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 $30\ \text{m}.$

Line 1:

HH:MM:SS MM/DD/YYYY

Line 2:

Example: 30 01230 12340 23450 FEDCBA98-J

where

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

```
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:

```
h31
                         Laser temperature shut-off (A)
            b30
                         Laser failure (A)
                         Receiver failure (A)
            h29
                         Voltage failure (A)
            b28
                         (spare) (A) (spare) (A)
            b27
E:
            h26
                         (spare) (A) (spare) (A)
            b25
            b24
D:
            b23
                         Window contaminated (W)
                         Battery low (W)
            b22
                         Laser power low (W)
            h21
            b20
                         Laser temperature high or low (W)
С
            b19
                         Internal temperature high or low (W)
                         Voltage high or low (W)
            b18
                         Relative Humidity is > 85 % (option) (W)
            b17
            b16
                         Receiver optical cross-talk
                         compensation poor (W)
            b15
B:
                         Fan suspect (W)
                         (spare) (W) (spare) (W)
            b14
            b13
                         (spare) (W)
            h12
Α:
            b11
                         Blower is ON
            b10
                         Blower heater is ON
            b09
                         Internal heater is ON
                         Units are METERS if ON, else FEET
            b08
9:
            b07
                         Polling mode is ON
            b06
                         Working from battery
                         Single sequence mode is ON
            b05
                         Manual settings are effective
            h04
8:
            b03
                         Tilt angle is > 45 degrees
            h02
                         (spare)
            b01
                         (spare)
            h00
                         (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)
           measurement mode; N = Normal, C = Close range
N
53
            laser pulse energy, % of nominal factory setting (0 ... 999)
            laser temperature degrees C (-50...+99)
+34
204
            receiver sensitivity, % of nominal factory setting (0 ... 999)
           window contamination, millivolts at internal ADC input (0 ...
146
2500)
            tilt angle, degrees from vertical (-15...+90)
+2
            background light, millivolts at internal ADC input (0 ... 2500)
621
           measurement parameters coded (pulse Long/Short, freq F, pulse qty
LF7HN1
            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 \dots 999 corresponds to integrated backscatter 0 \dots 0.0999 srad-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 $(10000 \cdot \text{srad} \cdot \text{km})^{-1}$

Line 17:

\$ or blank line indicates end of record

Ceilometer Description

The ceilometer is a pulsed laser that operates at 0.905 um. The beamwidth is 1.06 mrad. The range is from 0 to 15 km, vertical resolution is 10 m and time resolution is 15 s.