mp20181213_sodankyla.mpd

The "MPD" is an acronym for "Meteor Position Data". The data file corresponds to a 24 hour time span starting at 0000 UTC and ending at 2359.59 UTC on 13 December 2018. At the start of the file are a list of parameters which are relevant to the manner in which the data were collected.

After all of the parameters, there appears a line describing each of the fields in the data itself:

Date Time File Rge Ht Vrad delVr Theta Phi0 Ambig Delphase ant-pair IREX amax Tau vmet snrdb

After the header comes the actual data, usually one line per meteor detection. If a meteor cannot be unambiguously located, its various possible locations are each reported in the data file - one line per ambiguous location. This is noted in the "AMBIG" field of the data. If the AMBIG field is 3, for example, then there will be 3 consecutive entries in the data file for this one meteor. Any further analyses performed on the MPD data usually discard the ambiguous detections before any crunching is done.

The data fields are described in the following table.

Data Field	**Description**
Date	The date of the detection CCYY/MM/DD relative to UTC.
Time	The time of the detection HH:MM:SS.XYZ in UTC where XYZ is the millisecond of the detection. (Note that this represents the relative accuracy of the detection, not the absolute accuracy which, in the normal mode of operation, is +/- 1 second).
File	The file name extension used to store the raw data for this detection (VWXYZ characters from [0..9, A..Z]).
Rge	The range of the detection in km to one decimal place (WXY.Z).
Ht	The corrected height above ground of the detection in km (WXY.Z).
Vrad	The radial drift velocity of the trail in m/s (WX.YZ).
DelVr	The standard deviation of the radial velocity measurement obtained from the 5 antenna pairs in the interferometer. Note that the analysis rejects data with delVr > 5.5 m/s so that this represents a limiting value for this field in the MPD file.
Theta	The zenith angle of the detection in degrees (XY.Z).
Phi0	The azimuth angle of the detection in degrees measured anticlockwise from East (WXY.Z).
Ambig	The number of locations this detection could have originated from (X).
Delphase	The worst phase error between antennas if the measured azimuth and zenith of the detection are correct (XY.Z). Measured in degrees.
ant-pair	The antenna pair with the worst phase error (XY).
IREX	The receive channel used in the analysis for certain single-channel data quality tests. This is always "1" during normal operation.
amax	The peak value of the amplitude of the meteor echo in digitiser units. This may be greater than 32767 if channel saturation has occurred (VWXYZ).
Tau	The decay time of the meteor in seconds. This is a half-life, *not* a 1/e time constant (.XYZ).
vmet	The entrance speed of the meteor in km/s. Bad values are characterised with "-9.99" (WX.YZ).
snrdb	The signal-to-noise ratio for this meteor (X.YZ).

Format of Confirmed Event Data Files

The file names used for the confirmed event data are constructed from a date string and a sequence number - this number is the same as that reported in the corresponding line of the MPD file under the heading "File". Confirmed event files all start with the characters "ME" followed by the date of the detection issued in the format "CCYYMMDD". For example,

ME20181213.00000

would correspond to the first detection file written on the 13th December, 2018.

The content of the CEV files includes a set of ASCII token-value pairs at the head of the file in much the same way as is described for the MPD files. The final entry in this section of the file is the token "DATA" (which has no corresponding value). Following the DATA token are three or more lines of information which are, in fact, the same as the data found in the corresponding line of the MPD file, i.e., the result of the analysis of the meteor event is entered into the CEV file in addition to the MPD file. Following the lines detailing the result of the analysis, the token "CORR12" appears followed by a set of floating point numbers in binary format. These binary-format floating point numbers provide information on the complex cross correlation between receiver channels one and two during the time of the meteor event. The data are arranged thus:

- Number of valid data points following (4-byte floating point)
- Time between adjacent data points, or "lags" in the correlation function in seconds (4-byte floating point)
- Time shift of first (negative) lag of correlation function in seconds (4-byte floating point)
- 500 correlation function amplitudes, not all of which may be valid (4-byte floating point)
- • 500 correlation function phases, not all of which may be valid (4-byte floating point) At the end of the cross correlation binary data, the ASCII token "DATA" appears once again and is terminated by a single line feed ASCII character (#10). Following this token is the raw data for the meteor event from a single range gate written in the following format:

- Four synchronisation characters - ASCII code 48
- Receiver 1, IP0, QP0, IP1, QP1, ……., IPN, QPN (all 16-bit signed integers)
- Four synchronisation characters - ASCII code 48
- Receiver 2 IP0, QP0, IP1, QP1, ……., IPN, QPN (all 16-bit signed integers)
- Four synchronisation characters - ASCII code 48
- ……
- Receiver 5 IP0, QP0, IP1, QP1, ……., IPN, QPN (all 16-bit signed integers)
- Four synchronisation characters - ASCII code 48

Note that the number of data points stored ("N" in the above description) is specified as a parameter in the file header. This parameter is denoted by the token "RECL_PTS".

Finally, note that all data stored in the CEV files in the binary format are stored in native machine architecture format. This means that all integers are stored as little-endian quantities. All floating point binary numbers are stored in IEEE format.