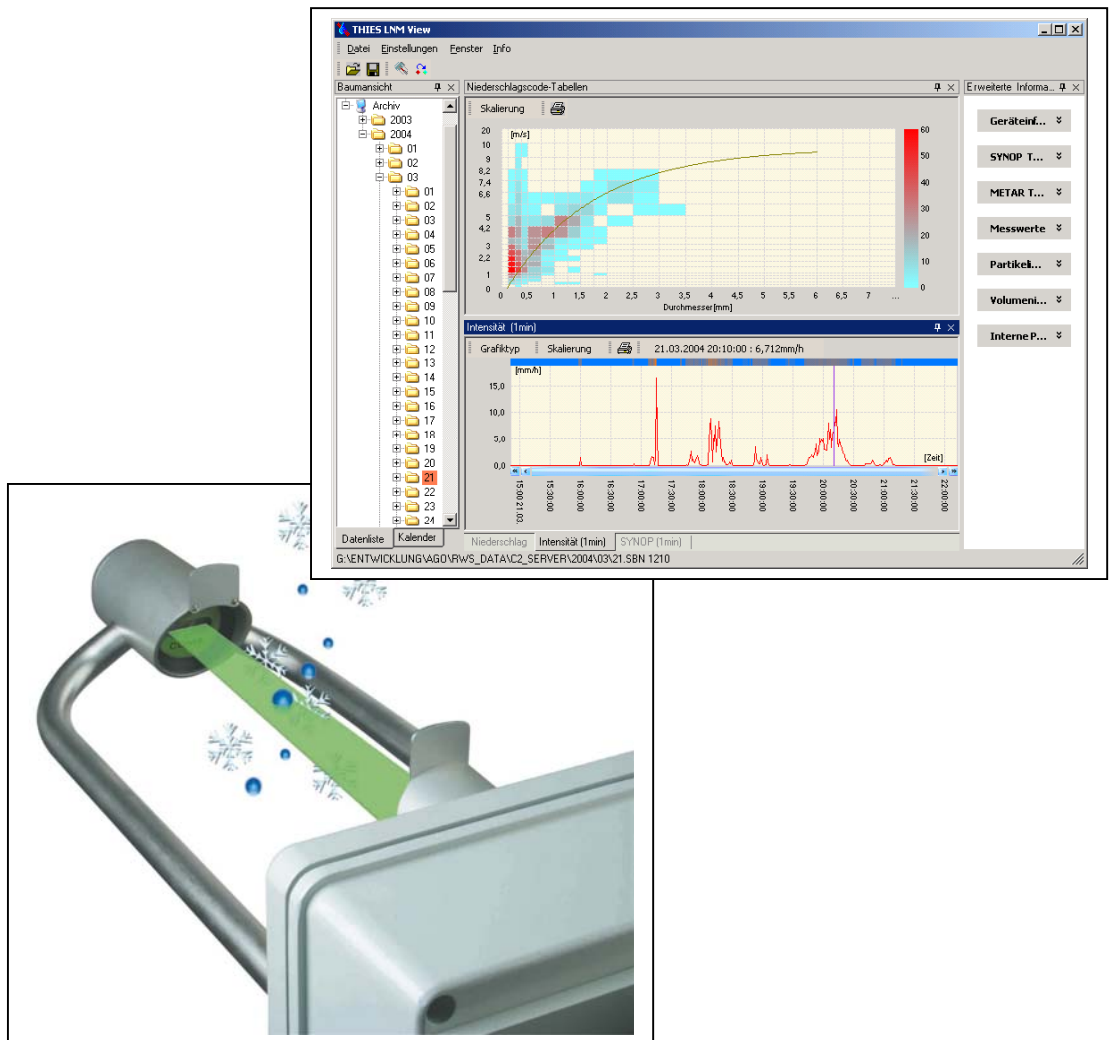


PC - Programm LNM View

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from version 2.5



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1 Brief Description

The LNM – View program is used to display data generated by the Thies Laser Precipitation Monitor. The program can not only archive the data transmitted from the LNM but also present it in a graphics display. The user-friendly design of the operating interface means that it is very simple to analyse all data records transmitted by the LNM.

The program has, amongst others, the following features:

- To govern any number of LNM-instruments in one project
- Client- Server architecture to the central data acquisition and remote visualization
- Installation in the network possible
- Graphic display of more than 30 different measuring values, such as for ex. type of precipitation, precipitation quantity, radar reflectivity
- Display of the precipitation spectrum in 22 size ranges, and 20 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 ex. wind speed, wind direction
- Display of internal diagnostic data

2 System Requirements

The program is based on Microsoft Windows[®] and will function with Windows 2000 or higher. The program requires Microsoft .NET Framework 2.0 and Internet Explorer V5.0. 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 (dotnetfx.exe)

Internet Explorer[®] 6 Service Pack 1 (or better)

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

Product: Internet Explorer 6 Service Pack 1

Minimum PC requirements

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

Graphics resolution: 800 x 600

Graphics colours: 16bit TrueColor

Recommended operation system: Windows 2000, WindowsXP

3 Installation

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

If installation is interrupted with the message that .NET Framework is not installed, proceed as follows:

Download the file dotnetfx.exe to your PC from the Microsoft homepage and install the program. When downloading, make sure you have the right language version. If you only have an old version of Internet Explorer on your PC, it will have to be updated. The version present is checked automatically when dotnetfx.exe is installed.

The CD contains a version of the file "dotnetfx.exe". However, it is not guaranteed that this is the latest version. Therefore, we would recommend to download the latest version from the Microsoft homepage

After the installation of dotnetfx.exe re-start the installation of LNM View.

After installation the program LNM View and LNM Server can be started using "Start", "Programs", "THIES Klima".

4 Start-up

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

For this, the program installs demo data records, and a German-speaking and English-speaking project. Please select in the main menu the item "File". At the end of the menu item there are two items "SampleDeutsch.Ins", and SampleEnglish.Ins". Please open one of the two projects, 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. First connect the LNM to the physical interface of your PC. Bear in mind that to connect the LNM to the RS232 of your PC a RS485/RS232 interface converter has to be used. Also make sure that you do not mix up the data lines between the LNM and the interface converter.

The following assignments are important for full-duplex mode:

Cable LNM	Cable interface converter
TXD+	RXD+
TXD-	RXD-
RXD+	TXD+
RXD-	TXD-

To display the data from the unit, it has to be configured first. Proceed as follows:

1. Start the program "LNM View" by selecting "Start", "Programs" and "THIES Clima". The program may take a few seconds to start up 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 parameters. Please refer to the operating instructions of your LNM for the transmission parameters used . The system suggests the settings 9600 baud, 8 data bits, no parity bit and one stop bit (9600,8N1).

5 LNM View in the Net Work

The program structure of LNM-View allows to operate the program in the local network. Internally, LNM-View consists of a server (LnmServer.exe), and 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 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 interface. Please don't forget to activate the interface via item “Activate COM Port”. The communication to the physical units can be checked on the index card “serial 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 LNM View

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

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

All client programs (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-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 LNM View

The "LNM View" program is characterised 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 organise your screen exactly as you want. It is also possible to change the position of the menu bars of the individual windows.

In the section "Operation of program" 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 "Start-up".

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 colour.

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 selection is possible in the Calendar view. The data records are shown in the views "Total precipitation", "SYNOPT Coding" and "Intensity". Additional views can be found under the menu item "Windows". In total the system offers over 15 different views.


The spectral precipitation distribution is displayed in the window Spectrum if selected with the mouse. All other graphics displays are synchronised 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 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 LNM- View it is possible to present the ZR-diagram over any period required. For this, the radar reflectivity is displayed graphically as function of the precipitation intensity. 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 any graphic view by pressing the button. Furthermore, the display is possible via the data tree by means of the right mouse button.

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 LNM-View and LNM-Server exists the program LNMFileConverter.EXE.

Please find further information in the document "LNMFileConverter.pdf"

With the program LNMFileConverter you can import existing data records to the program. If LNM data are written to a file with a program, e.g. Hyper Terminal, LNMFileConverter can then import the data. The data converter can be started directly from the program LNM-View: Menu "Settings" "DataConverter".

The file converter is also capable of extracting date / time data from the file name, so determining the time of the first data record. When importing data a distinction is made between the following cases:

- import of data with any file names
- import of data with a file name in which the start date is encoded.

Import of data with any file names

To import data with any file names proceed as follows:

- Please start LNMFileConverter.EXE through the Windows explorer. When the LNM Server is started, it is ended automatically. Select the target path to which the data are to be imported. As path select the directory containing one (or more) folders the name of which is the number of a year, or select a new directory.
- Select "Add" and add the required file to the selection list. The file appears in the list "Convert files".
- Under "Date of first dataset" select the date on which the record started. The converter is capable of reading the time data from the first data record of the file. This function is

activated when you select a file in the selection list 'Convert files'. The start time read is displayed in the section "Time information" .

- To manually enter the start time of the first data record select the item "Manual start time" in the section "Time information". Enter the time of the first data record here.
- Then press 'Convert selection'. The data will now be imported. Import will be followed by a message.

When converting with any file names it is only ever possible to import one file from the list "Convert files". The item "Convert all" is only active when the start date can be derived from the file name.

Import data with a file name in which the start date is encoded

If the data records are stored in files containing the start date, the program is capable of identifying this information and importing several files from the list "Convert files". For import perform the following steps:

- Under "Add" select the files you wish to convert. The selection dialogue supports the multiple selection of files. Select the required functions with the mouse holding down the SHIFT or CTRL key.
- Select "Date time of file name". The input for the file format is activated. Enter the date / time format of the name.
The valid formats are shown as a tool tip if the mouse is left on the input mask. The formats conform to standard Windows date / time data.

Important formatting:

- \x The character '\' precedes any character in the name. If the file name contains the string '.txt', this is shown by '\.txt\'.
• yyyy is the year with 4 characters, e.g. 2003
• yy is the year with 2 characters
• MM is the format used for the month with leading zeros, e.g. 03 represents March
• dd is the day of the month with leading zeros
• hh is the hour in the 12-hour format
• HH is the hour in the 24-hour format
• tt is the information AM/PM
• mm is the minute

If for example the file name LNM1_20031101.txt is to be converted to a valid format, the formatting is as follows:

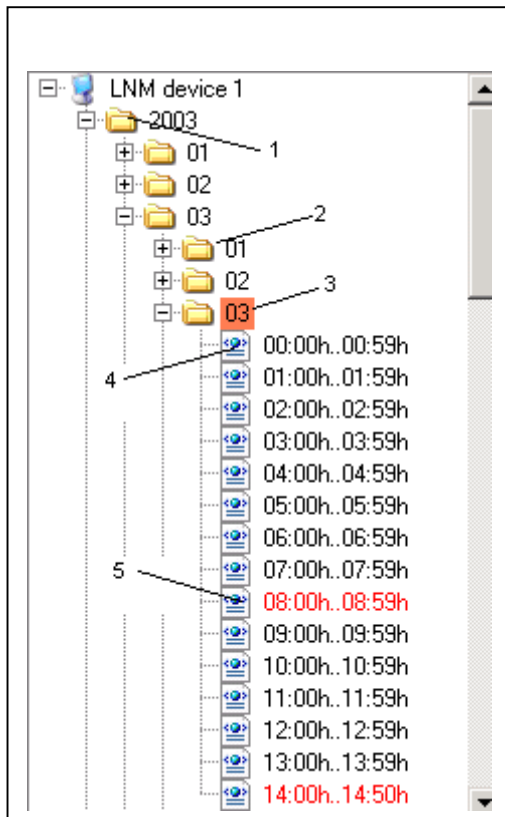
```
\LNM\1\_yyyyMMdd\.txt\
```

The format is valid, when no error message generates on selecting a file in the list "Convert files", and the key "convert all" is activated.

- It is recommended having the start time from the first data record of the relevant file determined automatically.
- Select "Convert all" or "Convert selection" to start the import of data.
- On completion the program will show a message to this effect.

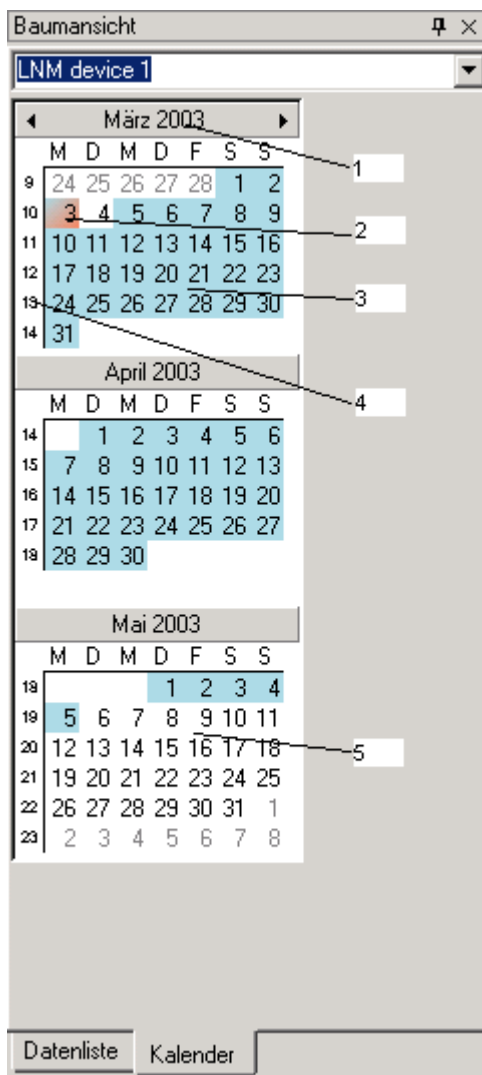
7.9 Operation of Program

Figure 1: Data tree



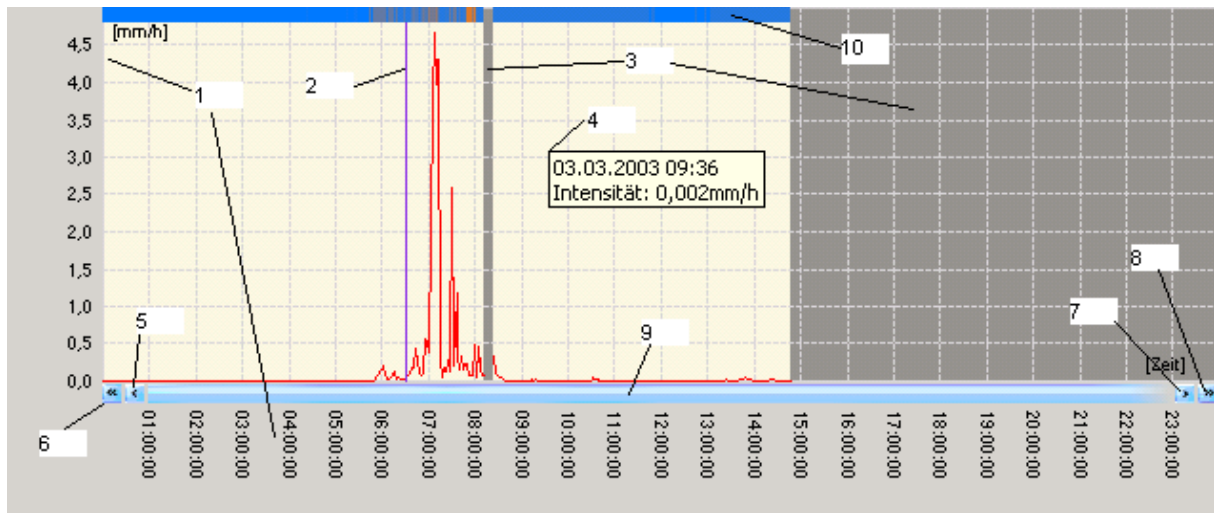
- 1) Year folder
- 2) Day folder
- 3) Select data marked in red
- 4) The day folder contains data for the individual hours
- 5) If data is missing in an hour, the data record is marked in red.

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.

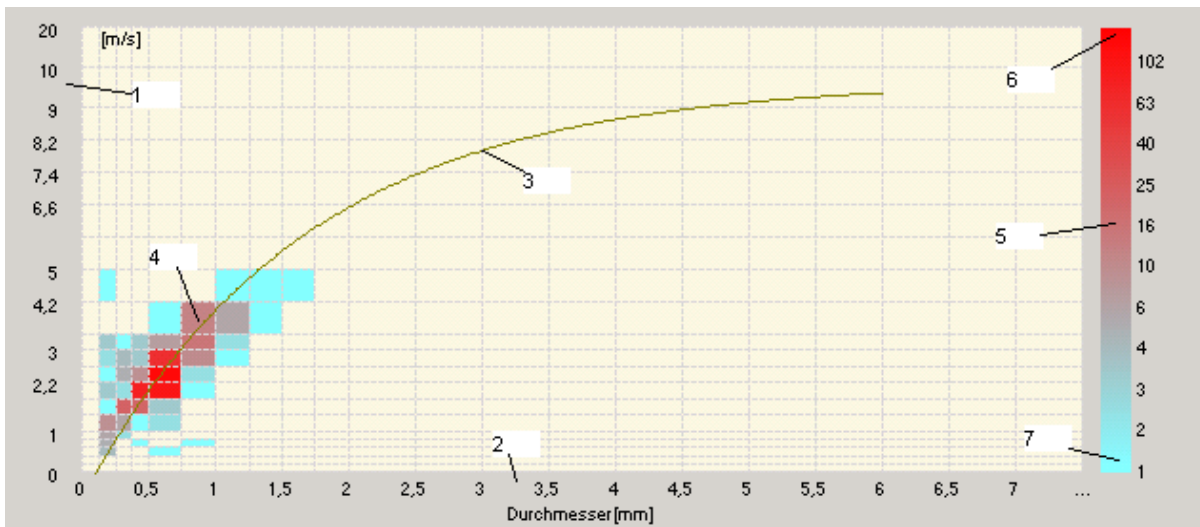
Figure 3: Graphic View



- 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 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 quantises the speed in the steps displayed.
- 2) The X-axis shows the diameter of the particles. The LNM 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 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.
- 7) 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.

8 Additional Measuring Values

In addition to the precipitation information some models of the LNM offer the possibility of connecting other measuring instruments. Possible is the connection of measuring transmitters for temperature, humidity, wind direction, and wind speed. Your LNM-instructions for use inform you if this extension is available with your instrument.

The program LNM view always displays these information. If the values are not stated by LNM no data values are included for the additional channels.

9 Compatibility with Previous Versions

Existing data from the LNM can be read in using version V1.0. However, data in extended displays, e.g. METAR, will not be shown. To display these data you have to convert the data again. To do so, the converting program LNMFileConverter.EXE“ is to be used; see “**Import existing data records**”.

On the first access to converted data in LNM new binary files are created. Through this, delays might occur on the first access. While the data are in processing the hour-glass is displayed.

LNM – Project files cannot be ported from the Beta version to the version V1.0 as the modifications were too extensive. We apologise for any inconvenience caused.

The data of the LNM can be used on the updating to version V2.0. However, it is necessary to install a new project.

10 Operation Comments

Error description:

- When using LNM 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 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-device transmits data which are not displayed in LNM-View
 - Please check if the RS485-lines are connected correctly (see 4.1).
 - Please check the voltage supply of the interface converter
 - Open the LNM-server. Check on the register “Serial communication” the settings of the COM-port. Please bear in mind that the button “Activate COM Port” must be pressed.
 - Press the button “C“ on the register “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 LNM-view. In the LNM-server the path is on the register “General”. In the LNM-view the path is under “Settings LNM-devices”. In both cases, the path must be identical, if 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-device sends the right telegram. For communication with LNM-view the device must send the telegram TM00004 or TM00005..

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