

UAH Ceilometer Data Formats

clo????????.dat Files

```
18:55:41 08/20/2001
40 01800 03300 ///// 00000800
100 N 99 +36 110 0 +4 203 LF7LN1 180
000 525 490 400 335 314 290 276 272 256 232 213 202 187 187 178 160
016 164 160 145 131 140 106 111 81 76 74 62 59 63 63 29 16
032 42 -1 18 13 14 -11 -6 26 17 9 -13 -26 -5 -1 -10 -9
048 1 -11 -4 -3 6 -20 -8 24 7 18 -12 7 -19 5 20 3
064 30 -24 -30 10 5 17 -24 6 -11 -2 11 -18 18 -8 7 -6
080 -4 18 -6 -10 16 -2 37 -15 4 8 19 18 0 -4 -18 -12
096 22 -2 15 0 6 -5 -23 -23 17 1 12 8 9 -5 -10 20
112 5 2 13 -35 11 4 1 -3 21 -13 -3 18 23 8 -29 19
128 14 -32 21 8 18 26 -9 -15 0 -9 -39 7 -26 5 -9 -3
144 11 -11 19 -5 10 -8 -2 0 6 23 11 6 25 -7 -21 -8
160 -11 -14 12 3 -12 -22 -19 18 0 7 15 11 -15 7 4 -9
176 -25 0 -24 -21 19 -1 -7 8 -10 1 12 0 -1 2 -6 6
192 12 5 -13 12 -32 6 13 23 0 -15 14 4 0 -20 -2 -11
208 -1 -3 6 -29 2 2 -1 -18 23 -8 -30 -11 11 0 -2 -28
224 6 -3 32 -1 10 16 4 18 37 19 17 8 15 -10 13 0
240 9 7 -5 -3 19 -22 4 8 15 -17 -20 0 0 0 0 0
$
```

The ceilometer is vertically pointing. A measurement is made every 15 seconds. Gate spacing is 30 m.

Line 1:

HH:MM:SS MM/DD/YYYY

Line 2:

Example: 30 01230 12340 23450 FEDCBA98-J

where

```
3          First digit of line: Status of detection as follows:
0          No significant backscatter
1          One cloud base detected
2          Two cloud bases detected
3          Three cloud bases detected
4          Full obscuration determined but no cloud base detected
5          Some obscuration detected but determined to be transparent

0          Second digit of line: Warnings and Alarm information as follows:
0 Self-check OK
W At least one Warning active, no Alarms
A At least one Alarm active

01230     If Detection Status is 1, 2 or 3:  Lowest cloud base height
          If Detection Status is 4:          Vertical Visibility as
          calculated
          If Detection Status is 0 or 5:     /////

12340     If Detection Status is 2 or 3:     Second lowest cloud base
          height
          If Detection Status is 4:          Highest signal detected
          If Detection Status is 0, 1 or 5:  /////
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23450      If Detection Status is 3:                Highest cloud base
                                                height
          If Detection Status is 0, 1, 2, 4, 5:    /////

```

FEDCBA98 Alarm (A), Warning (W), and Internal Status information. Each character is a hexadecimal representation of four bits, altogether 32 bits (b00-b3 1), with the following breakdown. Interpretation as follows:

```

F          b31      Laser temperature shut-off (A)
          b30      Laser failure (A)
          b29      Receiver failure (A)
          b28      Voltage failure (A)
E:        b27      (spare) (A)
          b26      (spare) (A)
          b25      (spare) (A)
          b24      (spare) (A)
D:        b23      Window contaminated (W)
          b22      Battery low (W)
          b21      Laser power low (W)
          b20      Laser temperature high or low (W)
C          b19      Internal temperature high or low (W)
          b18      Voltage high or low (W)
          b17      Relative Humidity is > 85 % (option) (W)
          b16      Receiver optical cross-talk
                    compensation poor (W)
B:        b15      Fan suspect (W)
          b14      (spare) (W)
          b13      (spare) (W)
          b12      (spare) (W)
A:        b11      Blower is ON
          b10      Blower heater is ON
          b09      Internal heater is ON
          b08      Units are METERS if ON, else FEET
9:        b07      Polling mode is ON
          b06      Working from battery
          b05      Single sequence mode is ON
          b04      Manual settings are effective
8:        b03      Tilt angle is > 45 degrees
          b02      (spare)
          b01      (spare)
          b00      (spare)

```

For example, if the battery voltage is too low, a warning is given and the second line appears as

```
0W ///// ///// ///// 00400300
```

In this example the internal heater is on and units are meters.

Line 3:

Example: 10 0 N 53 +34 204 146 +2 621 LF7HN1 139-1

Measurement parameters are mostly in engineering units. Plus and minus signs are possible. Out-of-Range is indicated by slashes (/////). Contents:

```

100      Parameter SCALE, 100 (%) is normal (0 ... 999 possible)
N        measurement mode; N = Normal, C = Close range
53       laser pulse energy, % of nominal factory setting (0 ... 999)
+34     laser temperature degrees C (-50...+99)
204     receiver sensitivity, % of nominal factory setting (0 ... 999)
146     window contamination, millivolts at internal ADC input (0 ...
2500)
+2      tilt angle, degrees from vertical (-15...+90)
621     background light, millivolts at internal ADC input (0 ... 2500)
LF7HN1  measurement parameters coded (pulse Long/Short, freq F, pulse qty
47+1, gain High/Low, bandwidth Narrow/NVide, sampling 10/20 MHz)
139     SUM of detected and normalized backscatter, 0 ... 999.

```

Multiplied by scaling factor times 104. At scaling factor 100
the SUM range 0 ... 999 corresponds to integrated backscatter
0 ... 0.0999 sr \cdot l

Line 4-16:

The first field is height of the first gate reported on that line divided by
100. The next 16 fields are data at successive gates.

The data are range and sensitivity normalized backscatter, units
(10000 \cdot sr \cdot km)⁻¹

Line 17:

\$ or blank line indicates end of record

Ceilometer Description

The ceilometer is a pulsed laser that operates at 0.905 μ m. The beamwidth is 1.06
mrad. The range is from 0 to 7.5 km, vertical resolution is 30 m and time resolution is
15 s.