JENOPTIK

JO–VisualCHM

Software description

Dear user,

Please read the following information about the operation of the DLEM laser rangefinder modules carefully before you start to operate the device. By complying with the advice contained in this manual, optimum use of the functions can be made and damages caused by operational errors can be prevented.

Editorial deadline: July 15, 2009
Documentation number:

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Revision status

Date	Revision	Information
July 15, 2009	003	

CE

Content

1 Introduction

The main purpose of the Software "JO-Visual" is offline visualization of previously saved raw data and telegram files form CHM 15k/ CHM 15k-x ceilometer. JO-Visual is working perfectly in conjunction with the folder structure (NetCDF (raw) data and telegram data) saved by the terminal Software "JO-DataClient" on the client computer.

The folder and file structure is listed in section 1.3. A configuration file "JO-VisualCHM.ini" handles directory, start-up and viewing options (refer to section 2).

1.1 Hardware & Software requirements

Operating System: Windows 2000, XP, …

Intel, AMD based processors: minimum Pentium IV

Memory: 512 MB RAM, (1 GByte RAM is recommended, for Windows Vista 2 GB)

JO-Visual is based on Labview® from National Instruments®. If you use the installer software on the CD the Labview runtime engine will be installed. If you have already the 7.1 runtime engine installed on your computer, you can also copy the JO-VisualCHM.exe and JO-VisualCHM.ini to your target installation directory.

1.2 Software Release

Software release: JO-VisualCHM Build 2.01 (Juli 2009)

1.3 File and directory structure

Measured and calculated data are saved in a simple but special manner inside the ceilometer itself and outside on the client (local) computer via JO-DataClient software (see both manuals for additional information). JO-Visual is making use of this file structure. If you are using your own terminal software you have to rebuild this file structure if you like to operate JO-Visual software in automatic mode.

Full day raw data files in NetCDF format are saved by JO-DataClient Software on the Client computer using the following directory structure:

…\measure\fabname\year\month\filename

(Example: d:\measure\CHM070001\2007\05\20070501_Jena_CHM070001.nc)

Full day telegram files saved by JO-DataClient in ASCII format:

…\measure\fabname\year\month\filename

Example: JO-DataClient saved on local disk 22 Sept 2008:
d:\measure\CHM080059\2008\08\CHM080059_2008-09-22.dat

1 hour telegram files saved by JO-DataClient (obsolete since version 2.25) in ASCII format:

…\measure\fabname\year\month\day\filename

(Example: JO-DataClient saved on local disk 3 May 2007 from 8 to 9 am:
d:\measure\CHM070001\2007\05\03\CHM070001_2007-05-03_08.dat

2 Configuration file: "JO-VisualCHM.ini"

The configuration file is located in the same directory as the JO-VisualCHM.exe.

An example of the JO-VisualCHM.ini listing is shown in section 2.1. Before starting the program basic settings like the path variables shall be adjusted. Most of the parameters (except the path variables) can also be modified while the JO-VisualCHM.exe is running. When closing the program correctly by using the "Stop" button in the upper right corner the configuration parameter are written to the VisualCHM.ini file.

The VisualCHM.ini file consists of different sections for the configuration of the following parameters:

a) Path variables:
    a. location of raw data (*.nc files)
    b. location of cloud telegrams (*.dat files)
    c. path for the image directory.
b) Fabname: Manufacturer name of the instrument, for the CHM 15k-x please use CHX… instead of CHM… (necessary for automatic mode)
c) Location: Location of the instrument, the location has to be the same as in the NetCDF file names. Default value is NN. (necessary for automatic mode)
d) Unit= {m; ft}
e) PresentationTime(s): Defines the grid of the time axis in 3D contour plot, if the calculation time is too long, e.g. if 36 hours are displayed combined with an original time resolution of 15 s and a similar presentation time it takes several seconds on a 2 GHz PC to display the data. A presentation time of 120s is reducing this time.
The value should be at least twice of the original time resolution dt(s).
f) Autoload= {TRUE; FALSE}: If set to "TRUE" program will automatically load the NetCDF file from today specified by "Fabname" and "Location" and the current date, it will also reload the latest NetCDF file every minute. Set to "FALSE" the program will start with a file dialogue in manual mode, see 3.1 for details.
g) DisplayTime(h): Set to 0 will switch off the special timeframe and load the specified NetCDF day file. Set to 24 hours, the system will always load and display the last 24 hours. The maximum useful time is close to 48 hours showing two complete days.
h) ImageSaveInterval(min): Set to 0 will switch off this option. Set to e.g. 60 min every 60 minutes a set of image files {1km, 5km, 10km, 15km, user def height} in png format will be generated. See Section 4 for further details.
i) TelegramSaveInterval(min), NA: variables are not assigned in this version
j) [Color Table]: All parameters are contributing to the look and feel of the time plot
These parameters can also be configured by selecting the "timeplot" tab and pressing the radio button "configure colour contour plot".
k) [Plot]: The range parameters are defining a standard range which should be initially displayed in the contour plot.

2.1 Listing

	[JO-VisualCHM]
	prefDlgTestData=1234
	useLocaleDecimalPt=False
	postScriptLevel2=False
	NetCDF Directory=/d/data/measure Image Directory=/d/data/image Datfile Directory=/b/logbook
	Fabname=CHM070001
	Location=Jena
	Software Release=2.01
	Unit=m
	PresentationTime(s)=60
	NA=0.000000
	Autoload=FALSE
	DisplayTime(h)=36
	ImageSaveInterval(min)=0
	TelegramSaveInterval(min)=30
	[ColorTable] z-scale_ColorInterpolation=FALSE Intensity=0.100000\090.500000\095.000000\0950.000000\09200.000000\09700.000000\091100.000000\091500.000000\093000.000000\096000.000000\0910000.000000\0915000.000000\0D\0A ColorCode=16448250\0911579568\0910132122\094382719\094351999\09786687\096618880\091985280\091671680\098980480\0916772608\090\0D\0A z-Scale_Mapping=TRUE z-Scale_Factor=10000001.000000 Noise_filter=TRUE Noise_filter_width=5 Noise_filter_dev=0.300000
	[Plot] Range_min=60.000000 Range_max=10320.000000

Table 1: Listing of JO-VisualCHM.ini

3 Working with the Visualization Software

Running the software in manual mode (Autostart=False or Autostart=0) a start dialog is coming up (section 0). In Autostart mode a file is directly loaded. If the file doesn't exist an error message is shown (Figure 4) and a file have to be selected manually.

3.1 Start Dialog (manual mode)

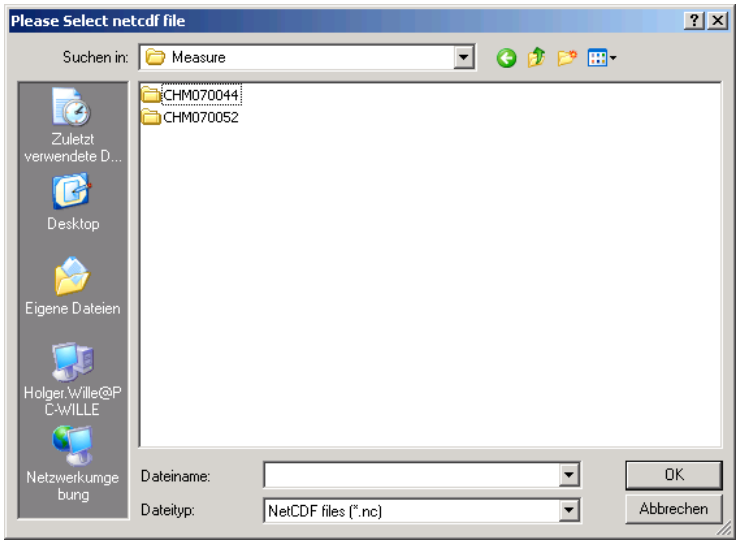

Figure 1: Start Dialog. All Ceilometer listet in the directory found in start path: NetCDF Directory=/d/measure

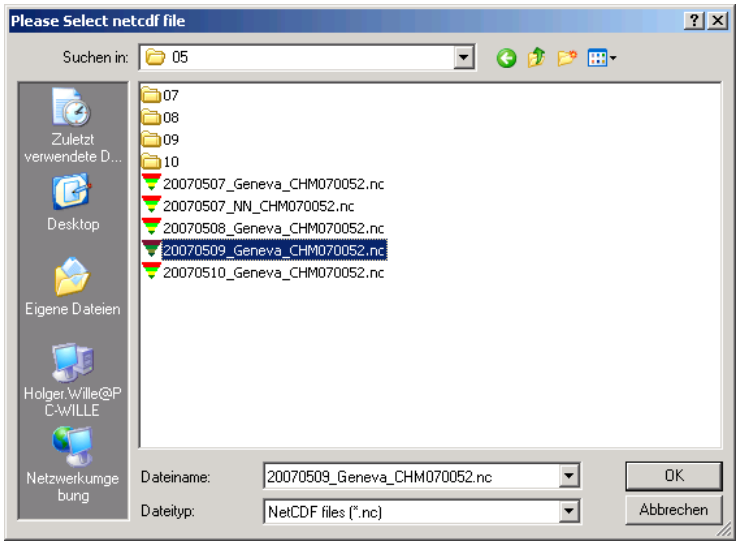

Figure 2: Start Dialog: In the subdirectory the NetCDF files are listed. Select one file and press "OK" to load the selected file.

3.2 General Information Tab/ Visual.ini

On top of the selectable tabs in Figure 3 a list of all NetCDF files of the last two months are shown. To reload the current file press "NetCDF reload". If another file is selected from the list it is automatically loaded and displayed. Using the "File Dialog - Go" another instrument or date can be selected. With the "Image –Save" button the present window is saved in a png-file in the image folder. With the stop button the program is stopped and can be restarted with the "play" button in the top left corner.

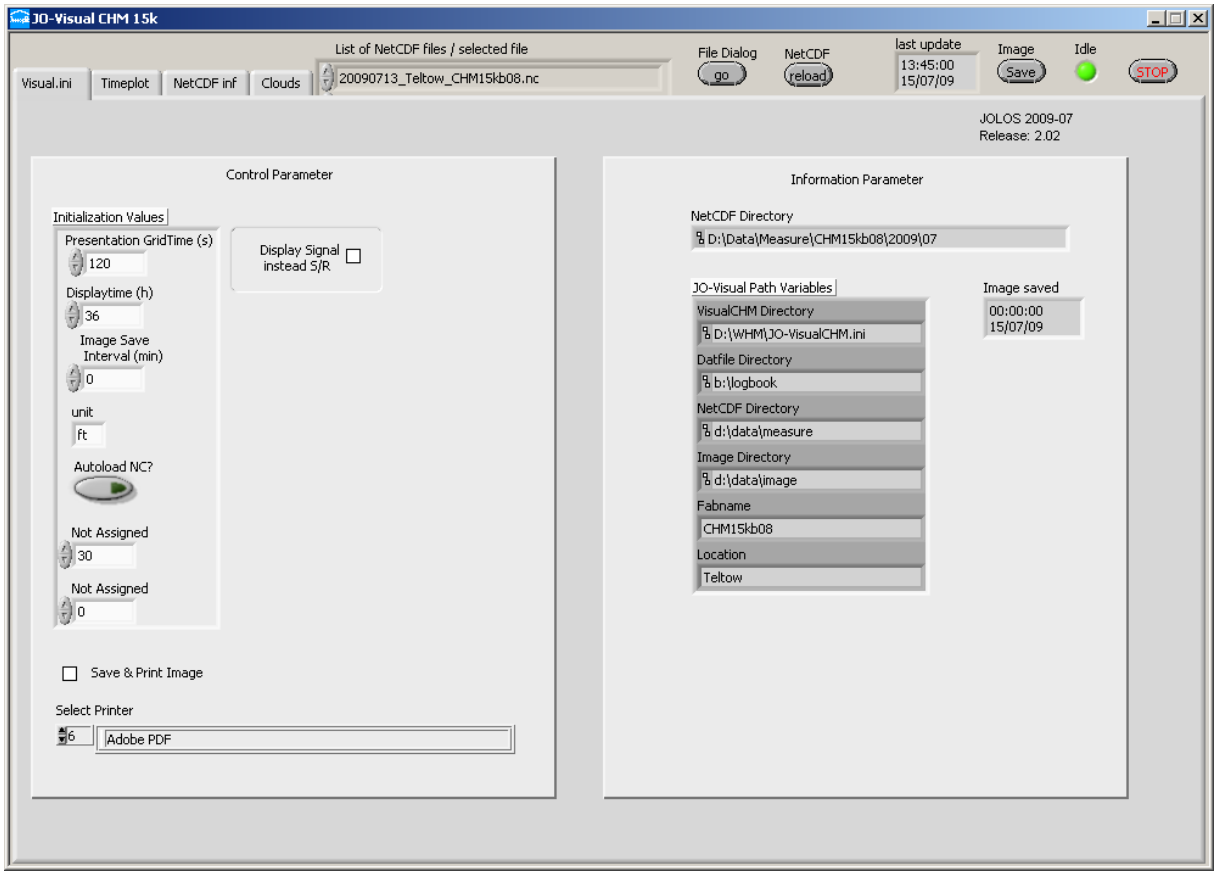

Figure 3: In the tab „Visual.ini" general control and information parameter are shown.

The "Visual.ini" tab displays in a control field those parameters, which can changed during operation. Depending on the real time resolution and number of measurements saved in the NetCDF file, the presentation time should be selected between 30s and 600s. The vertical scale can be switched between feet and meter (m, ft). In the information field some information are displayed about directory names etc.

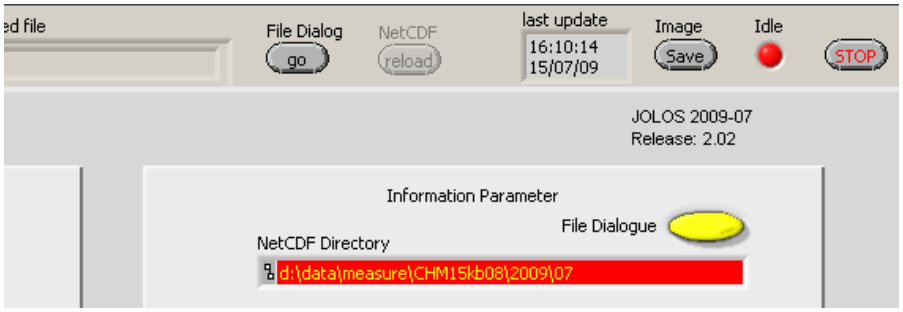

Figure 4: Error message: File can't automatically loaded, by pressing the file dialogue button a dialogue box (see Figure 1) is shown to select a file manually.

3.3 Contour Plot (Timeplot)

Pressing the "Timeplot" tab shows an intensity plot of the measured data (Figure 5). Various parameters are selectable. With the z-axis representation the main presentation form is selected between signal data and range corrected signal data. The cursor cross can be moved by the mouse. Its location defines the horizontal and vertical intensity signals shown in the figure.

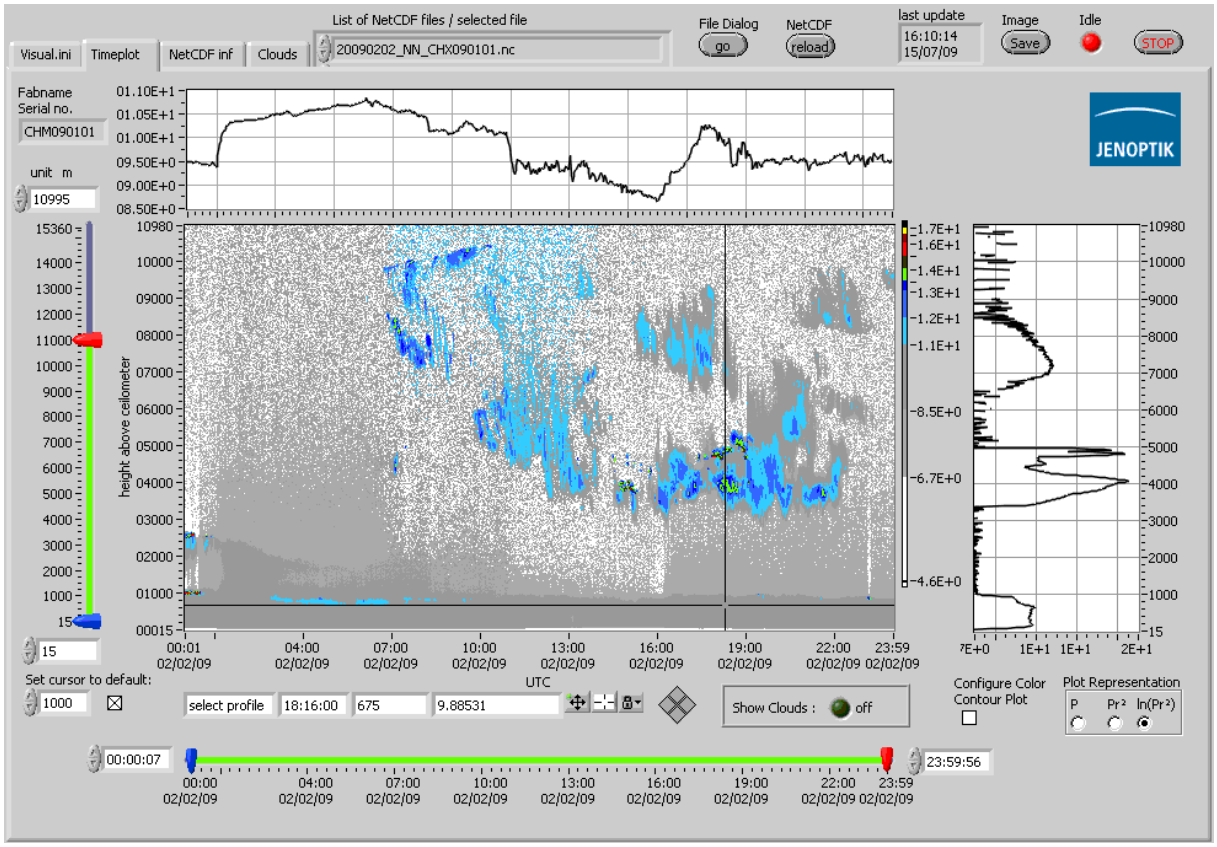

Figure 5: Timeplot. Selected Range (left), Time–intensity plot with cursor cross (centered), selected time interval (bottom), horizontal and vertical section plots defined by the cursor cross, z-axis (intensity) representation form (here lnPR² display mode). The parameter "DiplayTime(h)" is set to zero.

If the range of time interval is changed, the NetCDF-load button has to be pressed once to show the updated intensity profile. If the Display Time parameter is used the time interval bars are not shown (see Figure 6). By pressing the "Show Clouds" LED button the cloud information are merged with the intensity structure to allow the user a comparison if all clouds are correlated with a real structure in the atmosphere or vice versa if some clouds have been not detected although the backscatter structure is looking significantly enhanced

The colour scale is predefined in the JO-VisualCHM.ini file, but can be overwritten by the user. This can be done by selecting the "Configure Colour Plot" checkbox. By pressing the right mouse button on a colour field to select another colour and by typing another number in the intensity field the colour can be changed. Also the noise filter can be selected in the dialogue box (Figure 7).

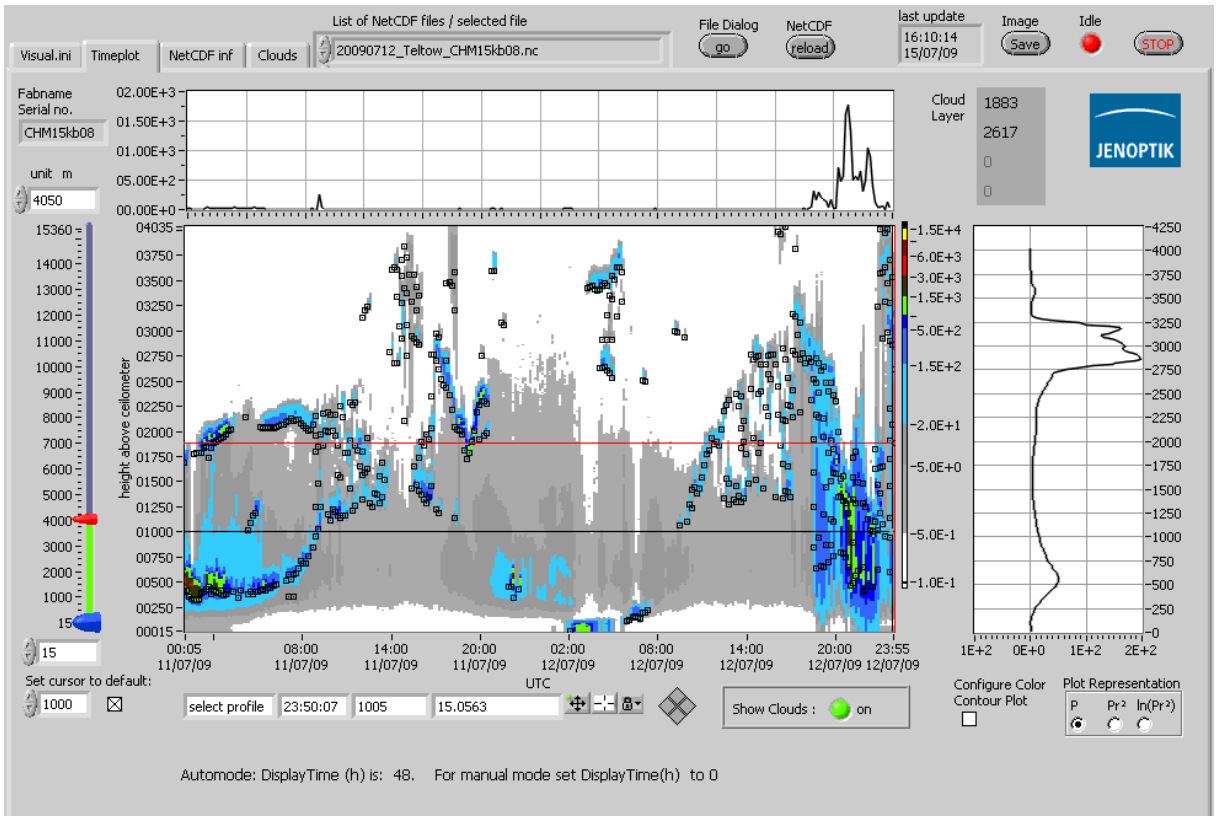

Figure 6: Timeplot merged with cloud bases (black squares) from the telegram file (datfile). An automatic mode is used with Display Time= 48 hours to generate this plot. On the right side the vertical profile is shown selected by the black cross in the contour plot. Now a red cross is overlaid coming from the cloud information. The detected clouds are shown in upper right corner.

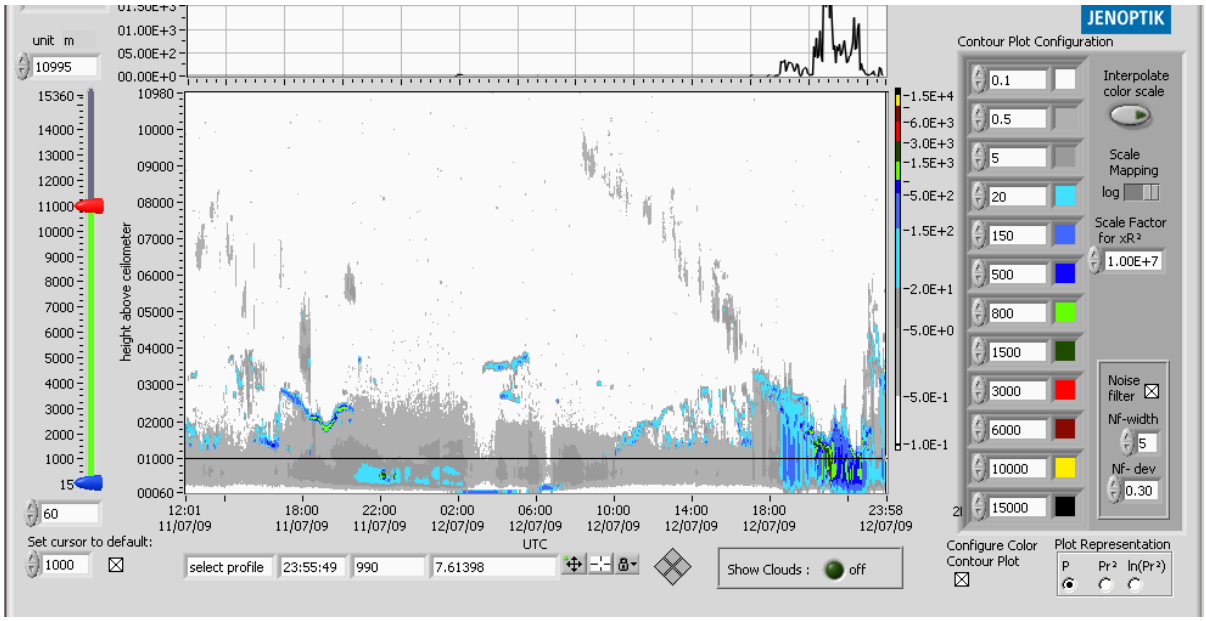

Figure 7: Timeplot-Tab in colour configuration mode

3.4 NetCDF Information Tab

The "NetCDF inf" tab displays the user information about the ceilometer system status during the measurement and general information about the location and environmental conditions. Pressing "Read" on the left side will load the status information form the NetCDF file. "Select Display" allows the user to visualize the NetCDF file header, service code, laser parameter or the temperature profiles saved with each measurement in the NetCDF file (Figure 8 – Figure 12).

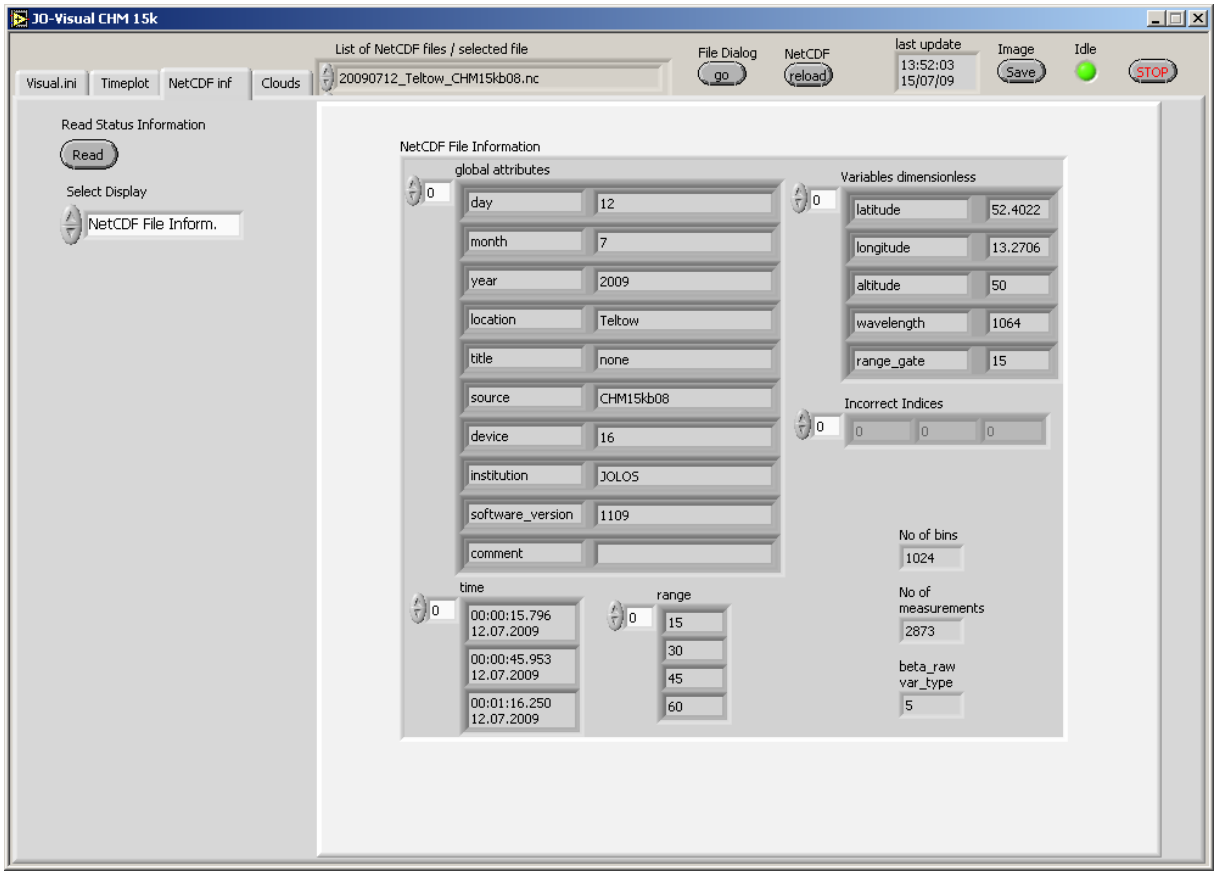

Figure 8: NetCDF file header information

The get the status of the system during the measurement first of all the service code can be checked. A full day quick view window can be used to get a fast overview about the full day. A non-zero black line indicates any possible system errors. With the red cross cursor the user can point at any error and press again the "READ" button in the upper left corner. The error(s) are displayed in the error box at the bottom in Figure 9.

Using the indices from the cursor (in the example x= 2192) in addition with the more detailed Service Code field (Figure 10) is user gets a n overview about all possible errors.

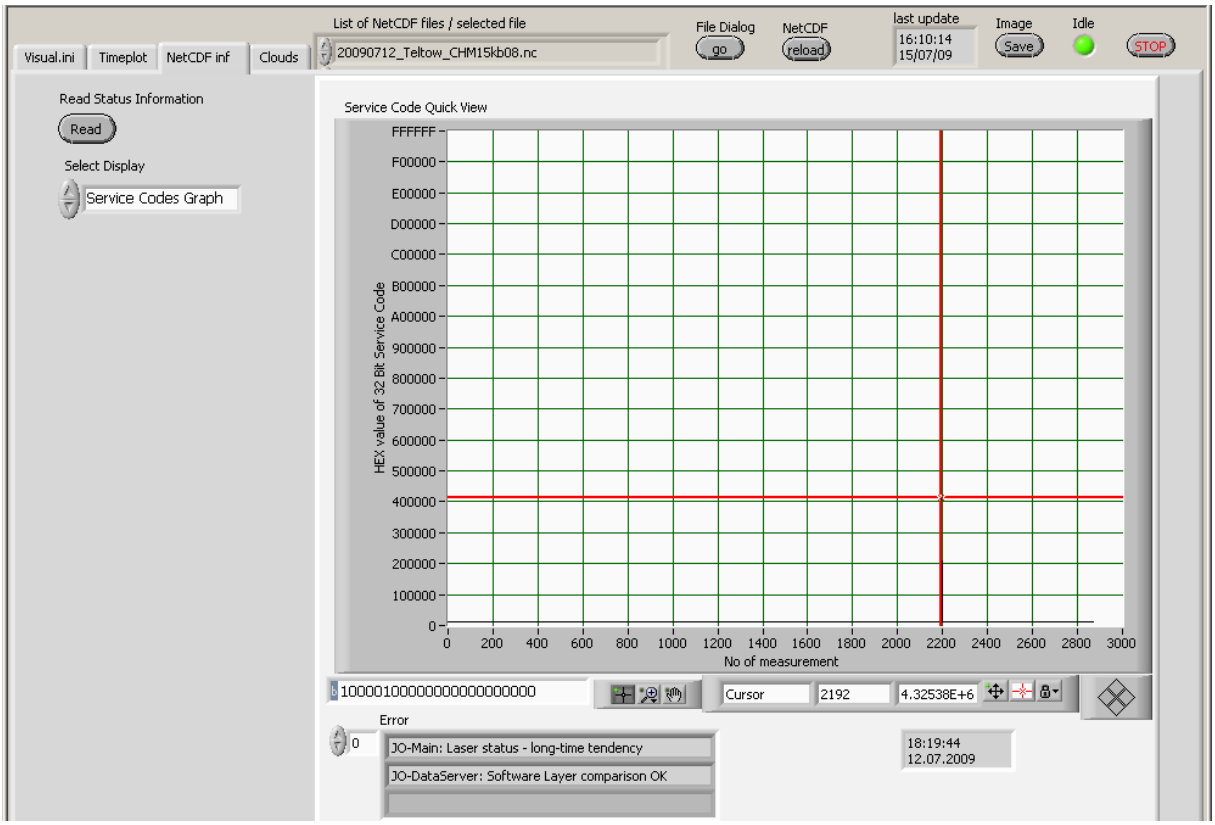

Figure 9: Service Codes (Full day quick view)

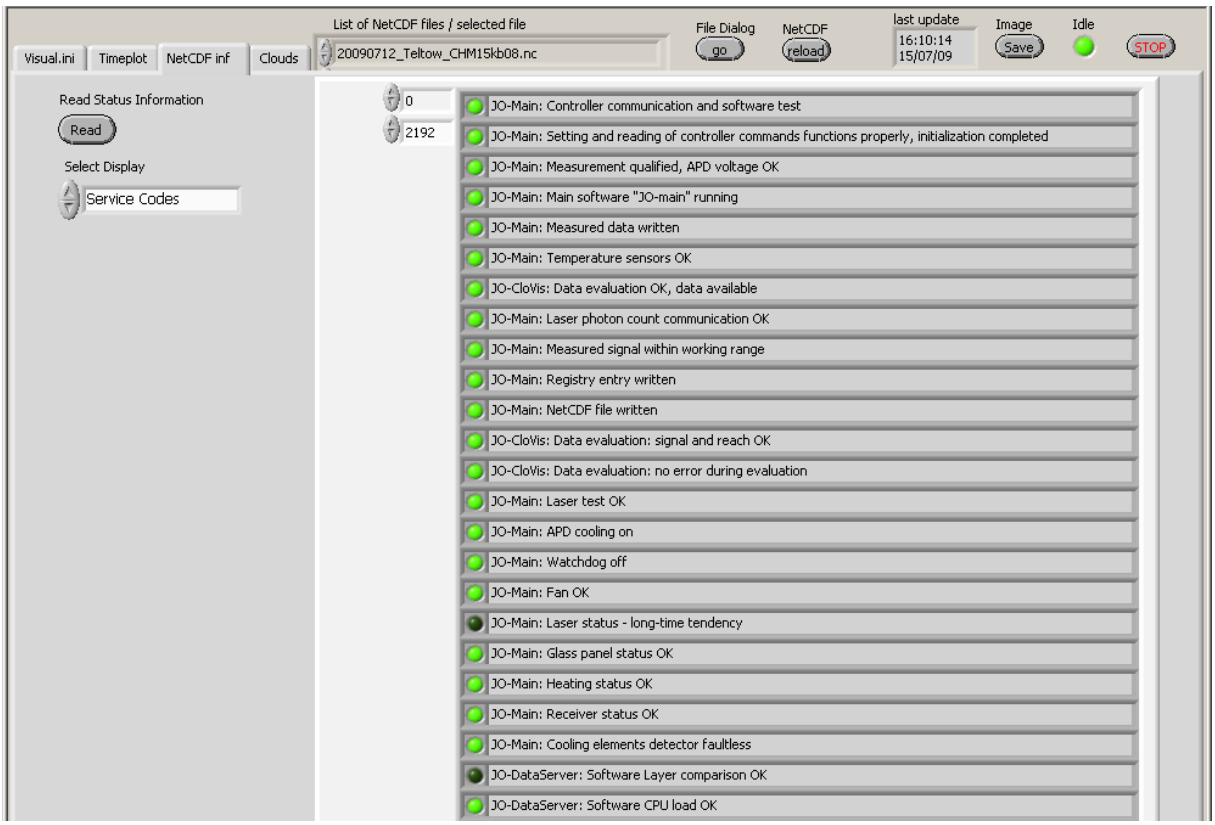

Figure 10: ServiceCodes - Status saved with each measurement in the NetCDf file.

Figure 11: Laser control – If the No. of laser pulses are decreasing the laser diode is getting old.

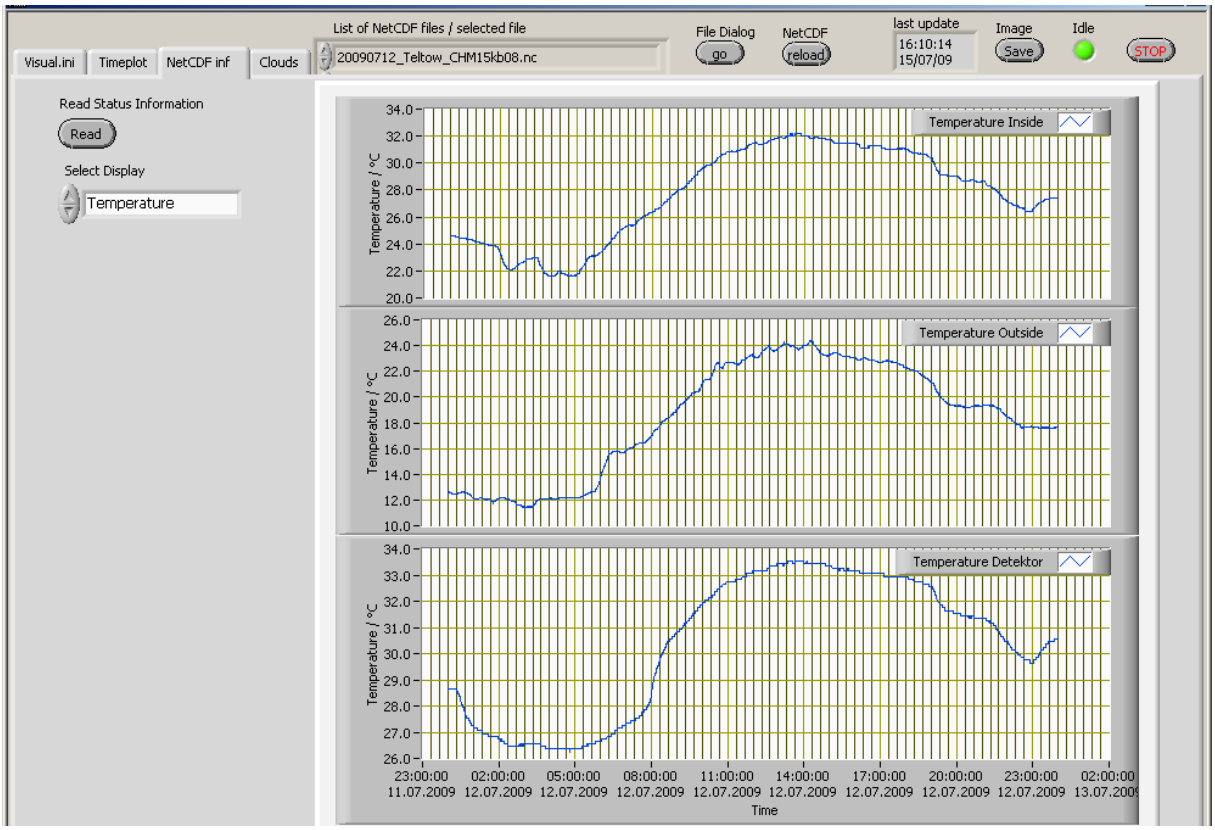

Figure 12: State – Temperature profiles, in this example the detector cooler is switched off. For optimal performance the curve in the bottom graph should only vary between 24 and 26.5 °C.

3.5 Cloud information

If the telegram files (*.dat files) are present and stored in the directory structure (section 1.3) cloud information anf further meteorological parameter can be displayed by switching to the "Clouds" tab and pressing the "Read" Cloud information button. The vertical scale can be changed between meter or feet regarding the general scaling unit selection, see Figure 3.

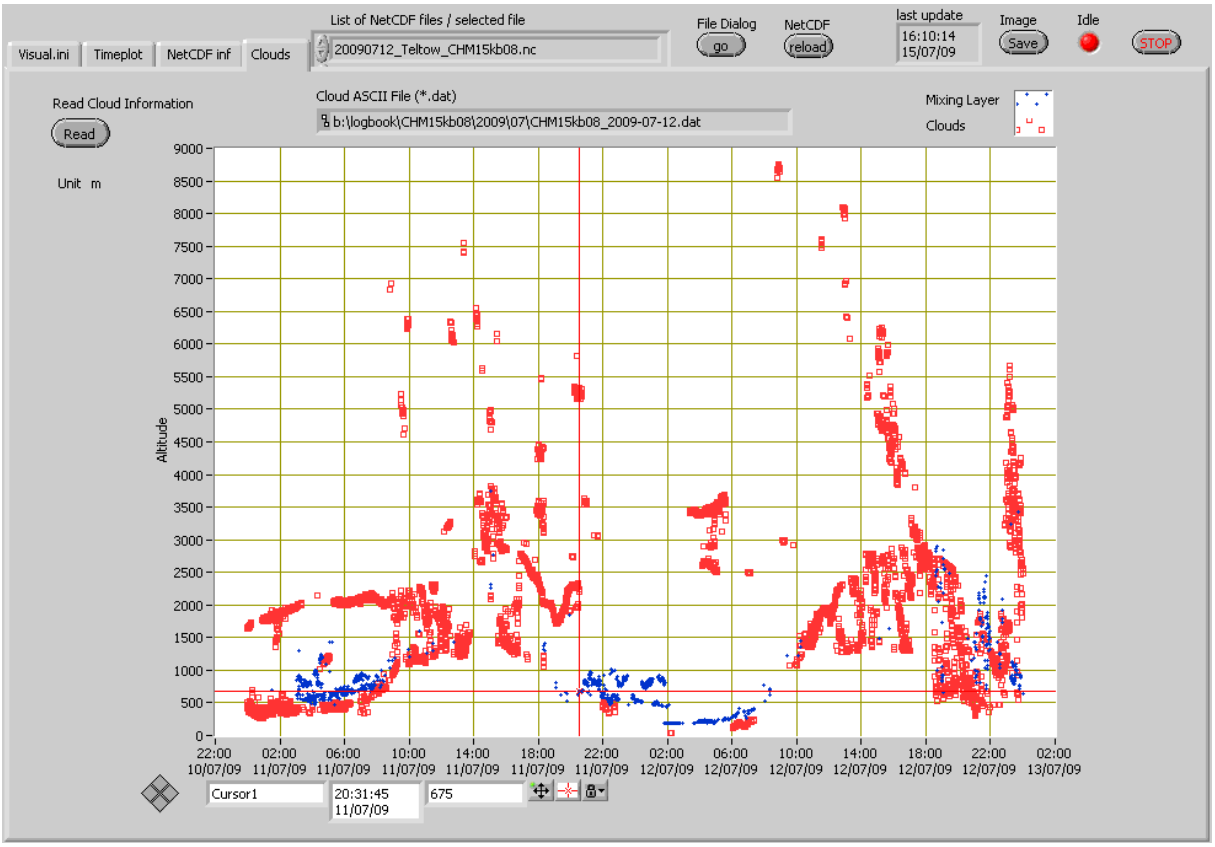

Figure 13: Cloud information and the mixing layer height are displayed together in this plot.

4 Automatic Image Files

These Image files are generated and saved in the image directory specified in the JO-VisualCHM.ini using a directory structure as shown in Figure 14:

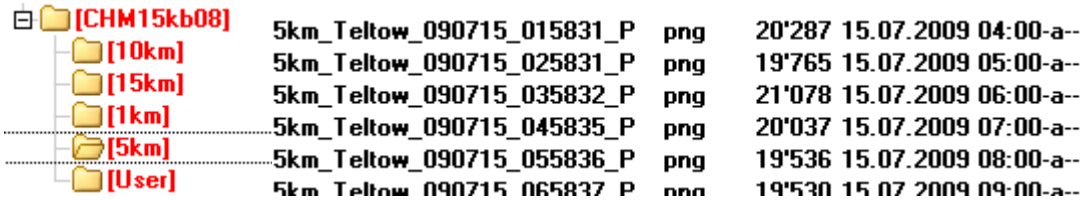

Figure 14: File and directory structure of automatically generated image files.

The 4 distances 1km to 15 km are set by the software. The "user…" files are using the current range interval of the time plot. The filename is always named yx**km**… even if the internal graph was generated in ft scale.

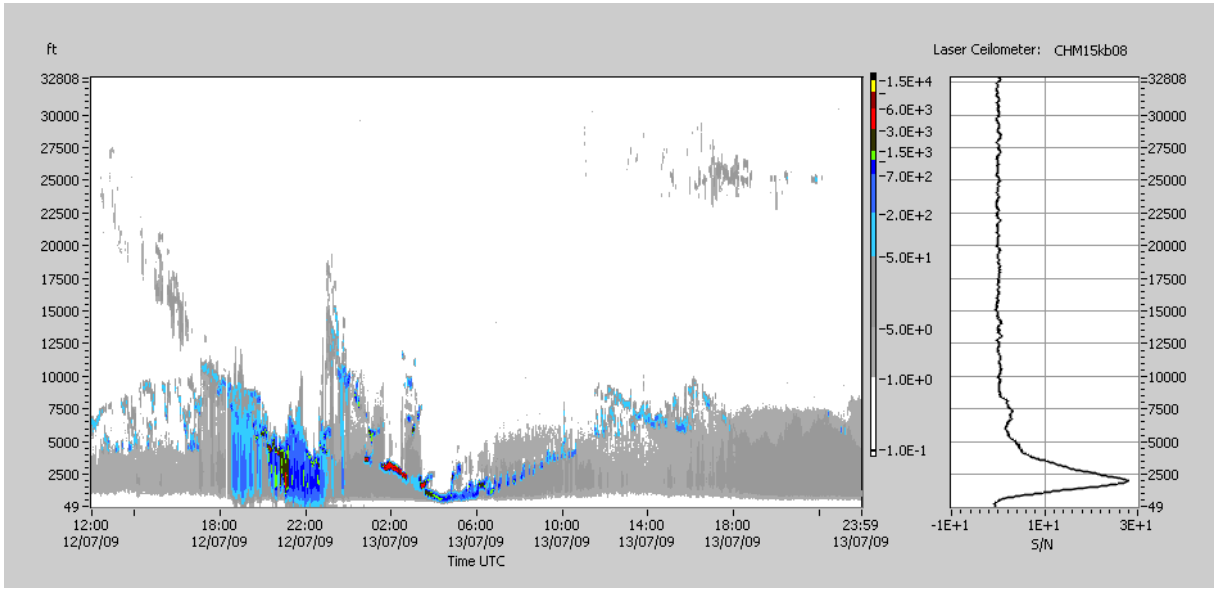

Figure 15: Image example: 36 hours display time, ft scale, file name: 10km_Teltow_090713_235939_P.png

5 Software Releases

Release	Date	Major Changes
1.17	28 Jan. 2008	- Print function implemented - Bug fixes, UTC correction, clouds display corrected
1.19	19 Feb. 2008	- Software now faster, automatic reparation of damaged NetCDF files - Datfiles can be read from different directories
1.25	9. Apr. 2008	- English language corrections, m/ ft corrections - Service code graph view integrated - colour configure mode integrated - NetCDF read routines changed
1.30	8 Mar. 2009	-PBL/ mixing layer integrated, minor changes
1.42	13. May 2009	- Autostart option integrated - ImageSaveInterval feature integrated
2.02	15 July 2009	- DisplayTIme(h) feture integrated: support for 24h (max. 48 hours), 2 NetCDF and 2 dat files will be read, display time is configurable - Tab: “clouds” changed: mixing laxer display integrated in clouds - Bug fixes: asynchronous display clouds to raw data, autoload mode - ImageSaveInterval now saves in a fixed PC clock minute pattern, e.g. if the interval is set to 10 min, the images are saved on 10, 20, 30, … minutes.

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