UAH Ceilometer Data Formats

ceilo_IOPXX.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:	/////
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)

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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 srad-1
```

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 $(10000 \cdot srad \cdot km)^{-1}$

Line 17:

$ or blank line indicates end of record

Ceilometer Description

The ceilometer is a pulsed laser that operates at 0.905 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.