARCS PROCEDURE: Author: W. Porch	CEILOMETER FIELD CALIBRATION (CALF)	PRO(CEI)-002.004 6 February 2002 Page 6 of 10
---	--	--

IV. Calibration Change(if applicable)

Offset (m) [Distance Correction Factor]:

Document(s) Referenced:

PRO(CEI)-001.001
PRO(CEI)-002.001

Document(s) Updated:

PROBLEMS:

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

NOTES:

ARCS PROCEDURE: Author: W. Porch	CEILOMETER FIELD CALIBRATION (CALF)	PRO(CEI)-002.004 6 February 2002 Page 7 of 10
---	--	---

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

ARCS PROCEDURE: Author: W. Porch	CEILOMETER FIELD CALIBRATION (CALF)	PRO(CEI)-002.004 6 February 2002 Page 8 of 10
--	--	--

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

ARCS PROCEDURE: Author: W. Porch	CEILOMETER FIELD CALIBRATION (CALF)	PRO(CEI)-002.004 6 February 2002 Page 9 of 10
--	--	--

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

ARCS PROCEDURE: Author: W. Porch	CEILOMETER FIELD CALIBRATION (CALF)	PRO(CEI)-002.004 6 February 2002 Page 10 of 10
-------------------------------------	--	--

LASER +40C ANGLE +1DEG

LENS +41C HUMIDITY NONE

OUTSIDE +30C

INHEATER OFF OUTHEATER OFF BLOWER OFF

CEILO>get unit_id

UNIT ID: N