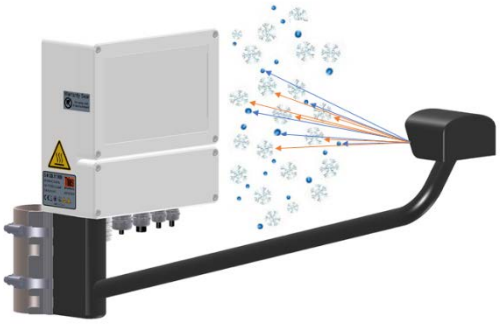
PC Program LNM View

Instruction for Use



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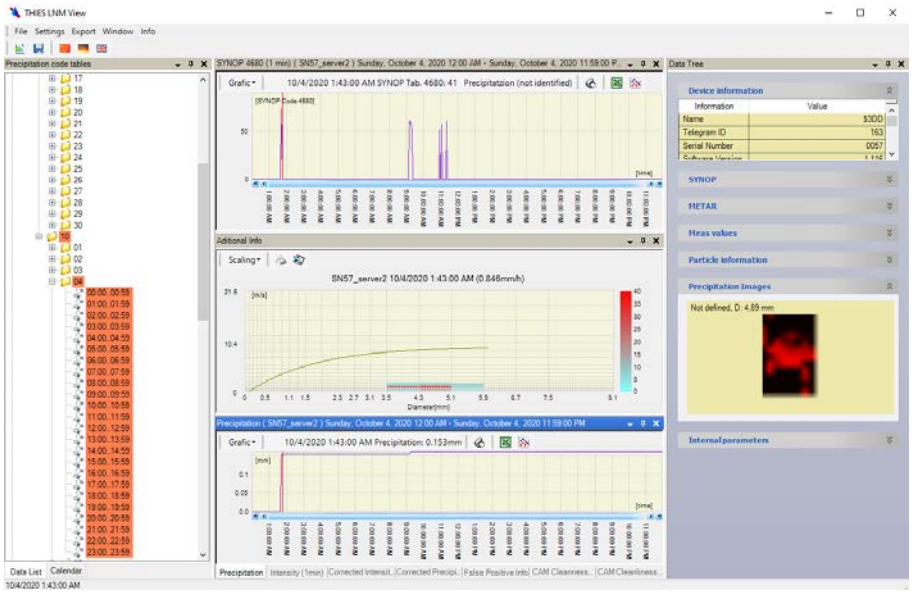
Softwareversion 4.0 Stand: 10/2020



Dok. No. 021406/10/20

THE WORLD OF WEATHER DATA

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1 Brief Description

The Thies LNM View program is used to display data generated by the Thies Laser Precipitation Monitor and/or Thies 3D stereo disdrometer. The program can not only archive the data transmitted from the LNM and/or 3D stereo disdrometer but also present it in a graphics display. The user-friendly design of the operating interface means that it is very simple to analyze all data records transmitted by both devices.

The program has, amongst others, the following features:

- To govern any number of LNM and/or 3D stereo disdrometer instruments in one project.
- Client-Server architecture to the central data acquisition and remote visualization.
- Installation in the network possible.
- Graphic display of different measuring values.
  - For LNM : > 30 graphic display.
  - For 3D stereo disdrometer : > 55 graphic display.
- Display of the precipitation spectrum.
  - For LNM : 22 size ranges, and 20 speed ranges.
  - For 3D stereo disdrometer : user-defined size and speed ranges.
- Data export in Microsoft EXCEL.
- Printing of several graphics.
- Data display as calendar or tree-format.
- Calculation and display of the ZR-diagram over any period.
- Display of data from external sensors, such as for example wind speed, wind direction.
- Display of internal diagnostic data
- Only for 3D stereo disdrometer: Display images of detected precipitation type, such as Rain, rain with snow, snow, graupel, hail, and insects.

2 System Requirements

The program is based on Microsoft Windows© and will function with Windows 8 or higher. The program requires Microsoft .NET Framework and Internet Explorer. Both programs are available from Microsoft. The CD contains a version of the .NET Framework. However, it is not guaranteed that this is the latest version. Therefore, we would recommend to download the latest version from the Microsoft homepage.

.NET Framework©

Microsoft homepage: http://www.microsoft.com/downloads/

Product: Microsoft .NET Framework Redistributable Package

Minimum PC requirements

PC: 1GHz, 256 MBRAM, recommended 2 GHZ, 512MBRAM

Graphics resolution: 800 x 600

Graphics colours: 16bit TrueColor

Recommended operation system: Windows 8, Windows 10

3 Installation

Please insert the CD supplied in the appropriate drive. If the installation does not start automatically, the program "setup.exe" has to be started manually via File Explorer. Please then follow the installation procedure.

If the installation is interrupted with the message that .NET Framework is not installed, please install the required dependencies mentioned in chapter 2. After the installation of required dependencies, re-start the installation of Thies LNM View.

After installation, the software Thies LNM View and LNM Server can be started using "Start", "Programs", "THIES Clima".

4 Start-Up

For the initial start-up, you can test the Thies LNM View program using the supplied demo data records.

The program installs demo data records and a German-speaking and English-speaking project during the installation process.

To test the demo data:

> First, select the “File” menu from the menu bar. At the end of the “File” menu, there will be two items: “SampleDeutsch.Ins” and SampleEnglish.Ins”. Please select one of them and the demo file are displayed in the tree.

4.1 Set-Up of a Physical Unit

Configuration of a physical unit is the pre-condition for working with real files.

Please connect the LNM and/or 3D Stereo Disdrometer to the physical interface of your PC. If the LNM and/or 3D Stereo Disdrometer is connected via RS485/RS232, please use the RS485/RS232 interface converter and make a connection described in the user manual of a particular device. If the device is connected via ethernet then connect the device directly to your PC or company network.

Once the device is connected to the physical interface of your PC via RS485/RS232 or Ethernet, to display the data from the unit, it has to be configured first. The procedure for the configuration are as follows:

1. Start the program "Thies LNM View" by selecting "Start", "Programs" and "THIES Clima". The program may take a few seconds to start depending on the PC.
2. In the menu „File“, select the item „New“.
3. In the dialogue box “Device position”, select “This PC (localhost)“
4. In the dialogue box “Choose Device”, press the button “Add”.
5. In the dialogue box "Device type", select the item "Configure a new physical device" and press the button "Next>>".
6. In the dialogue box "Device name", enter a name for the definition and press the button "Next>>".
7. In the dialogue box "Position of data" select the directory in which the data are to be saved. Select or create an empty directory. The system will suggest a directory, and you can accept this folder.
8. Select "Next".
9. In the active dialogue box “Choose Device” a new item with the name of the station is displayed. Select this item, so that a checkmark appears in front of the name.
10. Acknowledge the dialogue box with “Next“.
11. You can now select the interface (RS485 or Ethernet). Once the interface type is selected, you can set the appropriate parameters. Please refer to the operating instructions of your device for the transmission parameters.

5 LNM View in the Network

The program structure of the Thies LNM View allows to operate the program in the local network. Internally, Thies LNM View consists of a server (LnmServer.exe), and a Client (LNMView.EXE). The server starts on the processor where the physical units are connected. A symbol in the system tray (down on the right screen-border) indicates, that the server is being active. The symbol shows an LNM. Before using in the network both PCs must be connected via a network, and the TCP protocol must be installed.

For operating the program LNM in the network, please proceed as follows:

Please install LNM View on the Client-PC as well as on the Server-PC. On the server, start the program LNMServer.EXE via the start menu. Open the program by double-click on the LNM-server symbol. Select item “Add”. Then, enter the following data: instrument name, directory where the data are saved, and the serial or Ethernet interface. Please don’t forget to activate the interface via item “Activate Port”. The communication to the physical units can be checked on the index card “serial or Ethernet communication”. By means of the right-hand mouse button parameters can be read or changed respectively.

If the instrument is configured in the LNMServer, please start LNMView.exe on the client PC. For communicating with the connected instrument, please proceed as follows:

1. In the menu „File“, select the item „New“.
2. In the dialogue box “Device position”, select “PC in network (Intranet, Internet)“.
3. In the dialogue box “Remote communication parameter” in the area “Server Name” enter the processor name, the IP-address or the URL of the Server-PC (PC, where the LNMServer is installed). The data „Port“ and „Protocol“ must not be changed.
4. After acknowledgement by “Next” the configured instruments of the server are listed in the dialogue box “Choose device”. Select the item so that a checkmark appears in front of the name.
5. Acknowledge the dialogue box by “Next”.

6 Datalogging with Thies LNM View

The data server of Thies LNM View is in a position to record the measuring values of one or several physical LNM and/or 3D Stereo Disdrometer units. For this, it is necessary that the program LNM-Server is performed constantly. The LNM and 3D Stereo Disdrometer units are not able to save data. The program LNM-server is started automatically by Thies LNM View, if necessary, on the local processor. In the case of network access, Thies LNM View cannot start the server automatically.

After the start, the data of the LNM and/or 3D Stereo Disdrometer units are recorded automatically. In this process, the LNM and/or 3D Stereo Disdrometer units send a data record every minute. LNM-Server relocates a date and time stamp to each data record and saves the values as text files as well as in binary form.

All client programs (Thies LNM View) access to the archive data via the respective data server. In case the data server receives a new data record all connected clients are informed automatically.

For the saving of data, a certain capacity of hard disc memory is necessary, depending on the number of connected LNM and/or 3D Stereo Disdrometer units. The necessary capacity of hard disc memory for the recording and for each instrument is approx. 100 MByte data memory per month.

7 Working with Thies LNM View

The "LNM View" program is characterized by an operating interface that conforms to Microsoft; this means for example that many parameters can be accessed in a specific context using the right mouse button.

The windows in the program can be moved in any way required and positioned in a range of variations. You can change the position of a window by "grabbing" it by the title bar (generally in blue), holding down the left mouse button, and simultaneously dragging it elsewhere. You can thus organize your screen exactly as you want. It is also possible to change the position of the menu bars of the individual windows.

In the chapter 7.9 the operating elements are briefly explained with screenshots.

7.1 Change Language

It is possible to change the language of the user interface elements in the program. The languages available can be found in the menu "Settings", "Language". After selection, it is necessary to restart the program for the selections to take effect.

7.2 Add New Units

The LNM View program supports the simultaneous management of several physical units. The menu item "Settings", "LNM Devices" can be used to manage the units. To add a new unit see chapter 4.

7.3 Display Data

An overview of data can be displayed in two ways:

1. In the form of a tree with the levels Year, Month, Day, Hour
2. In the form of a calendar. Days already with data records are shown in color.

Both views have advantages to offer, depending on the application. The tree view, for example, presents the file system of the data read. It is very simple to page through the data hour by hour. The Calendar view is used to see long periods of time, e.g. several days or weeks.

If you select an item in the tree or the calendar, the values are shown in the graphics display. Multiple selections are possible in the Calendar view. The data records are shown in the graphics display. The views can be found under the menu bar item "Windows". In total, the system offers, for LNM, greater than 30 different views and for 3D Stereo Disdrometer, grater than 55 different views.

The spectral precipitation distribution is displayed in the window Spectrum if selected. All other graphics displays are synchronized with each other, i.e. if another data area is selected in one of the three windows, the change is included in the two other windows. The selection can be changed by using the arrow keys on the X-axis of the graph view.

7.4 Automatic Display of Current Data

The data are automatically updated by Thies LNM View, when the latest measuring values are presented in the graphic view, and the displayed time range is <2 days. In this case, the latest data records are displayed automatically in graphic form.

7.5 Data Exporting

The program offers the possibility of exporting data in Microsoft Excel®- format. For this, you may call the export function at different points of the program. An export can be called from the following points:

- From the main menu „Export“.
- From the tree view by means of the context menu (right mouse button).
- In the graphic view via the Icon  .

Depending on the position where the export is called from, several details have to be stated for the export. For concluding an export you have to state a file where the data shall be recorded.

Please start Microsoft Excel, and open the file in order to look at the data. Data records without valid measuring value are marked by 999999.

7.6 Display of ZR-Diagram

With Thies LNM View it is possible to present the ZR-diagram over any period required. For this, the radar reflectivity is displayed graphically as a function of the precipitation intensity. Thies LNM View calculates then a regression curve of the form.

$$Z = a * R^b$$

with Z = Radar reflectivity

R = Precipitation intensity

The constants a and b are calculated by the program.

The display of the ZR-diagram can be accessed from the following points:

- From the main menu „Export“.
- From the tree view by means of the context menu (right mouse button).
- In the graphic view via the Icon  .

7.7 Zoom

By pressing the right mouse button in the windows of the graphics display and dragging simultaneously, you can zoom into the data area. You can zoom back by clicking on the blue bar between the arrow keys in the graph view.

7.8 Import Existing Data Records

In addition to the programs Thies LNM View and LNM-Server, the program Thies File Converter exists with the installation. With the program Thies File Converter, the user can import existing data records to the program. If LNM and/or 3D Stereo Disdrometer data are written to a file with a program, e.g. Hyper Terminal, the Thies File Converter can then able to import these data. The Thies File Converter can be started directly from the program Thies LNM View via Menu->“Settings”->“DataConverter”.

The Thies File Converter program is described in chapter 8.

7.9 Operation of Program

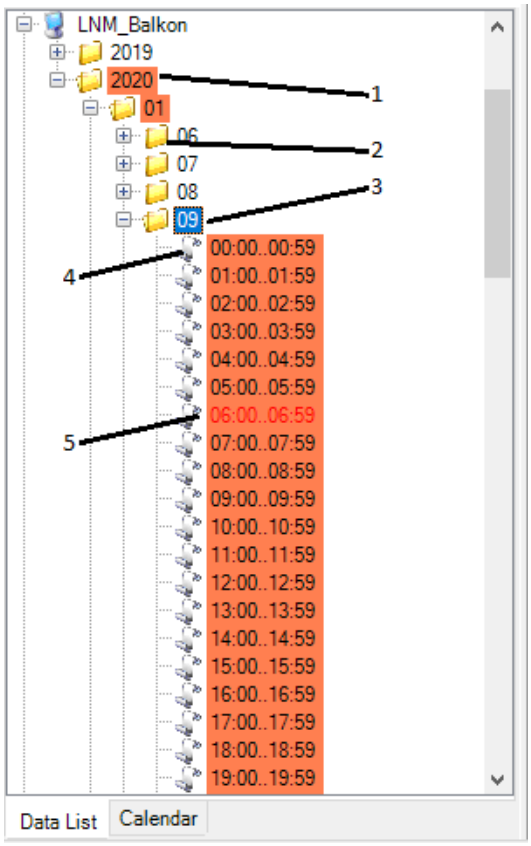

Figure 1: Data tree.

1. Year folder
2. Day folder
3. Select data marked in red
4. The day folder contains data for the individual hours
5. If data is missing in an hour, the data record is marked in red.

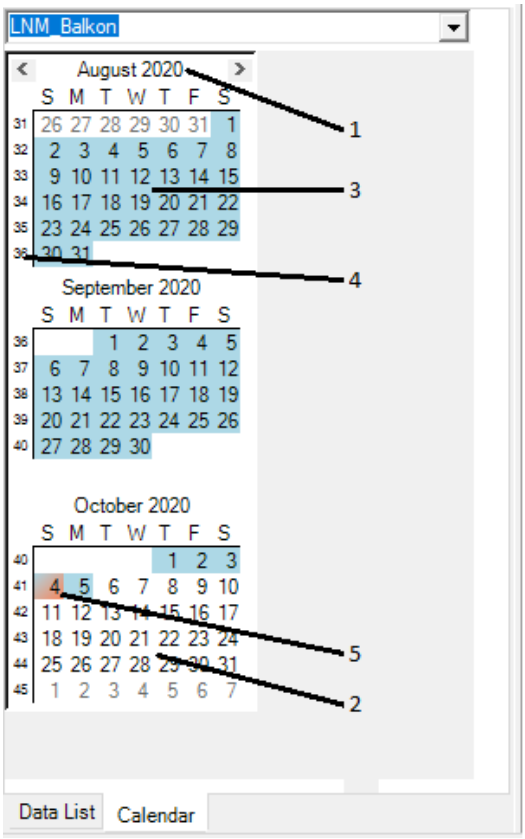

Figure 2: Calendar view.

1. Calendar view always on a monthly basis
2. Current data record marked in red
3. Available data records highlighted in blue
4. If you click on the calendar weeks they will be shown in the graph view. Multiple selection is possible by holding down the Shift key and simultaneously selecting with the mouse.
5. Unavailable data records highlighted in white.

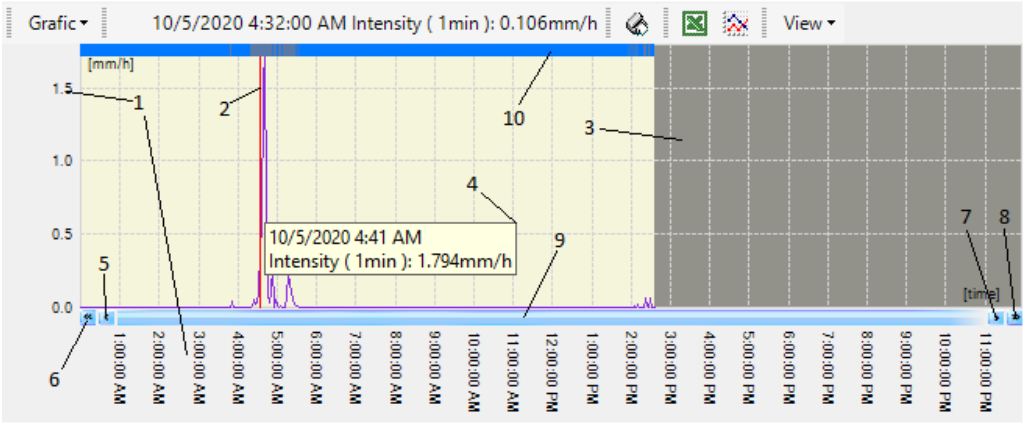

Figure 3: Graphic view.

1. The graph shows the measured values over time. Scaling is performed automatically. Line graphs and bar graphs are available as the possible types of graph. With the view of the Intensity logarithmic scaling can also be performed on the Y-axis.
2. The cursor is positioned by clicking with the mouse in the window. The values at the cursor position are displayed in the Spectrum view. The cursor can be moved using the arrow keys 5 and 6 as well as the arrow keys on the keyboard. When using the keyboard it is important for the focus to be on the window, i.e. the frame of the window appears in blue.
3. Time areas for which there are no data are shown in grey.
4. If the mouse is moved over the work area, information about the measured value will appear as a tool tip.
5. You can navigate through the data records using the buttons 5, 6, 7, 8 and 9. Button 5 is used to select the previous data record.
6. This button is used to display the time area before the interval currently displayed.
7. Selects the next data record in the area displayed.
8. This button is used to display the time area after the interval currently displayed.
9. If this button is pressed, the area previously visible will be displayed. This is also used to zoom back.
10. In the view of the Intensity the top of the screen includes a bar which contains the colour coding of the type of precipitation. If the mouse is moved over this bar, the tool tip will show the type of precipitation.

The Zoom feature is not shown. You can zoom into a new area by pressing and holding down the right mouse button and dragging simultaneously.

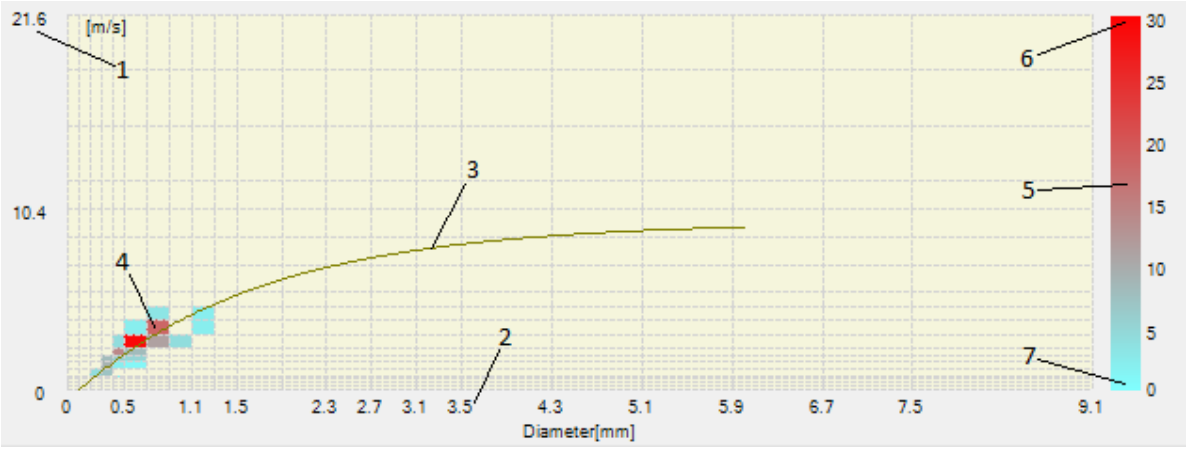

Figure 4: Spectrum view.

The Spectrum view provides information about the precipitation events registered in the current measuring interval. In the standard version, the measuring interval is one minute. The LNM and 3D Stereo Disdrometer uses the distribution to determine the aggregate state and the amount of precipitation.

1. The Y-axis shows the speed of the particles. The LNM and 3D Stereo Disdrometer quantises the speed in the steps displayed.
2. The X-axis shows the diameter of the particles. The LNM and 3D Stereo Disdrometer quantises the diameter in the steps displayed.
3. The curve shows the pairs of values for speed/size of particles to be expected with precipitation in liquid form. Example: A particle with a diameter of 2mm is expected with a speed of approx. 6.6m/s. This ratio differs depending on the aggregate state.
4. Fields marked in colour show that particles have been registered with the diameter and speed. The colour indicates the number of particles.
5. The bar shows the colours for the number of events. In the example shown the colour scaling is presented logarithmically. The menu displayed can also be used for a linear representation.
6. The colours for Maximum can be changed. If you press the right mouse button on the bar, you will see a dialogue box which allows you to change the colours.
7. The colours for Minimum can be changed. If you press the right mouse button on the bar, you will see a dialogue box which allows you to change the colours.

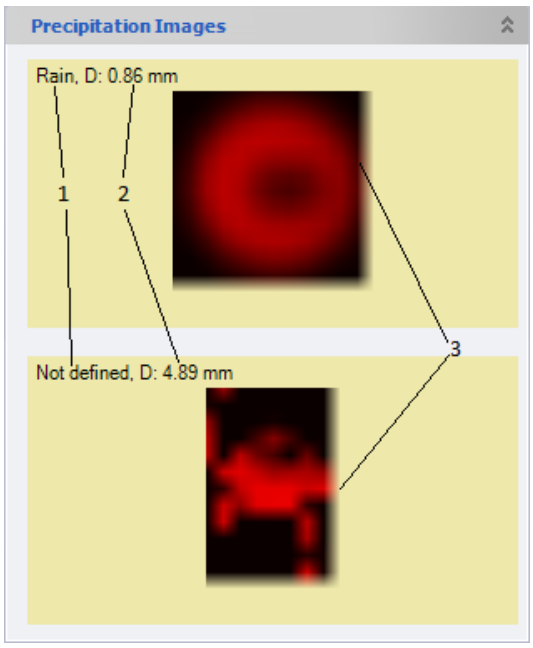

Figure 5: Precipitation Image view.

The Precipitation Images view provides information about the detected particle with its image. This functionality is only available for 3D Stereo Disdrometer.

1. Precipitation type
2. Diameter of shown detected particle
3. Particle image

The classification of precipitation image type is determined based on its characteristics. For more details, please read the provided user manual of the 3D Stereo Disdrometer.

8 Working with Thies LNM File Converter

8.1 Function

The function of the LNM File Converter is to convert existing data files to a format that LNM View can interpret and display.

To perform conversion, the data telegrams

From LNM:	TM00004 or TM00005.
From 3D Stereo Disdrometer (any one):	TM00005, TM00100 … TM163, TN00005, TN00100 … TN163, TQ00005, TQ00100 … TQ163

must be available in one or more files. During conversion, the data is then changed into binary format and brought together in files for one hour each. Here the date/time data can either be specified separately, determined from the file name, or ascertained from the first dataset of the file. It is recommended to determine the date/time data from the file name. Here the file name must be available in a specific format: see chapter 8.5.

After adding the files the data can be converted into a binary format using the button "Convert all“ or "Convert selection". The resulting output is a directory structure with the levels "Year", "Month", "Day" and the files for the individual hours.

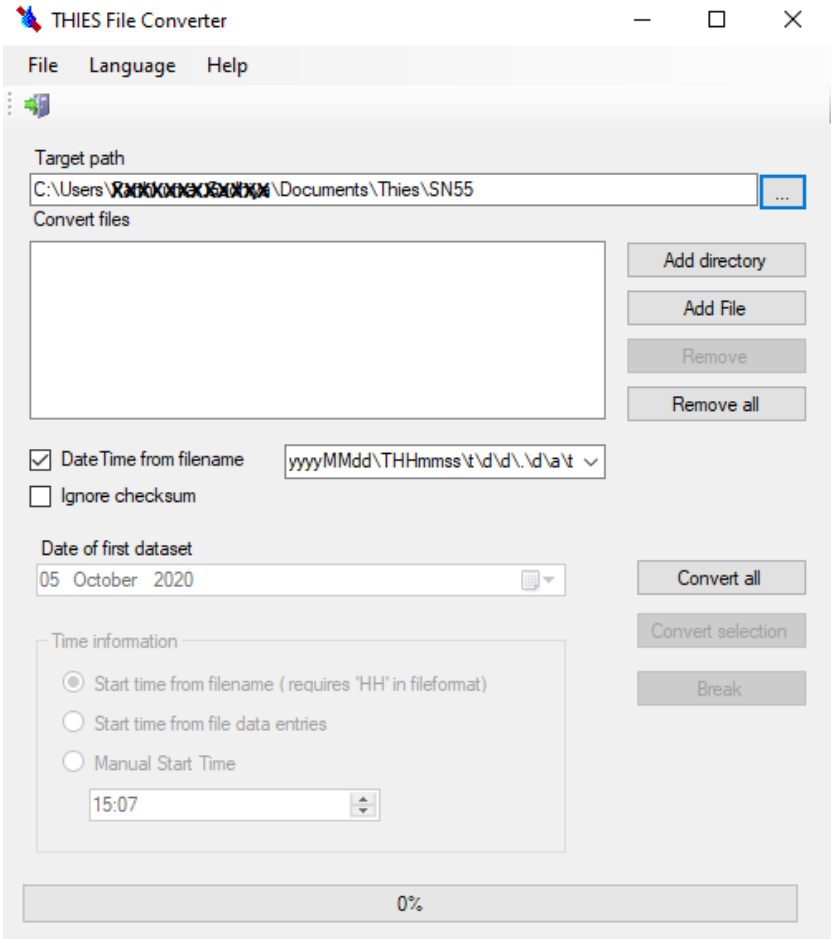

Figure 6: Screen-shot of Thies File Converter software.

8.2 Selection of Target Path

In the input field "Target path", select a directory in which the converted files are to be stored. Please note that a directory must be selected without any further subdirectories or a directory for an existing LNM project.

If a directory for an existing project is selected, please select the level here corresponding to the project name. The other levels such as Year, Month, and Day are managed automatically.

8.3 Adding Files

The files to be converted can be entered in the chapter "Convert files". Here not only individual files can be entered but also files from entire directories.

To add individual files select Add File. In the following dialog select the file to be converted. It will then be displayed in the list. The button "Add directory" is used to add files from a directory and all subdirectories.

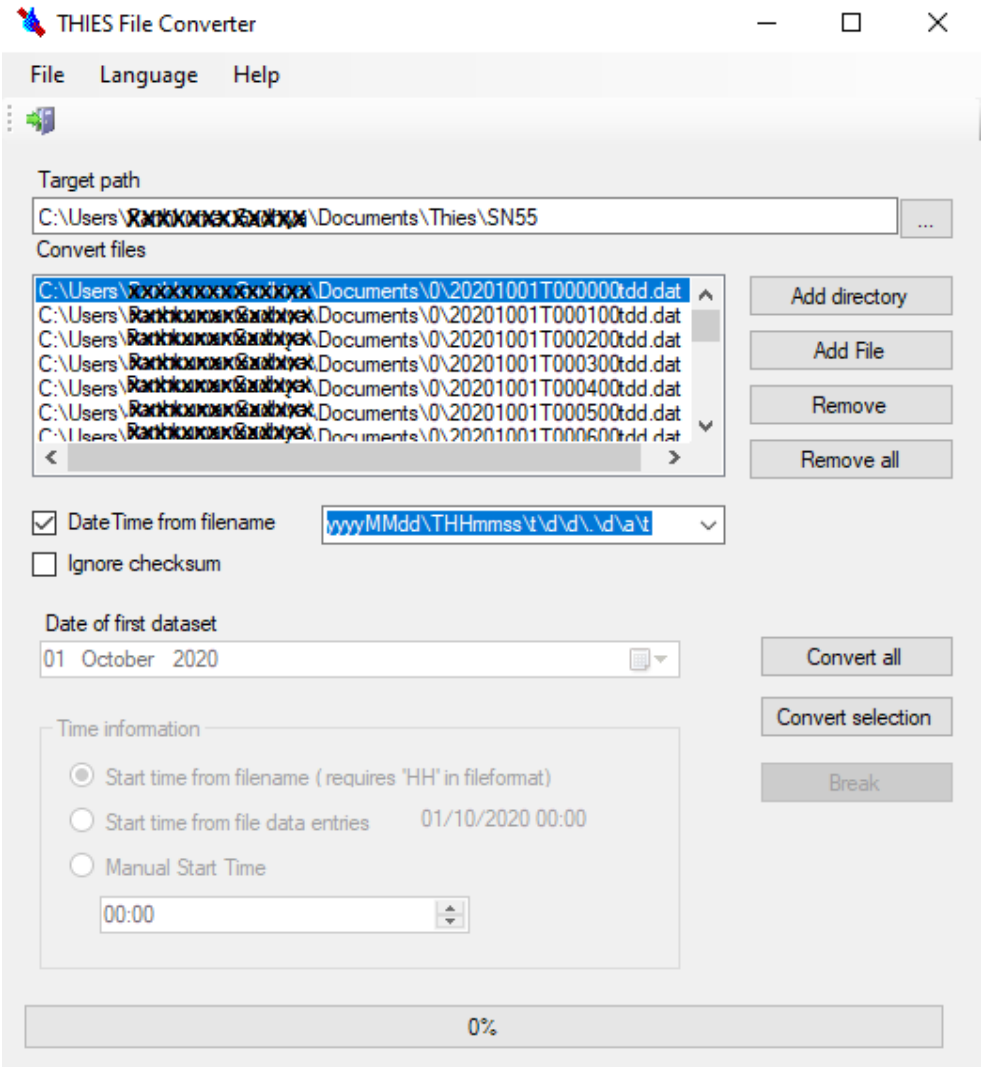

Figure 7: Screen-shot of Thies File Converter software with completed file list.

Figure 7 shows files selected for the conversion. The file name is made up of the year, month, day, hour, minute, and second. This information can be used to ascertain the time of the first dataset in a file.

8.4 Removing Files

Similar to the adding files function, to remove individual files, select the file which you want to remove, and then click Remove. It will remove the selected file. To remove all files, click on Remove all and it will remove all files.

8.5 Date and Time of Files Name

As described in previous chapter, it is possible to ascertain the time of the first dataset from the file name. To do so, check "DateTime from filename" checkbox (see Figure 7). In the next field now enter the format of the files. It is important that all file names have the same format in the file list.

The input field accepts the following formatting:

d	Day of the month. Single-digit days have no leading zero.
dd	Day of the month. Single-digit days have a leading zero.
M	Month of the year. Single-digit months have no leading zero.
MM	Month of the year. Single-digit months have a leading zero.
y	Year without century. If the decade is zero, no leading zero is expected.
yy	Year without century. If the decade is zero, a leading zero is expected.
yyyy	Year with 4 digits.
h	Time in 12-hour format. Single-digit hours have no leading zero.
hh	Time in 12-hour format. Single-digit hours have a leading zero.
H	Time in 24-hour format. Single-digit hours have no leading zero.
HH	Time in 24-hour format. Single-digit hours have a leading zero.
m	Minute. Single-digit minutes have no leading zero.
mm	Minute. Single-digit minutes have no leading zero
s	Seconds. Single-digit seconds have no leading zero
ss	Seconds. Single-digit seconds have no leading zero
:	Default time separator
/	Default date separator.
\ c	With ‘c’ representing any character. For example, if the extension is ".dat" in the file name, this appears in the format field as "\.\d\a\t".

Example:

If the file name has the format 20201001T000100.dat (consisting of year, month, day, hour, minute and second), the corresponding format is " yyyyMMdd\THHmmss\t\d\d\.\d\a\t".

If a file is now selected in the file list, the file name is checked according to the format specified. If the formatting complies with the specifications, the date from the file name is displayed in the field "Date of first dataset" (see Figure 7).

If the file name does not contain minutes, this is set to zero, i.e. the data is interpreted as beginning on the full hour.

8.6 Time Information

The chapter "Time information" specifies the time of the first dataset. There are three possibilities here:

- Start time from the file name. Is selected automatically when "DateTime from filename" is selected.
- Star time from the dataset. Displays the time determined from the first dataset of the file.
- Manual start time. The start time can be selected manually here.

8.7 Converting Files

Conversion is started using the button "Convert all" or "Convert selection". The button "Convert all" is only active when the start time can be derived from the file name. If this is not the case, the conversion must be restarted for each file.

Please try to convert data without enabling the “Ignore Checksum” checkbox. It will prevent wrong data conversion.

During conversion, the status of the conversion process is shown via a progress bar. At the end of conversion, there is a message reporting completion.

The data can then be displayed in Thies LNM View.

9 Additional Measuring Values

In addition to the precipitation information, some models of the LNM and 3D Stereo Disdrometer offer the possibility of connecting other measuring instruments. Possible is the connection of measuring transmitters for temperature, humidity, wind direction, and wind speed. The document “instructions for use” provided with your LNM and/or 3D Stereo Disdrometer instructions inform you if this extension is available with your instrument.

The program Thies LNM view always displays these informations. If the values are not stated by LNM and/or 3D Stereo Disdrometer, no data values are included for the additional channels.

10 Compatibility with Previous Versions

The Thies LNM View software version 4.0 is compatible with the previous version.

11 Operation Comments

Error description:

- When using LNM and/or 3D Stereo Disdrometer in the network the server does not receive an updating from the client.

  - Cause:
    The server was re-started without restart of the client.
  - Remedy:
    Please re-start Thies LNM View.
  - Cause:
    You are using a PC with several Ethernet-cards. On the communication set-up between server and client it might occur, that Windows uses the “wrong” Ethernet-card.
  - Remedy:
    Deactivate the Ethernet-card not used.
    Please use Windows XP as operating system, and make out a logical Ethernet card containing both cards.

- The LNM and/or 3D Stereo Disdrometer device transmits data which are not displayed in Thies LNM View

  - Please check if the RS485-lines are connected correctly (see chapter 4.1).
  - Please check the voltage supply of the interface converter
  - Open the LNM-server. Check in the tab “Serial communication” that RS485 or Ethernet settings are valid. Please bear in mind that the button “Activate COM Port” must be ON.
  - Press the button “C“ on the tab “Serial communication”. Within the next minute new data must appear In the area “Last received data record”.
  - Please check the set path in the LNM-server, and in the Thies LNM view. In the LNM-server the path is on the tab “General”. In the Thies LNM view the path is under “Settings LNM-devices”. In both cases, the path must be identical, if Thies LNM View and LNM-server run on the same processor.
  - Please check the LOG file “LogFile.TXT” in the installation directory. If the server receives data but cannot interpret them an entry is generated here.
  - Please check if the LNM and/or 3D stereo disdrometer device sends the right telegram. For communication with Thies LNM view, the device must send the telegram:
    - LNM: TM00004 or TM00005.
    - 3D Stereo Disdrometer (any one): TM00005, TM00100 … TM163, TN00005, TN00100 … TN163, TQ00005, TQ00100 … TQ163.

Please contact us for your system requirements.
We advise you gladly.

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