Ultrasound Solutions

UAS3

Ultranalysis® Suite 3

USER MANUAL

Version 10 – 2023

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SDT International sa-nv • Bd de l'Humanité 415 • B-1190 Brussels (Belgium) • Tel: +32(0)2 332 32 25 • info@sdtultrasound.com
SDT North America • 7677 County Road 2, Cobourg, ON K9A 0X4 (Canada) • Phone: 1-800-667-5325 | 1-905-377-1313 • hearmore@sdtultrasound.com
www.sdtultrasound.com

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1. Operating instructions

Welcome to the world of the SDT Ultranalysis® Suite.
This manual has been structured to help you get the most out of your software dedicated to your SDT340, SDT270 or LUBExpert portable ultrasound instrument.

1.1. Getting started

Before you start working with Ultranalysis® Suite, this chapter gives you information on how to install and register your software.
In complement, get information about system requirements, updating and upgrading Ultranalysis® Suite.

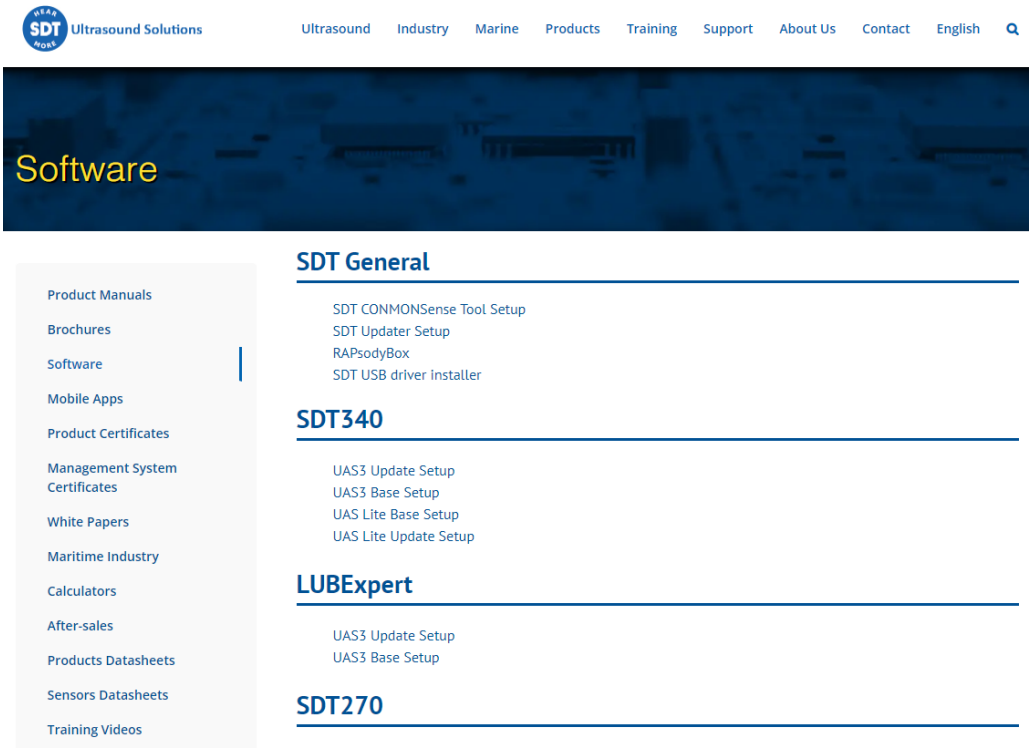
2. Ultranalysis® installation

2.1. Minimum system requirements

- Compatible Operating Systems: Windows 8, 10, 11;
- Architecture 64 Bits only;
- 1.6 Gigahertz (GHz);
- 4 Go RAM;
- Minimum 500 MB available hard disk space;
- USB 1.1 or higher port;
- Sound card and audio output.

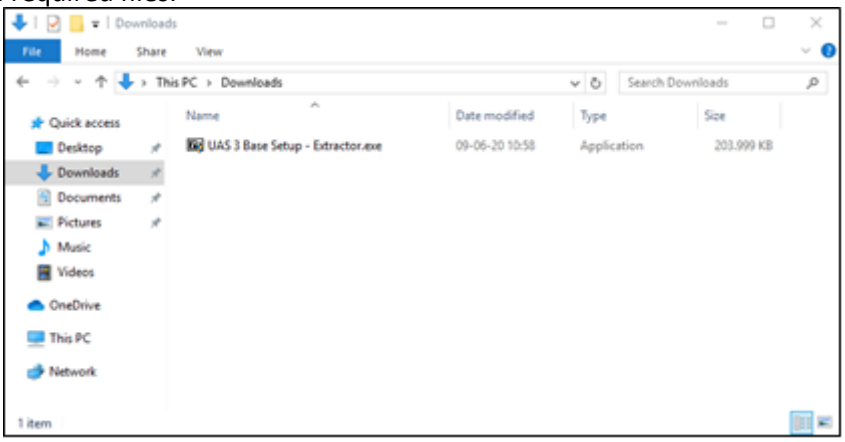
2.2. Download Ultranalysis® Suite 3 Base Setup

If you don't have it yet, you need to download "**Ultranalysis Base Setup** – Extractor.exe" file. The base setup is available on SDT website, section download/Software at https://sdtultrasound.com/support/software/

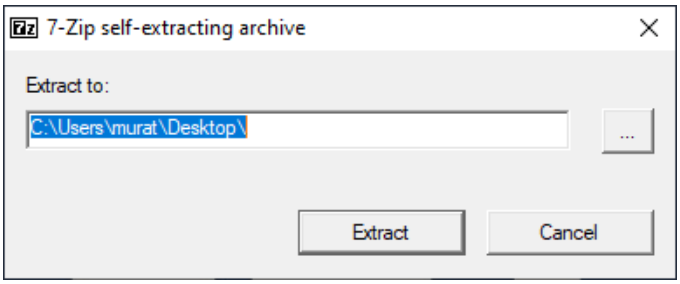


2.3. Extract Base Setup

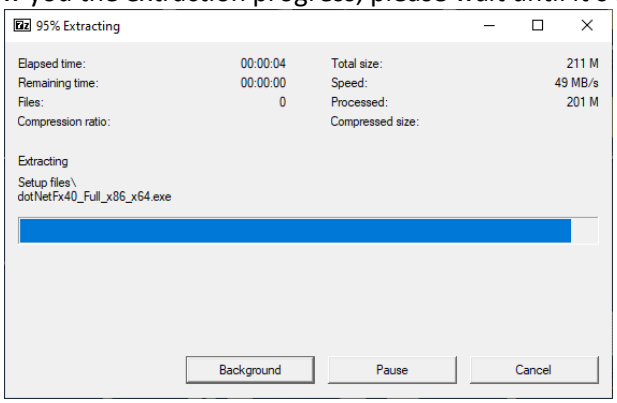
From your download folder, double click on the file "UAS 3 Base Setup – Extractor.exe" to start the extraction of all required files.



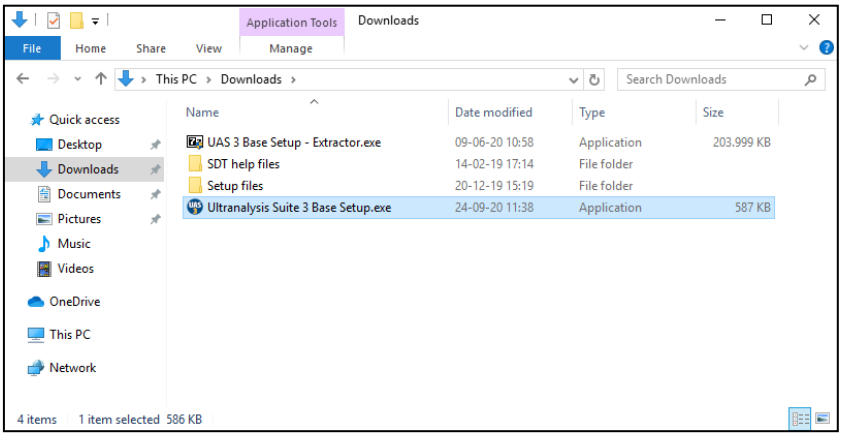
By default, all files will be extracted at the same location as “UAS Base Setup – Extractor.exe” file, if you wish, you may also specify another location at your convenience.
Click “Extract” button to start the extraction.



The progress bar will show you the extraction progress, please wait until it’s finished.



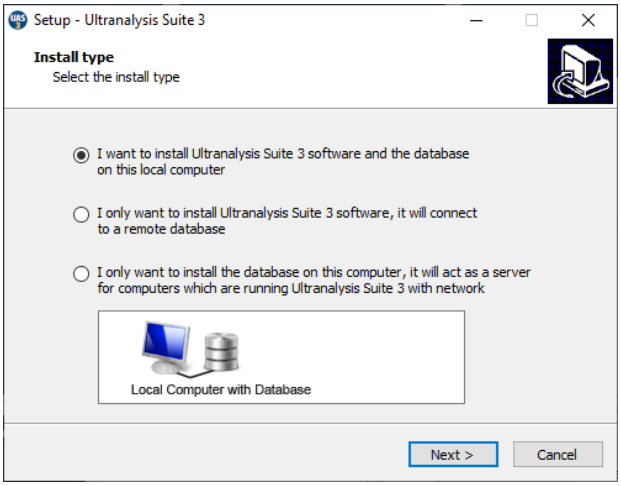
When the extraction is finished, you should see (in the folder location you have specified) the following files:



2.4. Run Base Setup

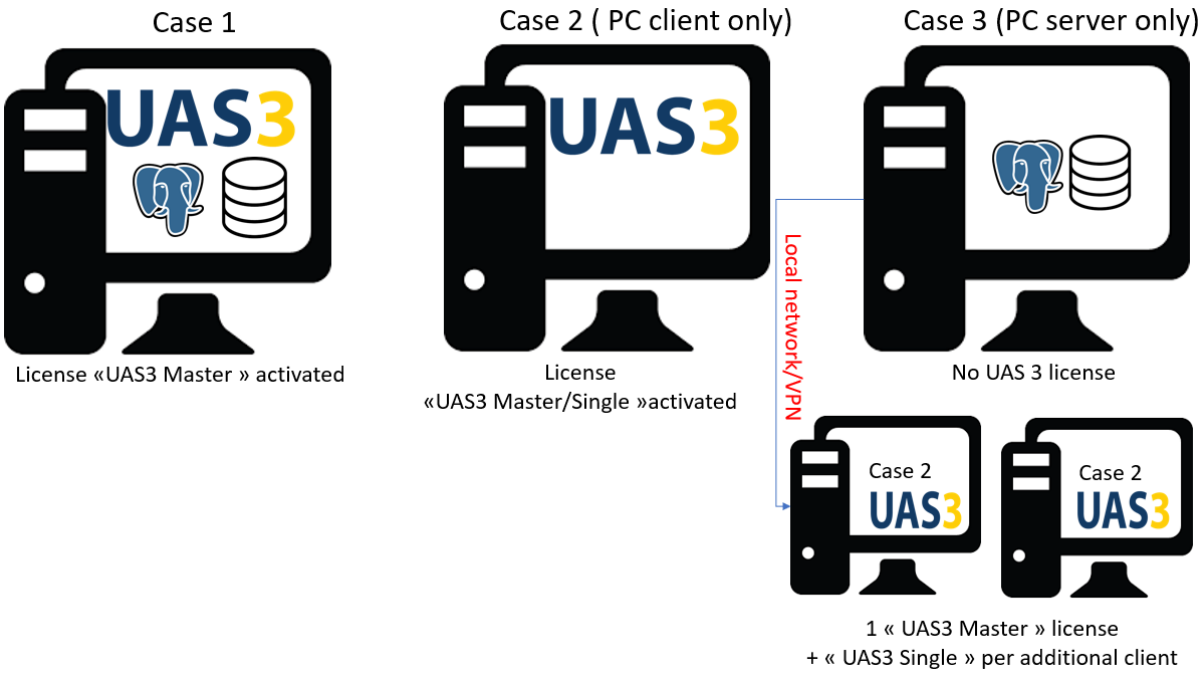
You must have Administrator rights to proceed from here.

Double click on the file "Ultranalysis Suite 3 Base Setup.exe" to start Base Setup installation.
You should see the following window:

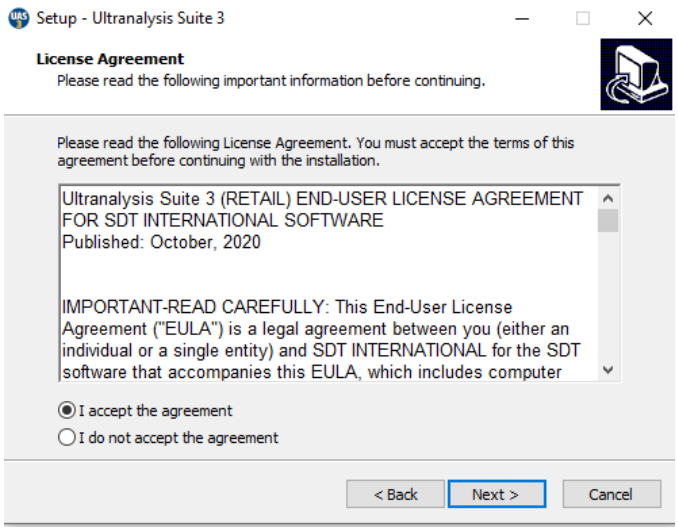


Select the install type and click the **Next** button to continue.
3 types of installation are proposed depending on your network architecture.

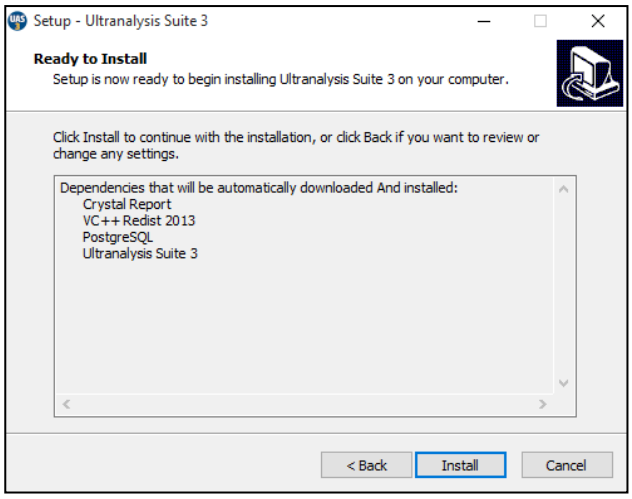
- Case 1: the software (client) and the database (server postgreSQL) will be installed on this computer. UAS3 Master license will be mandatory to exclusively work on the local computer.
- Case 2: the software (client) will be installed on this computer, but you must also install the database on another computer running as a server. UAS3 Master/Single license will be mandatory to access the remote database.
- Case 3: the database will be installed on a computer running as a server. No license is required for this option, but you will need to install the software on the different clients (case 2).



In selecting the first option (case 1), you should see the following window:

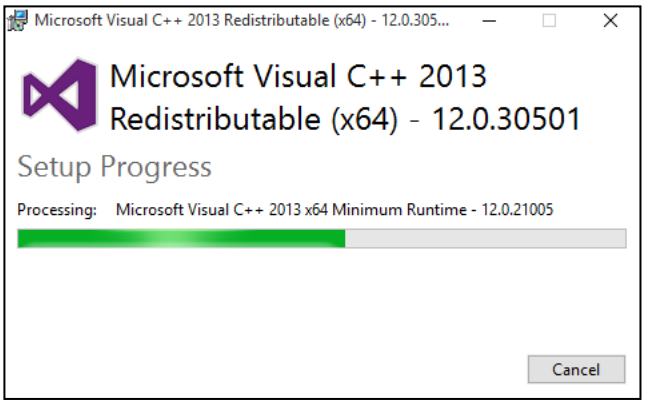


Read the End User License Agreement and if you agree with it, select “I accept the agreement”.
Click on **Next** to continue.
This step will list all the components the Base Setup will install to your computer.
Click **Install** to continue.



2.5. Microsoft Visual C++ Redist 2013

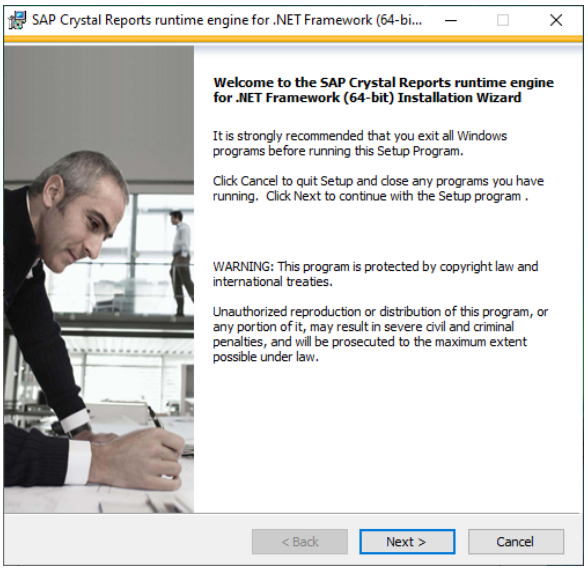
If the Base Setup requires to install the component “Microsoft Visual C++ 2013 Redistributable (x64)”, you should see the following window:



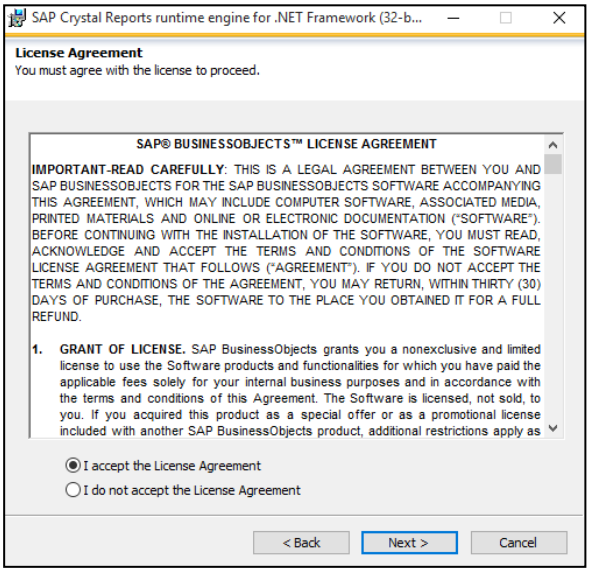
Depending on your computer performances, it could take few minutes.

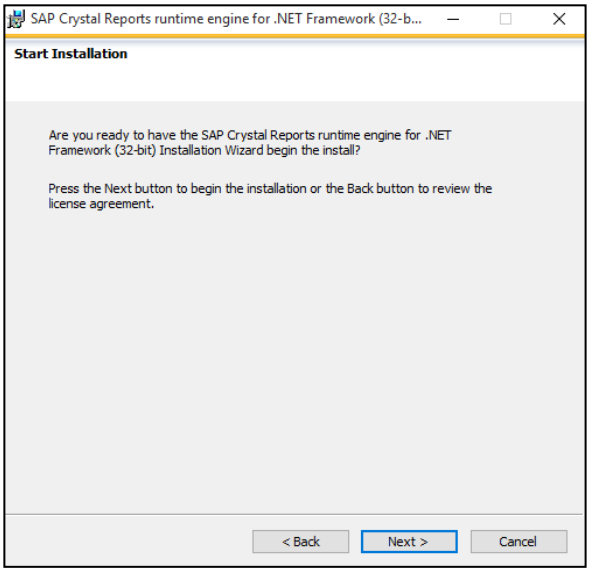
2.6. Crystal Report

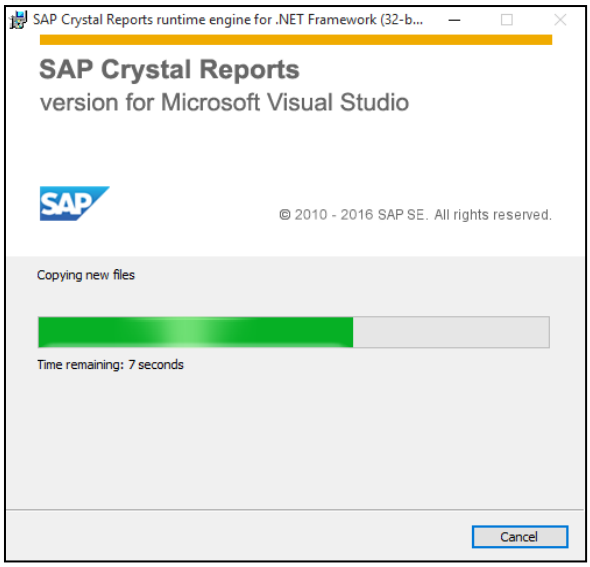
If the Base Setup needs to install the component “SAP Crystal Reports”, you should see the following windows. Depending on your system performance it could take a few minutes. Click **Next** to continue.



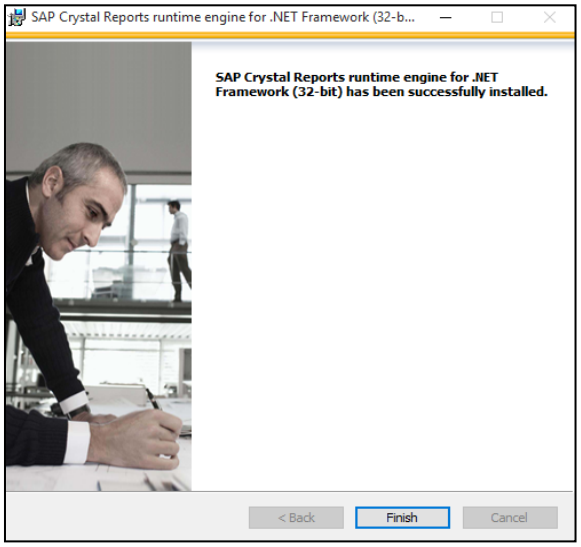
Read the End User License Agreement and if you agree with it, select “I accept the agreement”. Click **Next** to continue.





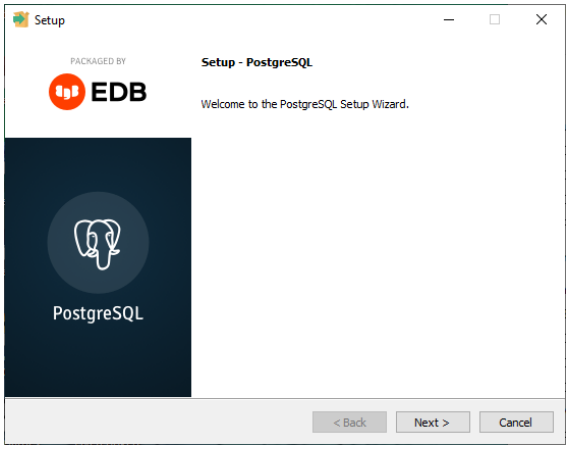


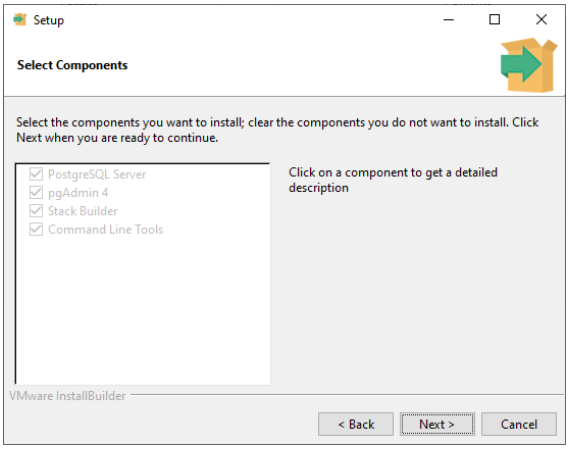
Click the **Finish** button to finish to installation of Crystal Reports



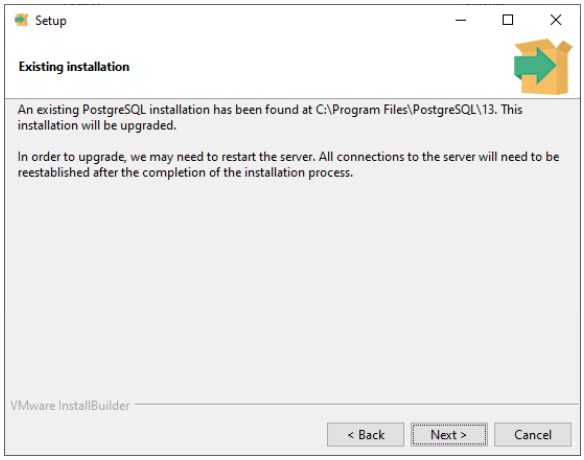
2.7. PostGreSQL

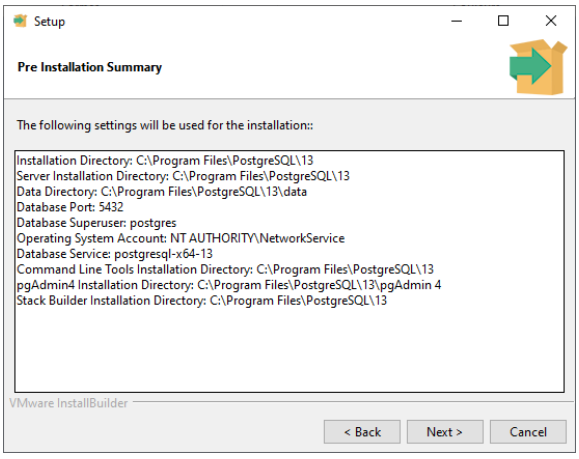
If the Base Setup needs to install PostGreSQL database, you should see the following windows:



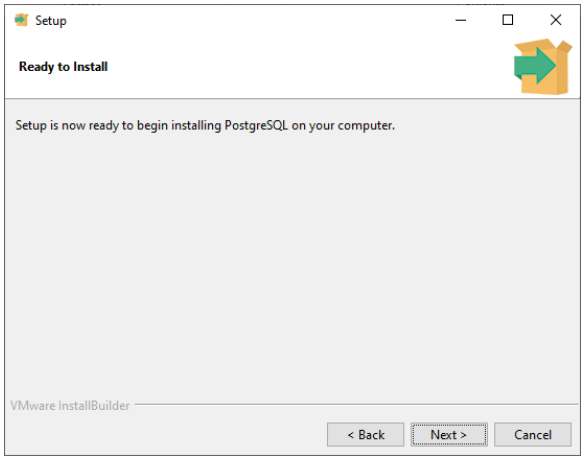


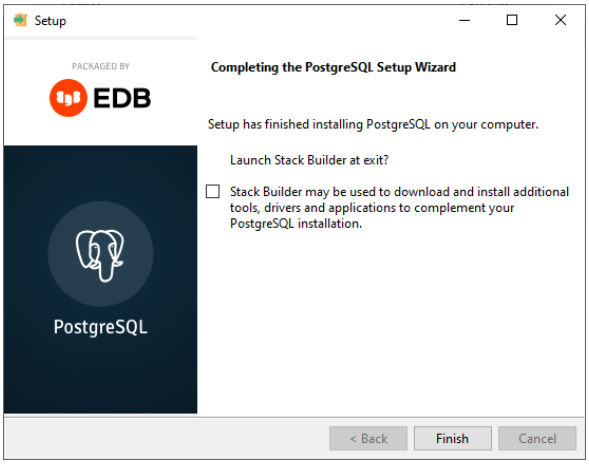
Please also make sure you have uninstalled the old version (Open the windows taskbar, type Control Panel, and select it from the results, Select Programs > Programs and Features.
Press and hold (or right-click) on PostgreSQL Database server (<13) you want to remove and select Uninstall.
Select **the recommended settings** and click the **Next** button to continue. The right window lists the default components being installed with the PostGreSQL installation. Only **PostgreSQL Server** is mandatory for UAS3.
Click **Next** to continue.





If another installation is detected, you must uninstall it before installing the default settings for UAS3.

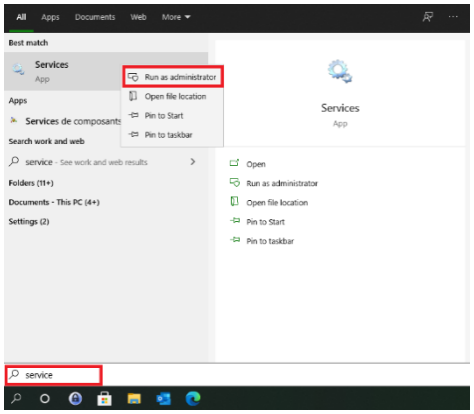


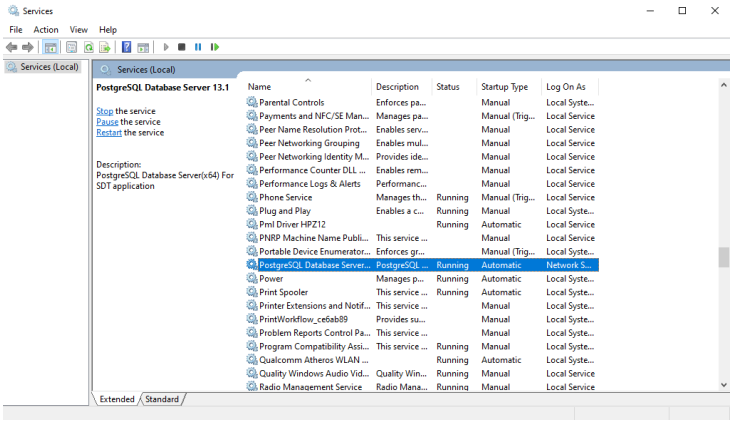


Finalize the installation by clicking **Next.**

Untick the Stack builder box, Click the **Finish** button to complete PostGreSQL installation and continue with the Base Setup.
Depending on your system's performance it could take a few minutes.

The database service should be launched as a service, in Windows. Make sure that PostgreSQL Database server (v13) is locally running, in automatic mode, as follows:

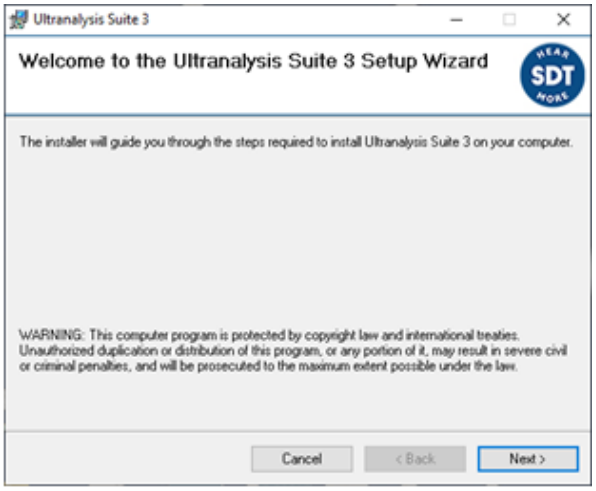




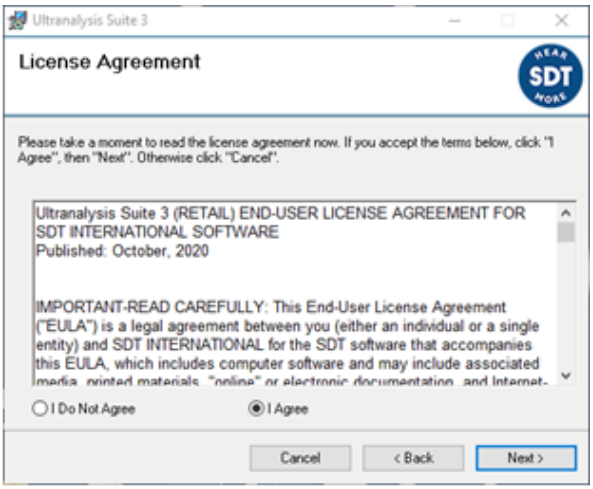
Type Services in the windows task bar, right-click, run as administrator. Find the service postgresql-x64 and make sure that the service is running in automatic mode.

2.8. Ultranalysis® Suite 3

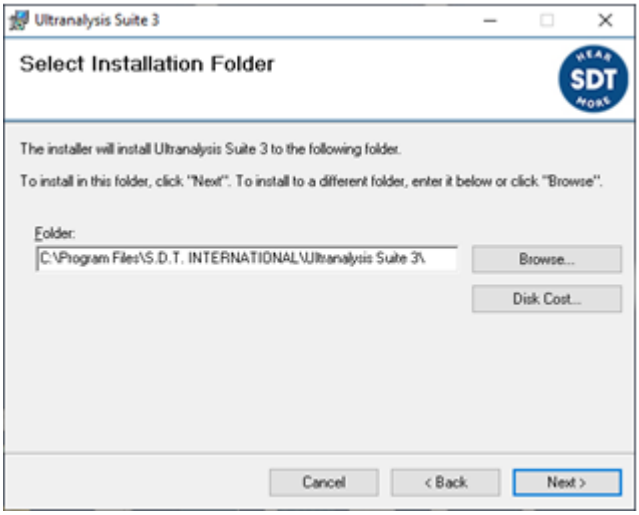
The final part of Base Setup is the installation of Ultranalysis® Suite 3.
You should see the following window:



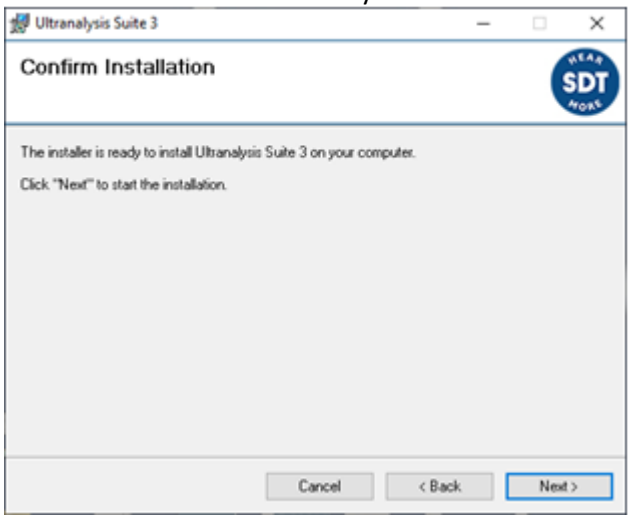
Click the **Next** button to continue.



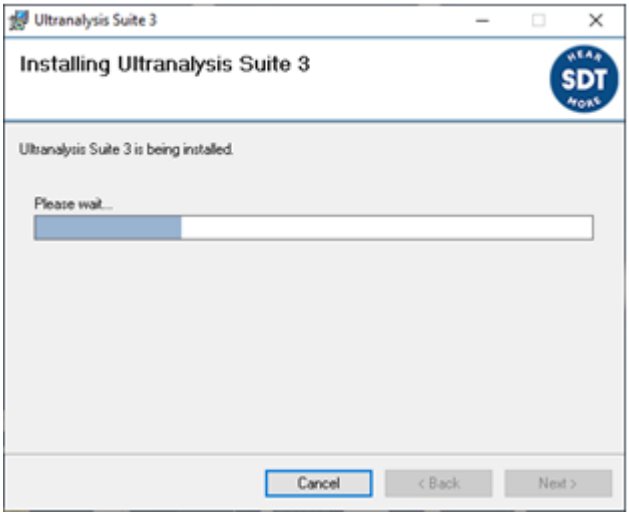
Read the End User License Agreement and if you agree with it, select **I Agree**.
Click the **Next** button to continue.



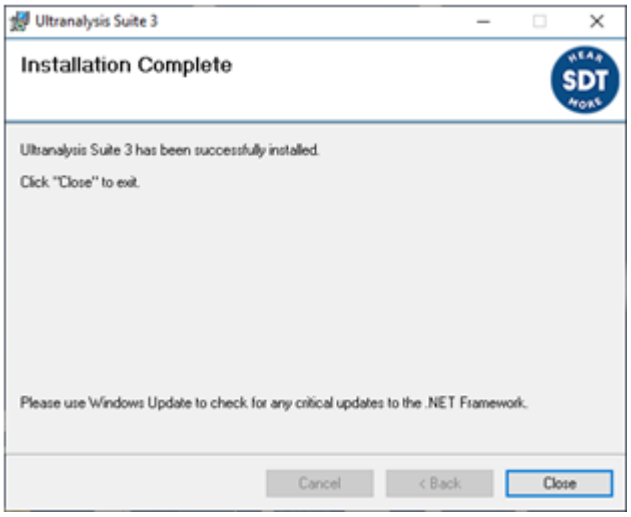
Select here the Destination folder location for Ultranalysis® Suite. Click the **Next** button to continue.



This window will list which components will be installed on your system.



Click the **Next** button to continue.



Click the **Close** button to finish Ultranalysis® Suite 3 installation.

3. Activation and registration of Ultranalysis® Suite

3.1. Serial number

Your serial number has been communicated by e-mail:

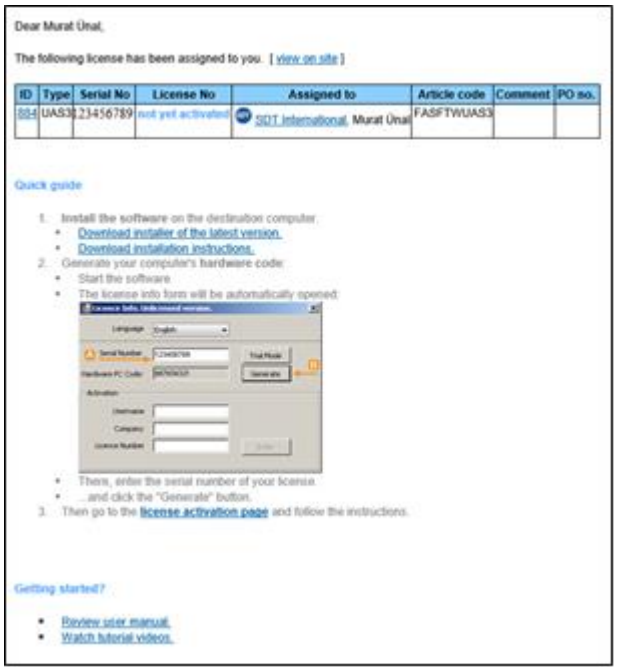


Figure 3-1: Specimen of e-mail containing the serial number

When Ultranalysis® Suite is launched for the first time, the following license window opens automatically.

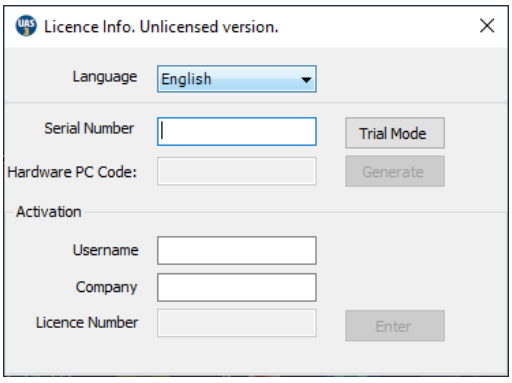


Figure 3-2: License information window

Encode your serial number in the corresponding field. If you are using the trial version of the software, use the menu **Help / License set up**.

3.2. Hardware code

Generate your hardware code by clicking on the button **Generate**. This code is unique and can only be used with your machine.

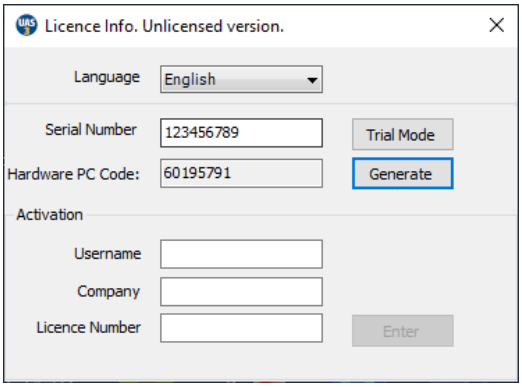


Figure 3-3: The hardware code has been generated

3.3. Registration of Ultranalysis® Suite

Visit our server at the address https://extranet.sdtultrasound.com/licenses/activate
Encode your serial number in the corresponding field and then click **Next step**:

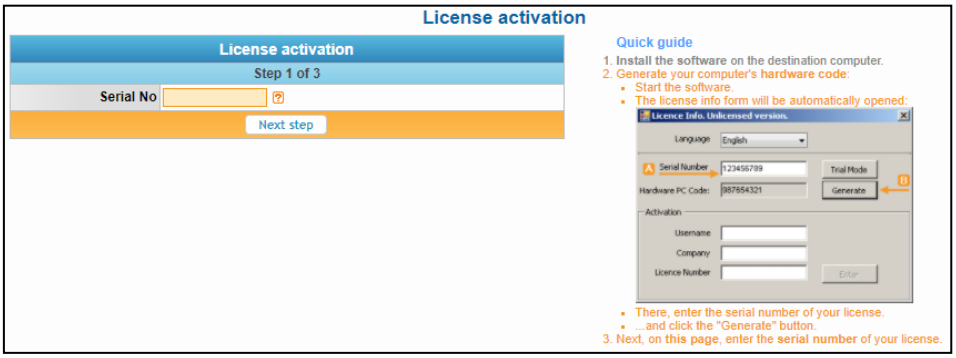
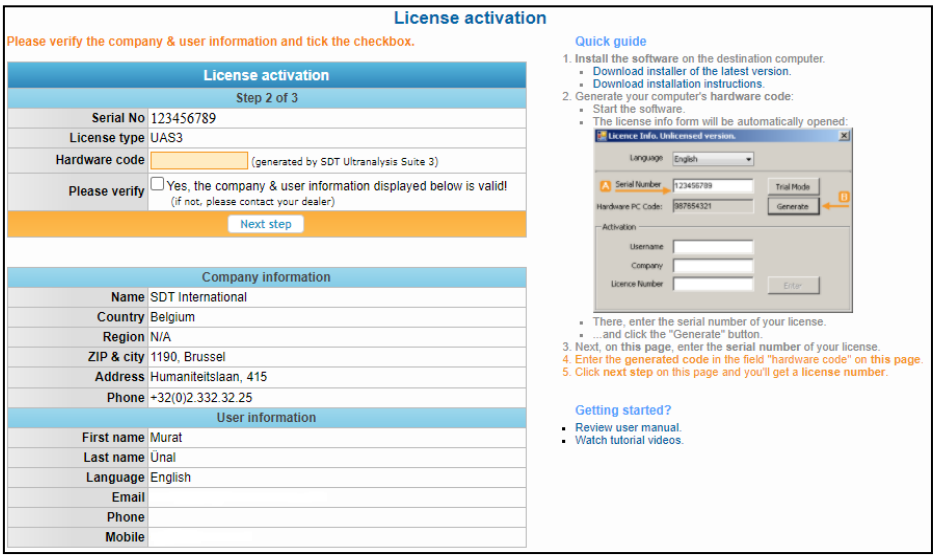


Figure 3-4: Type your serial number

Or click on the link at point 3. in the email received.



The webpage asks you to encode the hardware code and to confirm your contact information. The hardware code is a unique identifier that is specific to your PC and therefore, you can't replicate the installation, based on the same license, on other PCs. For multiple installations, you will need to purchase additional licenses to activate. Each supplementary installation will require a specific hardware code, based on the registration procedure.
Type your hardware code corresponding to your PC in the corresponding field.
If the other fields are correct, tick the box **Yes, the company & user information displayed below are valid!** and click '**Next step**. The system sends you by e-mail your license number.

Dear Murat Ünal,

The following license has been activated. [view on site]

ID	Serial No	License no	Assigned to	Type	Article code	Comment	PO no.
884	123456789	12345678901234567890	SDT International, Murat Ünal	UAS3	FASFTWUAS3		

Figure 3-5: Standard e-mail of license number attribution

3.4. Activation of Ultranalysis® Suite

Come back to the license window of Ultranalysis® Suite, type your license number received by email in the dedicated field and fill in the required fields Username and Company then click **Enter**.

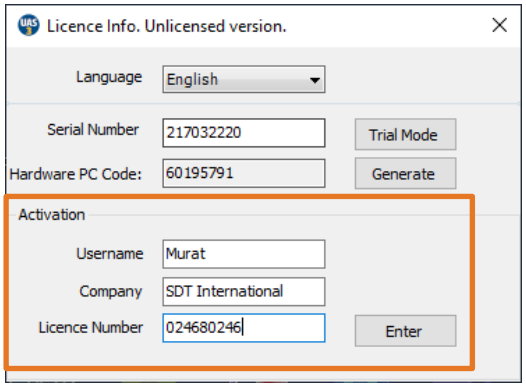


Figure 3-6: License number, username and company

Congratulations, Ultranalysis® Suite is now activated. If the data is incorrect, please contact your local dealer or SDT International.

3.5. Unlocking additional feature "Bearing diagnosis"

Available since v 3.1925

To get access to this advanced analysis tool (bearing database, periodic cursors), you must purchase an activation code that will be associated to your main license.
Contact your local dealer or SDT with your Serial Number & Hardware code to get your activation code.

Once the default installation is activated, launch UAS3. On the top menu, click **Help(?)** then **License setup.** Enter your second validation code in the appropriate field and click **Enter.**

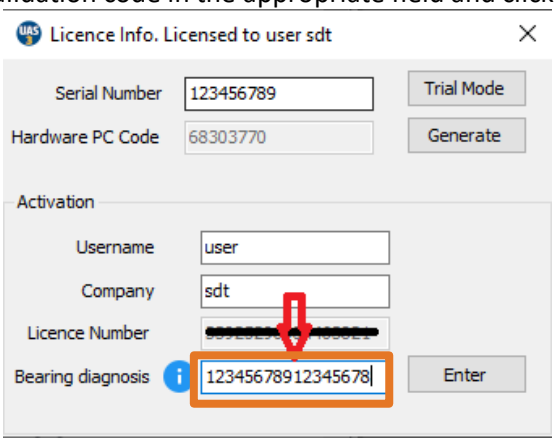
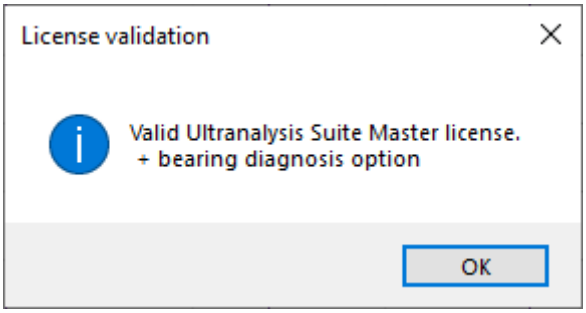


Figure 3-7: activation of the bearing toolbox

If the code is valid, the following window should pop up.



Congratulations, you get access to the bearing toolbox.

4. Updating Ultranalysis® & version check

4.1. Updating

Automatic update

If your PC is connected to the Internet, Ultranalysis® automatically checks if a new version is available.
In case of update, a pop-up will appear at the right bottom of the software

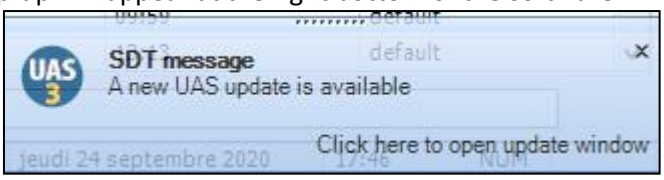


Figure 4-1: Automatic check of an Ultranalysis® update

Click on the message to download the latest version and follow the instructions. You will be invited to create a backup of your database.

SDT International strongly recommends ensuring regular backup to prevent against potential data loss for which we cannot be held responsible.
In some cases, the download step may be blocked by your IT restrictions. If so, contact your IT department.

Manual update

To recover the latest version of Ultranalysis®, select **Help (?)** / **check for Updates**.
You need an Internet connection to realize this operation.

4.2. License information

To check your license information, select Help (?) / License setup.

4.3. Ultranalysis® software version

To check your software version, select Help (?) / About.

5. Introduction to Database/ Tree Structure

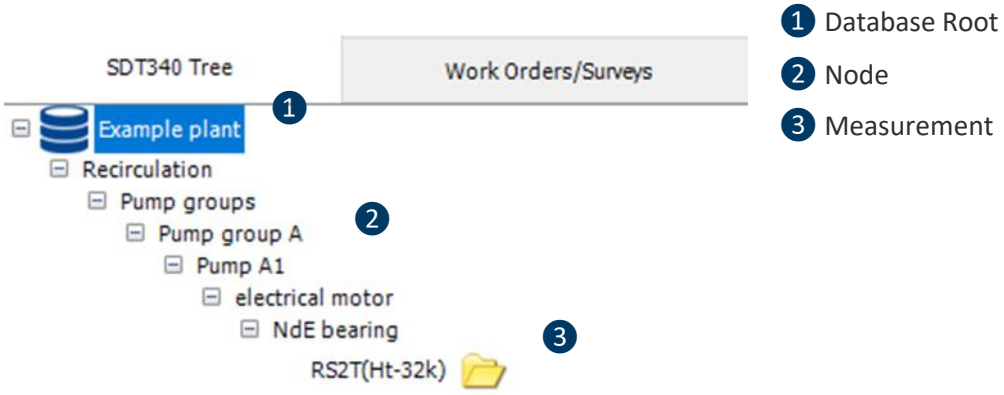
5.1. Database definition

UAS3 is fundamentally used as a Database to manage your collection, processing, and analysis of data. A database is an integrated collection of logically related records or files consolidated into a common pool that provides data for one or more multiple uses. It is used to store and organize information in such a way as to make it easy to retrieve.
Imagine a library where you know all the books you need are located but you have no logical way of finding them – it would be a nightmare. In the same way, many databases are created in such a way that only their creator knows how to find information. As predictive maintenance departments are typically comprised of team members relying on integrated data, this would not be a good database.

5.2. Tree structure definition

UAS3 uses hierarchical database model in which the data is organized into a tree like structure. The content could be data collected with the SDT340, SDT270 or LUBExpert, comments, events, statuses, or external document.

The tree structure is the way of representing the hierarchical nature of the Database. It is named a tree structure because the representation looks like a tree. In this type of structure, The Database name, also called the Database root, is the top of the tree structure and the Measurements, also called the ''leaves'', are at the end. A Measurement is the combination between a sensor choice and Measurement settings. The branches between the Database name and the Measurements Categories are called Nodes.



5.2.1. Node

Node is a position in a tree between the database root and the Measurement. Each node has a unique parent (their upper level) and can have multiple children (their lower levels).
UAS3 database can effectively contain a virtually unlimited number of nodes, regarding your computer storage capacity.

5.2.2. Measurement

The Measurement combines a sensor choice (by example the Needle RS1 or Parabolic dish) and a set of specific parameters (by example Static or Dynamic measurement, the Mixer Frequency, the bandwidth).
For each measurement point, you can decide the type of sensor you want to use. SDT340, SDT270 work with a variety of different sensors like Airborne and Structure borne Ultrasound probes, Accelerometer, Tachometer, Thermometer. LUBExpert works with one single sensor – LUBESense1.

However, the notion of sensor type is not sufficient for reliable comparison of data. For example, an RMS calculated between 10 and 1000 Hz is not comparable to an RMS calculated between 10 and

10000 Hz. This is the reason why UAS3 adds, to the sensor type, the parameters associated to the measurement.
Measurement is the end leave of the tree structure.
Consequently, no sub level can be assigned to a Measurement.
The Measurement name is generated automatically by UAS3, when it is created, regarding your selection.
Measurements can be **Static (indicators only)** or **Dynamic (signal)**.

Static measurement

A static measurement is one which is purely a single numerical value - a dBµV value (RMS, maxRMS or Peak), linear value of ratio (Crest Factor), RMS velocity, Peak acceleration … or a temperature are all static measurements.
Static measurements can be collected using either the SDT340, SDT270 or LUBExpert.
These values are normally logged for trending or alarm comparison.

Dynamic measurement

A dynamic measurement is an entire event recorded during defined data acquisition time, represented as Time domain or Frequency domain.
An example of dynamic measurement would be a recording of the ultrasonic signal from a bearing, or a recording of the collection of close and purge phases of a steam trap.
This type of measurement would normally be analyzed by viewing and processing the time signal of perhaps the spectrum of the signal in UAS3.

5.3. Structure of a good database

A considerable amount of thought should go into the structure of your database. Spending some time in detailed consideration of nomenclature and organizational structure will help you to develop your database in the right way today.

NOTE!
It is highly recommended to introduce several assets into your database, and work with it for a day or two, in different situations, performing different tasks. If you are not completely satisfied, edit it, try it again. Once you are satisfied and tree structure is correctly reflecting organizational structure and it is suitable for required tasks, continue. Do not put yourself in a position of introducing 1000 assets and realizing then that it should be organized differently.

It may be that you have already been through this process with the development of your computerized maintenance management software (CMMS) database in which case you are likely to be using the same database structure in UAS3.
If you are not familiar with this topic, here are some issues to consider.
Consider when you are filling in an address form.
There can be several levels of information needed to define your address:

- Country;
- State, Province or Region;
- Town or City name;
- District name;
- Street or road name;
- House or Apartment number.

The database required to manage all this data would require 6 levels in order to fully describe the location of each house or apartment.
Notice how the structure starts at the top, with the country, and moves down becoming more specific, or localized, with each lower level.

Consider how you might want to organize and search through this database to:

- Find a particular house on a particular street;
- Find all houses on that street;
- Find all the streets in a particular district with the same name.

An important function of the database then is to organize the data into a hierarchical structure – this is what we call a tree.
Using UAS3, you can create multiple databases. Each database is characterized by its name and has its own tree structure. In a tree structure model, the database name is equivalent to the database root.
The number of databases is limited only by your computer storage capacity.
You cannot open simultaneously several databases. One logical unit (process, location...) should be in one database/tree structure. You can upload only one database at a time in the SDT340, SDT270 or LUBExpert. This is an additional reason to create your database with logical nature of work in mind.

5.4. Number of levels

Inside UAS3 databases, you can organize the tree with a maximum of 6 levels. This means, 6 additional levels below your tree structure name. Final level (whether it is 2nd, 3rd, … or 6th) allows you to define a measurement (sensor type, measurement settings). This is just to avoid confusion that might appear when counting levels (it could look like 8 if includes tree structure name and sensor/measurement level). This should be more than enough for most applications and will generally be more than is used by your CMMS program.
Careful consideration should be given to the use of these levels to maximize your ability to locate and describe a measurement point within your plant. Tree structure is there to make you do your job easily, so it needs to be built in a way that allows you to search, filter or view asset groups and assets in easiest way.

Whilst we have 6 levels, you do not need to use all 6 all of the time. If you can define your measurement point location at 2nd, 3rd or 4th level, that is all you need to create. There is no requirement to invent levels just to make it up to 6. UAS3 is flexible enough to identify measurements wherever they may be in the tree structure which gives you tremendous flexibility in your database design.

The SDT270 and LUBExpert Database is identical to that of UAS3, but its screen can display only 5 levels at the time. SDT340 will display all levels defined in UAS3.

5.5. Choice of a reliable naming

In UAS3 database, as in most databases, the use of upper, lower case and space character can be used as a distinguishing characteristic which can be used to filter through large amounts of data quickly:

- Pump 1 is not the same as pump1.
- Pump1 is not the same as pump 1.
- Non-driven bearing is not the same as Nd bearing or/and bearing.

Being consistent is critically important when you are creating a database. It helps you to keep track and it helps the database search engine to find what you are looking for in the future. It is important that you develop a standardized naming system and stick to it.
Think of terms you can use within your own plant or organization which will convey meaning. Abbreviation is often required, so make sure that the abbreviations you use are consistent and understood by all involved.
Consistency between the maintenance department and operators is also important. If you have a conveyor feed into a zoned oven for example, do you number the Recirc fans from the infeed end

forward or from the outfeed end backwards? Is your system consistent with what the operators call them?
One simple naming system is to use capitals for Areas, Processes, Functions (Recirc Fan, Boiler Feed Water Pump) and lower-case letters for components inside one of these functional units (motor, pump, fan, gearbox, bearing).
You might want to add a suffix that might help you easily filter assets according to certain criteria (as an example; electrical motor GL, where GL stands for Grease Lubricated, or exhaust fan OL, where OL stands for Oil Lubricated) and extract only assets that you need for certain task.

5.6. Considerations for Database construction

As you add more and more information, data, and measurements to any predictive maintenance database, the value and the cost of the database increases. That value is based upon the knowledge locked away inside it about the reliability of components, systems and methods used in your plant. Cost related to the database represents hundreds of ours invested to populate it.
Both value and cost are high, so make sure you build it in a way that will deliver benefit.

As you build your database then, plan ahead a little bit by putting information in now which will make it easy for you to do some digging in the future. Consider some of these real-life database searches and their implications in the database construction. In example, show me:

- Bearings mounted next to belt pulleys.
- Drive end bearing of all 15 kW motors on site.
- Pump drive end bearing.
- Conveyor roll bearings using ABC grease.

One way to build an efficient database is to:

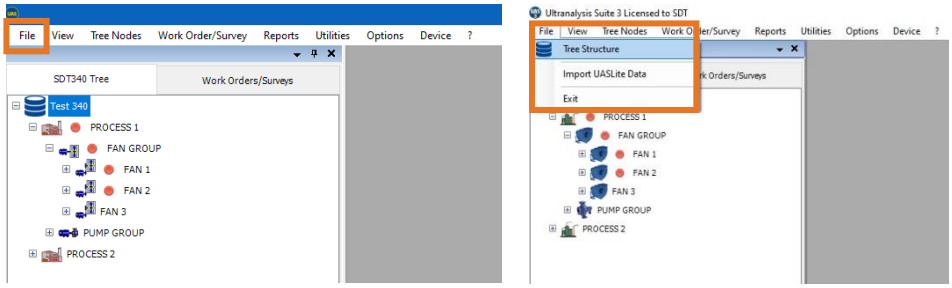
- Regroup all identical equipment into one branch level (or Node).
- Regroup equipment from a process function into one branch level.
- Avoid regrouping machines regarding survey routines.

6. Creating and Editing Data Folders and Tree Structures

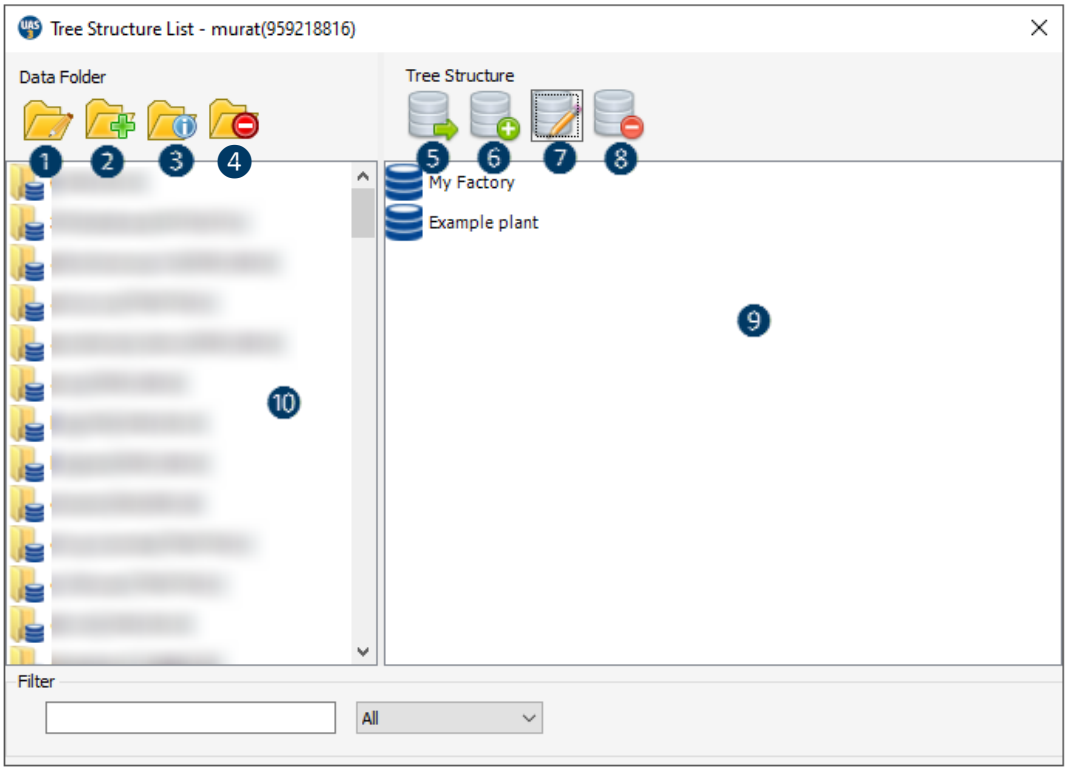
NOTE!
To assist you, SDT provided several examples in the Demo database included in UAS3.
You have the possibility of involving you without risk within the Demo Database.
You can load, test functionality, modify and then restore Demo database to its original version.

6.1. Creating a Database

In top toolbar, click on **File/Tree structure:**



Folders & Tree structures management window with following functionalities will pop up:



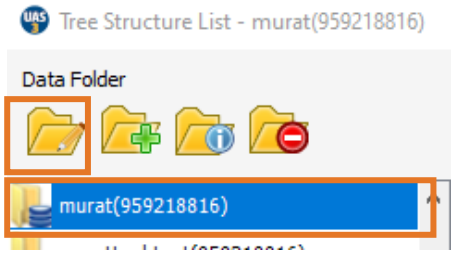
1. Edit folder name
2. Create new folder
3. Data folder info
4. Delete folder

5. Open selected tree structure
6. Create new tree structure
7. Edit selected tree structure name
8. Delete selected tree structure
9. Databases (tree structures) contained in displayed folder
10. Name of the displayed data folder

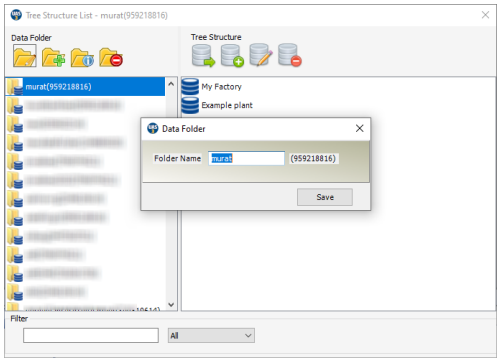
You can create as many data folders and tree structure (databases) as you need.
Default data folder is named “mydatafolder”.
Now, you can start working on your **Data Folders** and **Tree Structures**.

6.1.1. Editing data folder

Click on the drop-down menu (arrow) in Data Folder field, select a data folder and press **Edit***:*

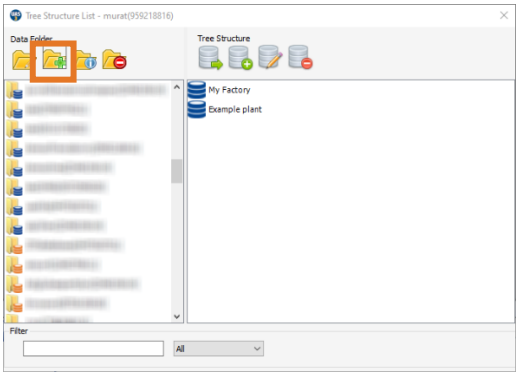


Edit window will pop up, where you can edit the Data Folder name and **Save** it:

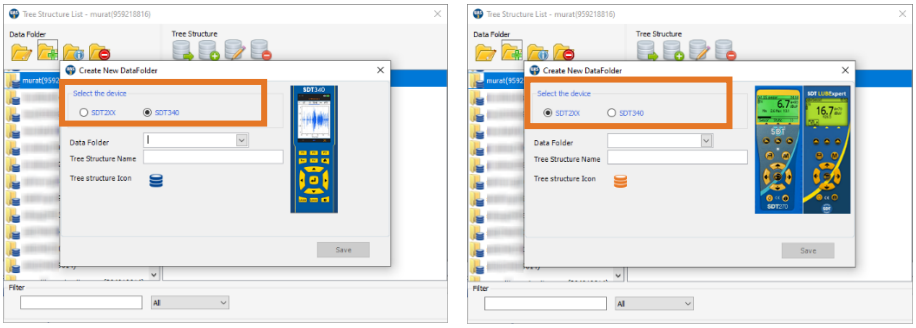


6.1.2. Create new Data Folder

To create a new data folder, click **Create New**:



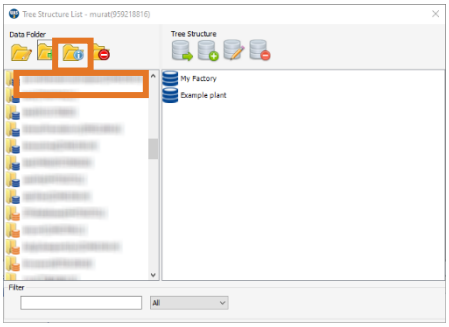
New window will pop up:



Since UAS3 supports SDT340, SDT270, and LUBExpert, you need to choose the instrument you will be using for the **Data Folder** you want to create. Note that type of data folder (SDT340 or SDT270 and LUBExpert is indicated by different Tree structure Icon color.
Enter the name of the **Data Folder** and **Tree Structure Name** and press **Save**.
Your new **Data Folder** and its initial **Tree structure** is created.

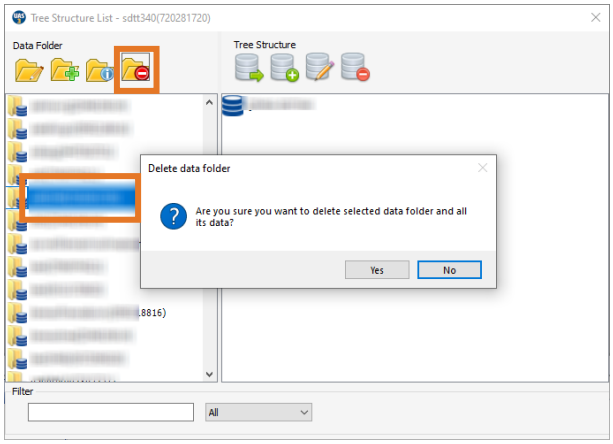
6.1.3. Data Folder info

Select Data Folder and click on **Info**:



6.1.4. Deleting Data Folder

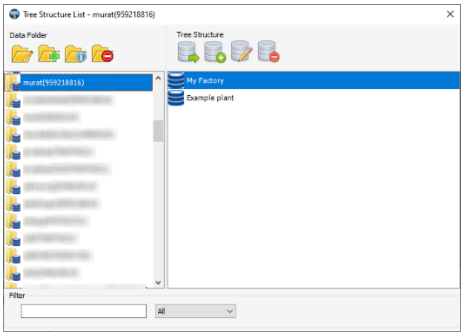
Select data folder and click on **Delete**:



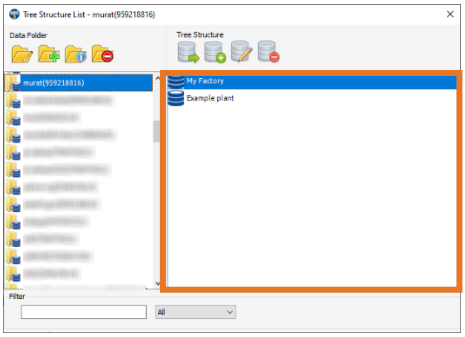
Double check that you want to delete selected **Data Folder**, as you will be deleting all **Tree Structures** it contains.

6.1.5. Open existing database (tree structure)

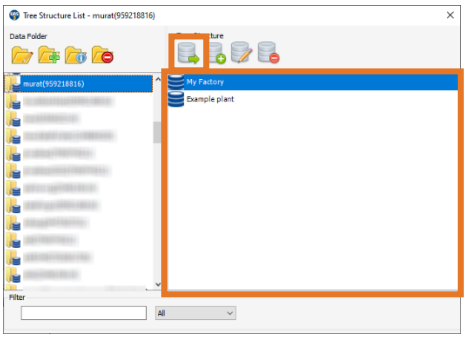
Select data folder (click on the drop-down menu in Data Folder field):



Once you choose desired folder, all tree structures it contains will be displayed:

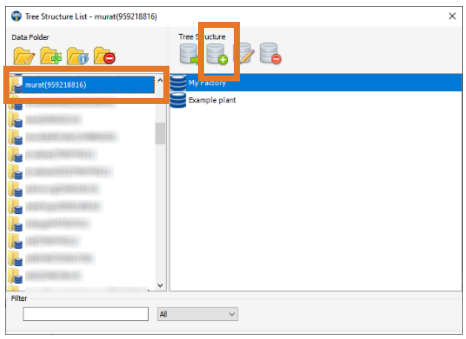


Select tree structure and select **Open**:

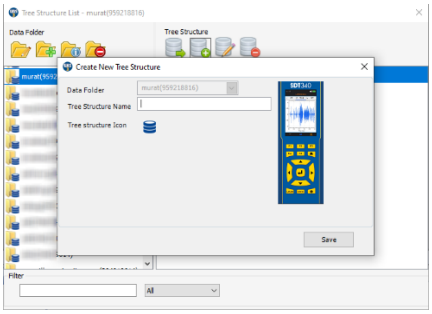


6.1.6. Create new database (tree structure)

Select a ***Data Folder*** where you want to create a new **Tree Structure**:



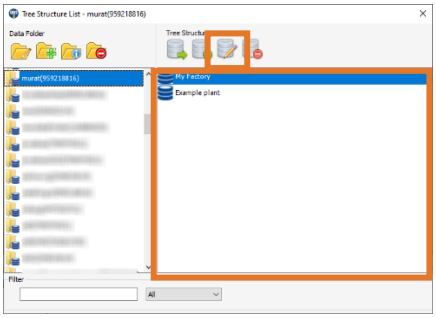
Click on **Create New**:



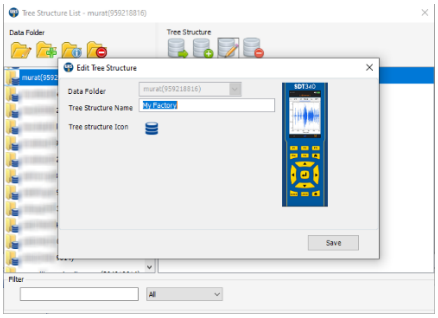
Enter **Tree Structure** name (the database name can contain up to 50 characters, including special characters) and click on **Save.** Your new **Tree Structure** is created.

6.1.7. Edit database (tree structure)

If you want to edit the **Tree Structure** name, select it, and click on **Edit**



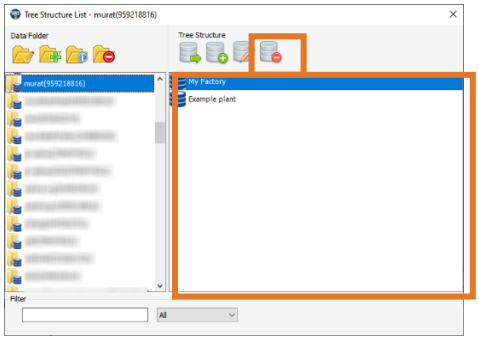
Tree Structure editing window will pop up.



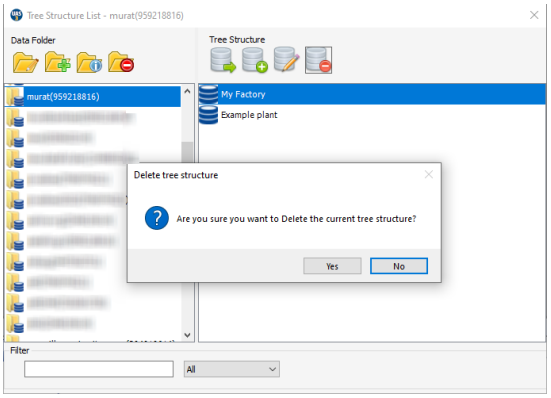
Edit **Tree Structure** name and click on **Save**.

6.1.8. Delete database (tree structure)

Select **Tree Structure** and click on **Delete**:



A new window will pop up.

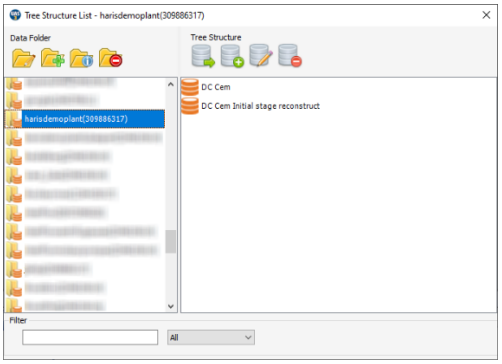


Double check that you want to delete selected **Tree Structure**.

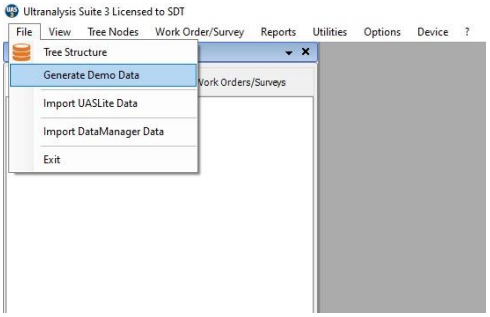
6.1.9. Generate Demo Data

Demo Data is a training database created for you to practice and familiarize yourself with UAS3 features as well as practicing in signal analysis and recognizing certain most common findings. In order to have access to Demo Data, you need to generate it in any of the SDT270/LUBExpert folders.

Select existing or create new SDT270/LUBExpert Data Folder and open any of the tree structures.



In top toolbar, click on **File** and select **Generate Demo Data**



Confirm, and your **Demo Data** will be generated in your UAS3:

Ultranalysis Suite 3 Licensed to SDT
File View Tree Nodes Work Order/Survey Reports Utilities Options Device ?
SDT270/LUBExpert Tree
Work Orders/Surveys
DEMO_DATA
Electrical inspection
Steam trap inspection
Lubrication
Mechanical inspection
low speed Bearing monitoring
high speed Bearing monitoring
Healthy bearing @1500 RPM
Outer race spalled bearing @1500 RPM
RS1T(DY-Ht)
Gearbox monitoring
Trending
Alarms
Readings Matrix
Click indicator to show/hide its curve in graph
RS1T
STATIC TREND
US RMS
US Max RMS
US Peak
US Peak (dBµV)
US Max RMS (dBµV)
US RMS (dBµV)
TIME WAVEFORM
DEMO_DATA/Mechanical inspection/high speed Bearing monitoring/Outer race spalled bearing @1500 RPM
µV
Seconds
DYNAMIC SPECTRUM
DEMO_DATA/Mechanical inspection/high speed Bearing monitoring/Outer race spalled bearing @1500 RPM
µV² (env. PSP)
Hz
Selection
Filter
Parameters
Selection
Alarms
Work Orders/Surveys
Settings
Readings
Alarms
Events
DEMO_DATA/Mechanical inspection/high speed Bearing monitoring/Outer race spalled bearing @1500 RPM/RS1T(DY-Ht)
Graph
default
Database server: : localhost 13.1
No Device
jeudi 25 mai 2023
15:13
NUM

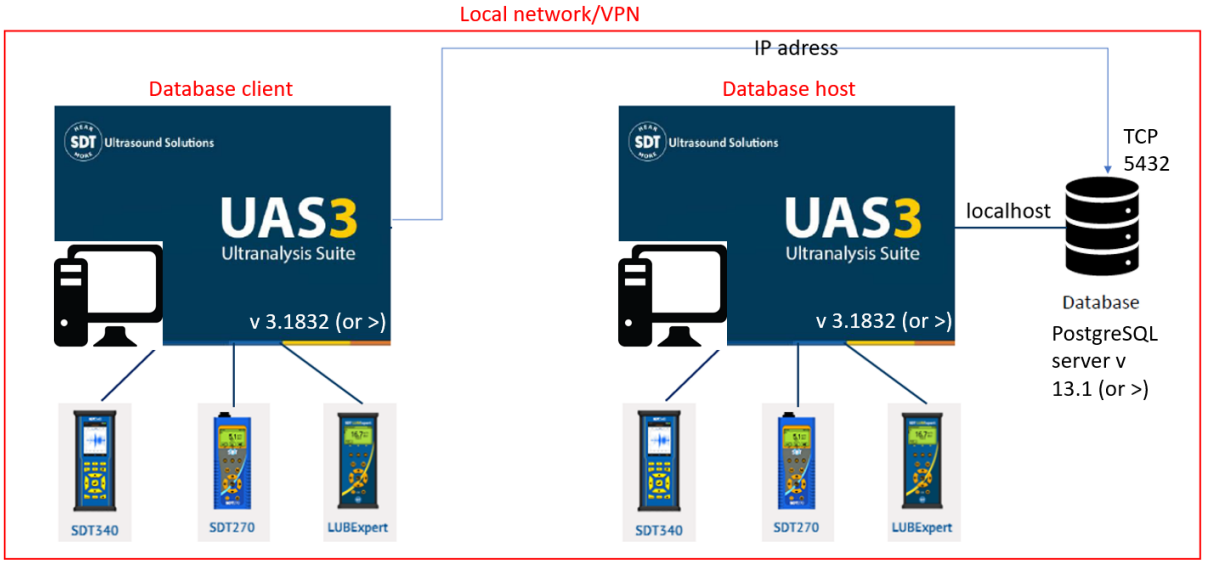
7. Remote access to the database on a local network

Feature available since version 3.1862.

7.1. Prerequisites

- At least, 2 PC (1 host + 1 client) with distinct licenses of UAS3 (V 3.1862) or more recent versions, are mandatory. Both are connected to the same network (local or VPN).
- PostgreSQL v13 is running on the host PC (windows sleep settings disabled, additional firewall settings might be required, please contact your IT team)
- The TCP port 5432 is open on the host PC and static IP address are assumed to be assigned on the local network.

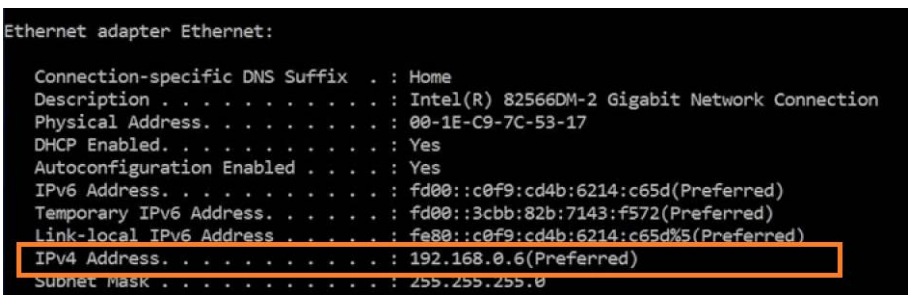
7.2. Principle



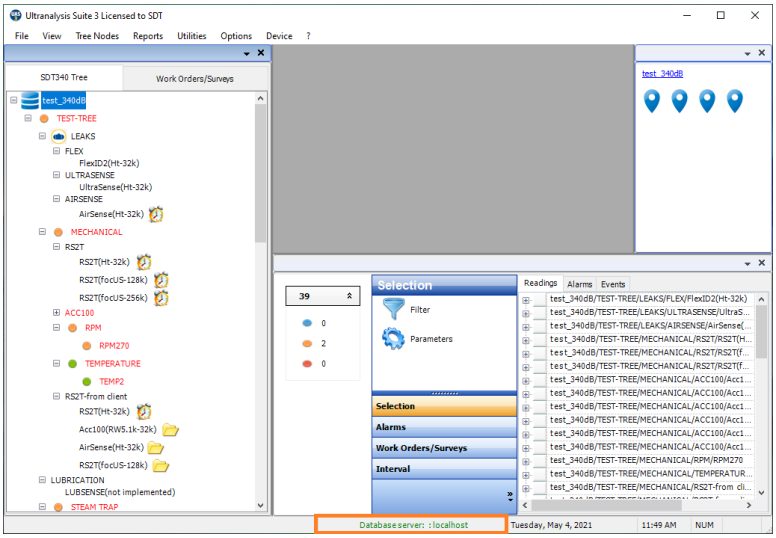
7.3. Getting synchronized client/host(server)

- Retrieve the host IP address:

On the host PC, in the search box on the windows taskbar, type **cmd** and press **enter**. In the new screen, type: **ipconfig /all** and press **enter** and retain the **IP v4 address.**



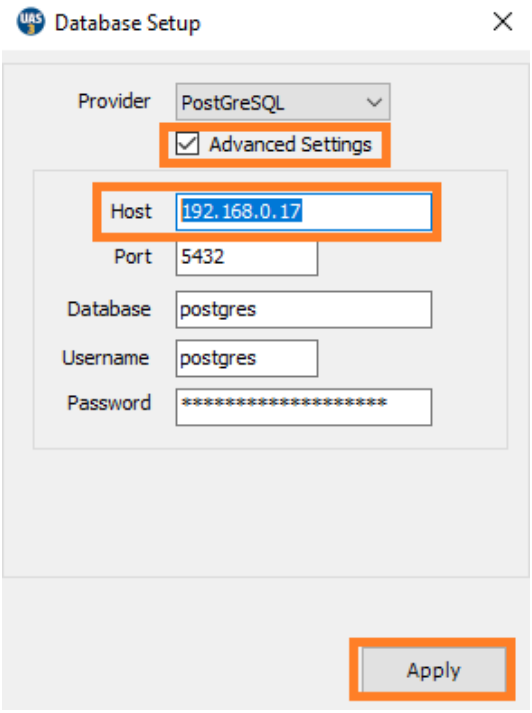
If UAS3 is running on the host PC, you should directly see the default screen below. The location of the database is identified in the bottom bar.

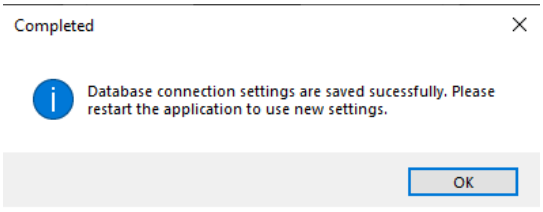


On the client PC, the last IP address will be used as settings to get synchronized with the distant database.

Launch UAS3 on the client PC then go to **Options/Database settings.** By default, UAS3 is synchronized in localhost, assuming PostgreSQL is running.

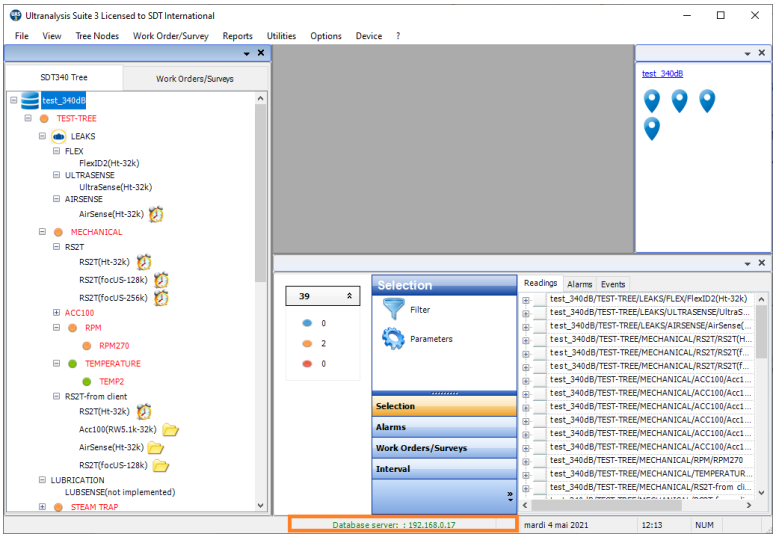
To change the default settings, tick **advanced settings** then **type the IP address** determined at the first step (192.168.0.17 for this example).





If the settings are correct, restart UAS3, and the client will be synchronized with the remote database.

You can verify that the synchronization is well established with the remote server. In the default screen of UAS3 Client, as in local configuration, you can browse and open a distant database/tree structure. The IP address of the remote database is identified in the bottom bar of the software, as follows:



7.4. Notes

- Several users can interact simultaneously with the same database. A pop-up system informs in real time about the changes and invites the passive user to refresh the tree structure.
- A distant client can interact with the host database while UAS3 is not running on the host PC. Only PostgreSQL Database server is required to ensure the synchronization.
- Each time UAS3 is launched, the client retrieves the last updated database.
- An auto-reconnection system ensures the continuity of the distant service.
- To avoid potential conflict in the tree structure, do not edit the database while your instrument is in the field.

8. UAS3 Workspace

8.1. Overview

The UAS3 workspace includes 4 panes, menus, and tool bars.

8.1.1. The Top Pane

In this pane, all your assets are represented in a tree structure hierarchy, by their name, containing all settings you defined. In Top Pane, you build your database, navigate through it, edit it, and define, edit, and manage all your surveys/work orders.

8.1.2. The Graph Pane

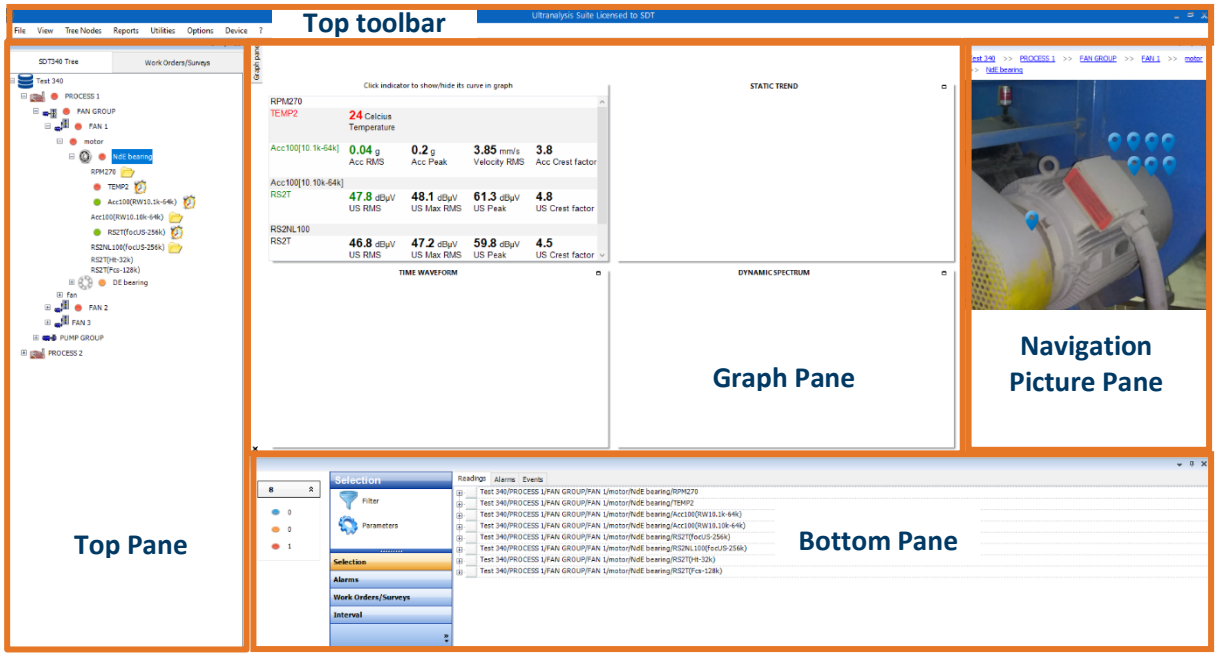
This pane displays your Trend, Time domain, Frequency domain, and four most recent measurements for viewing and analysis.

8.1.3. The Bottom Pane

The bottom pane contains detailed information of each measurement (data collection) or Lubrication process at sensor level, all measurements within certain node, and allows you to filter and apply action on selection of measurements.

8.1.4. The Navigation Picture Pane

In this pane, your tree structure nodes are represented with a picture you assigned to them, containing pins for each node within selected node, enabling you to navigate.



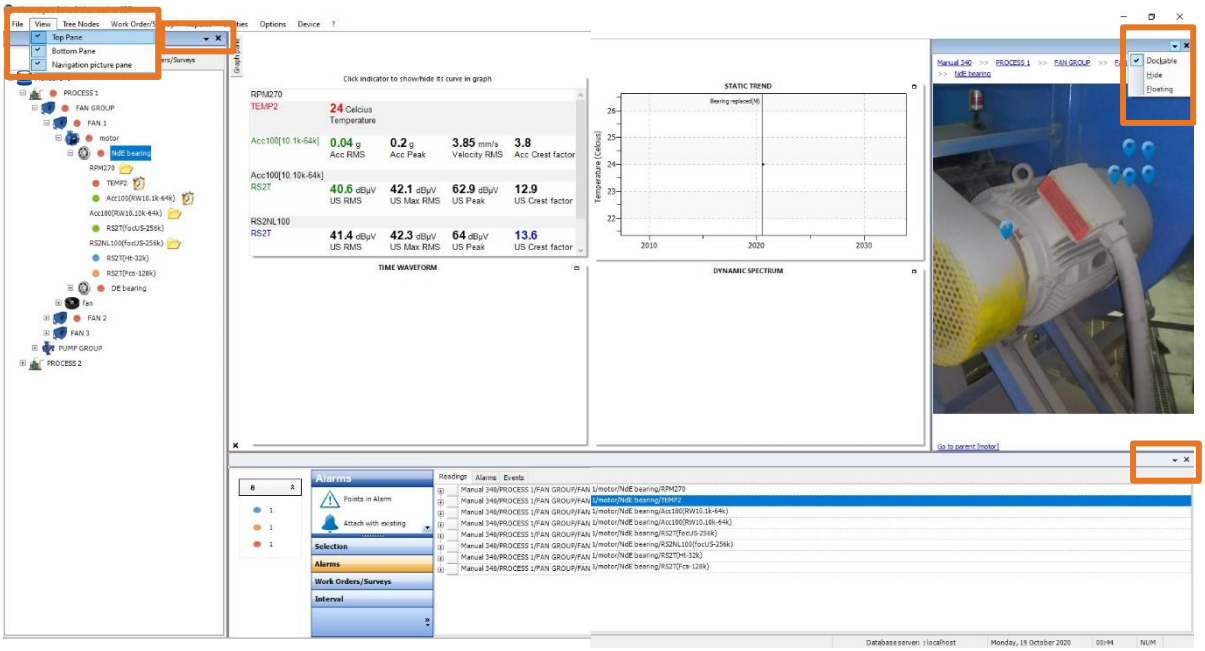
8.2. Hide or show Panes

You can hide or show each of the panes in several ways:

Use the **view** menu in top tool bar and tick/untick the pane you want to hide/show.

Click **X** in right top corner of the pane.

Select **down arrow icon** in the right top corner of the pane, select hide or press **H.**



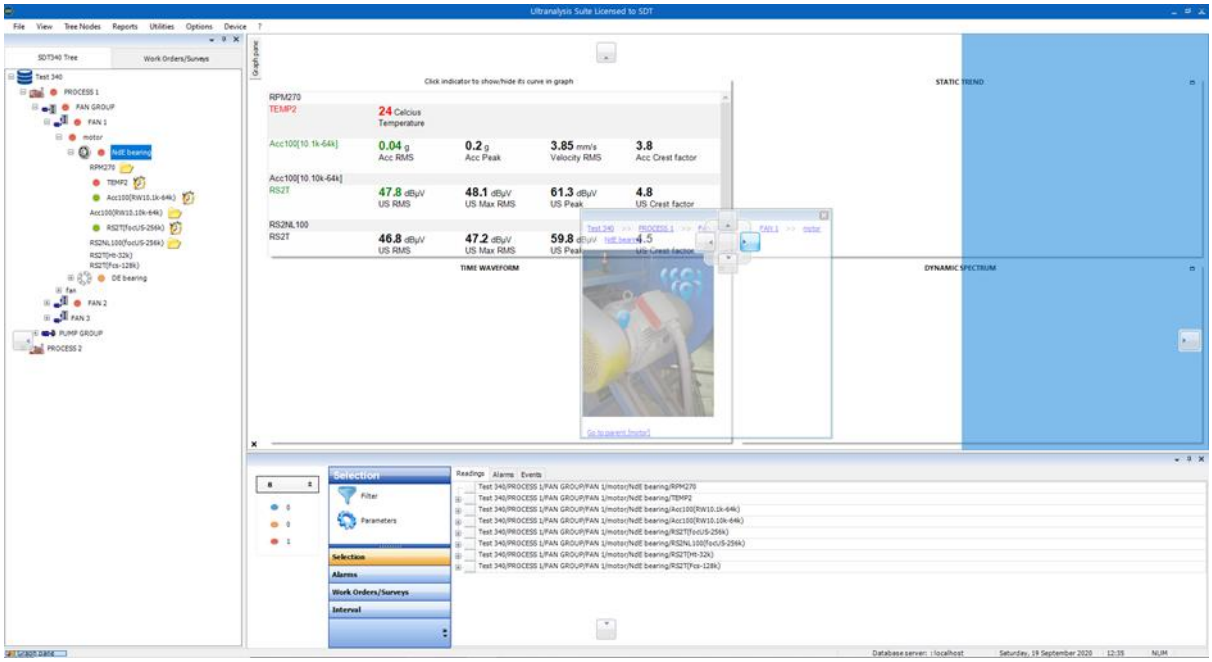
To re-view a hidden Pane, select the menu **View** and tick it with a left mouse click.

8.3. Floating and docked Panes

To undock a Pane and place it floating inside UAS3 frame, left click on the down arrow icon of its title bar and select **Floating**. As an alternative, press **F**.

You can now drag the Pane to the location you want on your desktop and resize it.

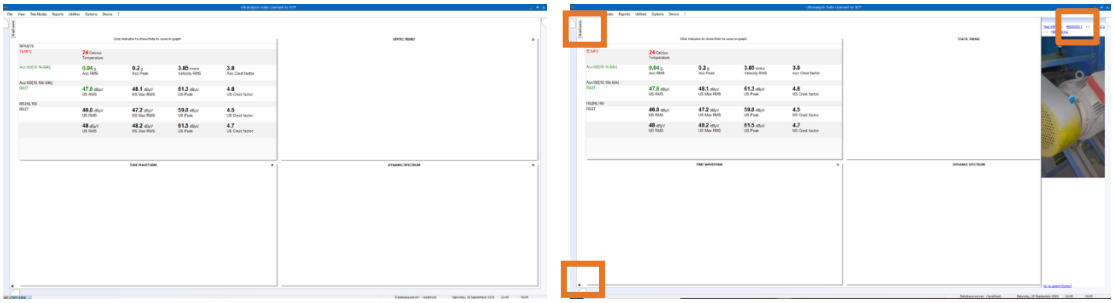
To return a floating Pane to a docked position, left click on its bottom bar and slightly drag it. Guides then appear on UAS3 frame. Drag the Pane upon a guide to dock it to place it in one side or in the middle of UAS3 frame. When the Pane is placed over a guide the designated area is shaded. Then release the mouse button.



8.4. Minimize or maximize docked Panes

To minimize a docked Pane, left click on the down arrow of its title bar and select **Auto Hide**, or the shortcut **A**. As an alternative, click the pushpin icon placed on the right of its title bar.

When a Pane is minimized, a tab with its name is placed on right, left or bottom of UAS3 frame, depending on your settings.



Top Pane, Bottom Pane and Navigation Picture Pane tabs placed on borders of UAS3 frame and maximized when needed.

To maximize a docked Pane, click on its corresponding tab. Then left click on the pushpin icon placed in its title bar, to keep it maximize.

8.5. Resize panes

To re-size a Pane, place the mouse pointer on its border (right border for the Top Pane, top border for the Bottom Pane, left border for the Right Pane).

When it is correctly placed, the appearance of mouse pointer changes to this symbol ⇹.

Press and hold the left mouse button and drag the window border to re-size the Pane.

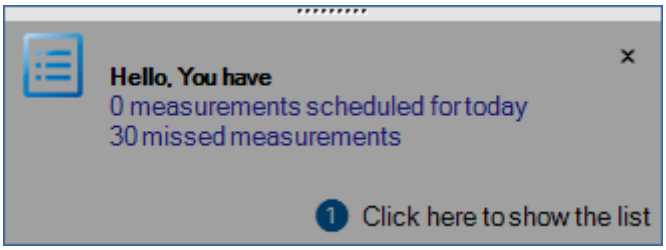
Release the mouse button to complete the size modification.

Note! When the Panes are docked, only the right border of the Top Pane, the top border of the Bottom Pane, the left border of the Right pane can be dragged to re-size the corresponding Pane.

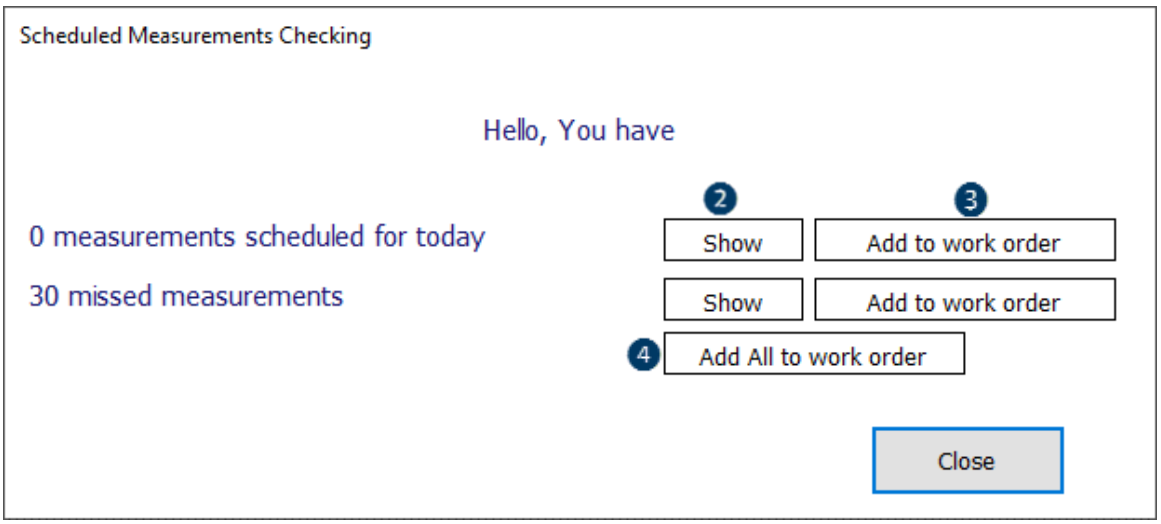
8.6. To-do List

When you start UAS3, it will check if you have some data in missed measurements or never measured points. It that case, it will remind you showing a popup message.

That popup will be shown at the bottom right of the screen.



1 Click on the popup to select the options you want to apply to the missed measurements (see next picture).

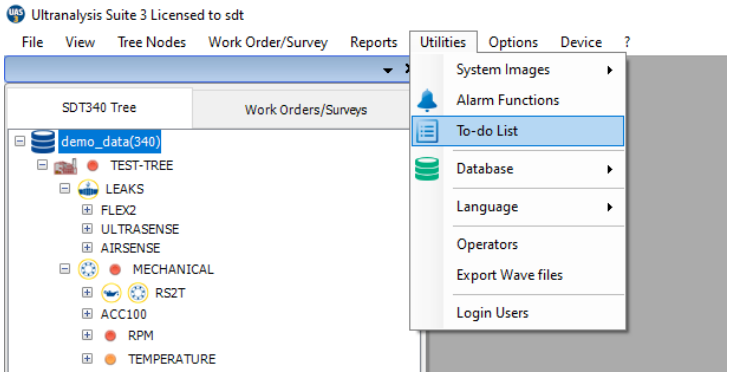


2 Click on **show** button to open the list of scheduled or missed measurements.

3 Click on this button to add scheduled or missed measurements to an existing work order or a new one.

4 Click on this button to add all scheduled and missed measurements to one existing work order or a new one.

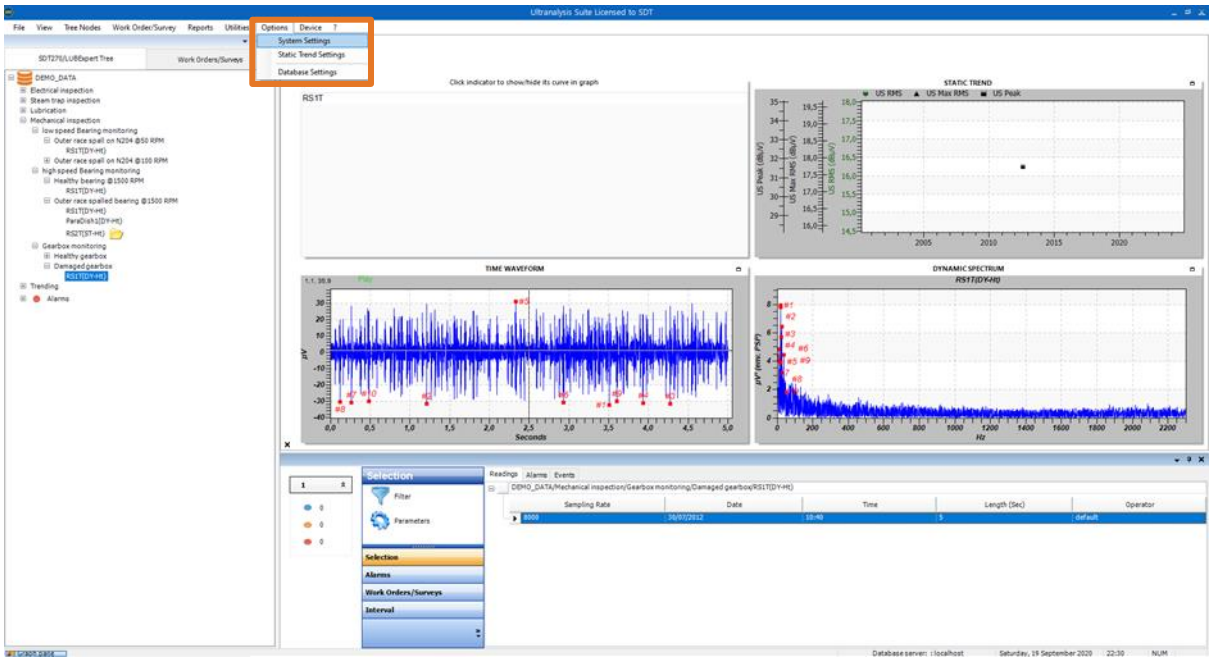
You could also access that feature by clicking on **Utilities/To-do List** in top toolbar, as shown below:



9. System settings & System images

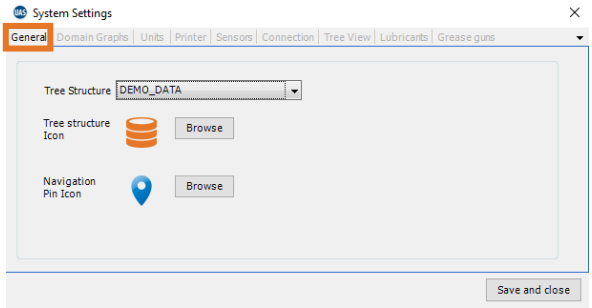
In **System Settings** menu, you will define certain settings that will make your work easier (not mandatory), but you will also need to introduce certain data that mandatory for work continuation.

In top toolbar, click **Options** and then **System settings**:



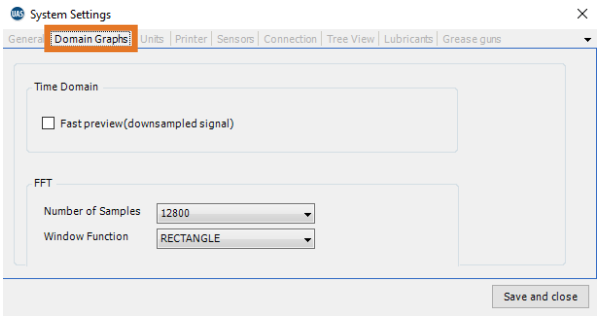
Settings management window will pop up.

By selecting first tab – **General** – you can choose **Tree Structure Icon** and **Navigation Pin Icon** for any of the **Tree Structures** within the **Data Folder** you currently use.
Click **Browse**, and select **Icon** from **System Images** (it will be later explained how to upload additional icons):

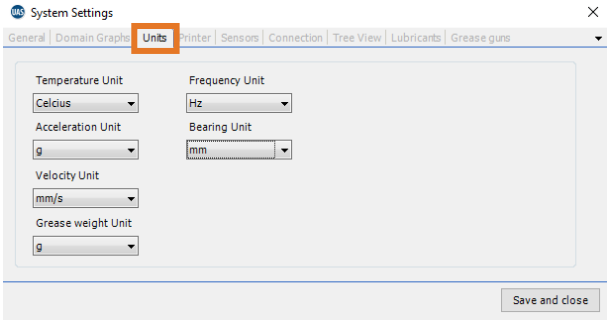


By selecting next tab – **Domain Graphs** – you can select **Fast Preview** for your **Time Domain.**
By selecting this option, Ultrasound signal displayed in **Time Domain** will be down sampled for fast loading, but at any moment, you can load full data by single click while viewing **Time Domain**.

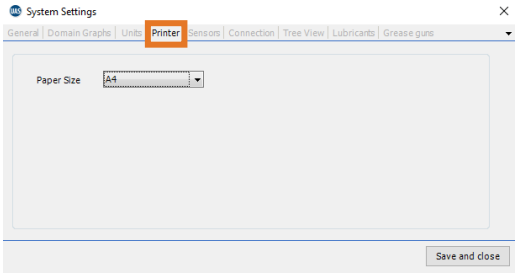
In the same tab, you can adjust settings for FFT, both **Number of Samples** and **Window Function.**



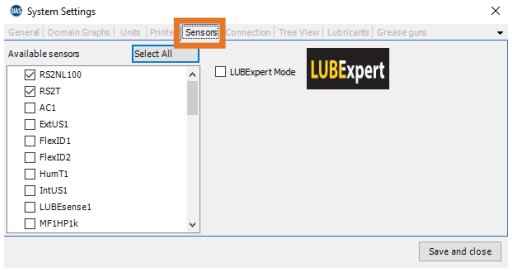
Next tab – **Units** – allows you to set unit for Temperature, Acceleration, Velocity, Grease weight, Frequency and Bearing size.



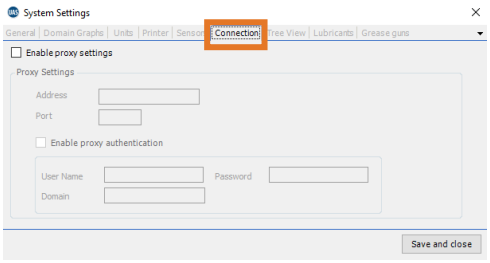
Next tab – **Printer** – allows you to define paper size for printout:



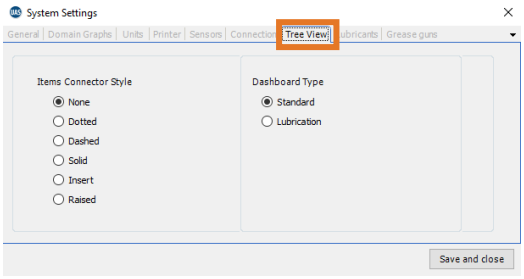
Next tab – **Sensors** – enables you to customize a list of sensors you use. The full list of sensors contains all sensors in SDT produce range, but you do not necessarily use all of them. In order to narrow the list offered to you while choosing the sensor, select sensors you have and only those sensors will be in the list. Additionally, if you use UAS3 to work with LUBExpert, select **LUBExpert Mode** and only LUBESense1 and TEMP2 will be shown.



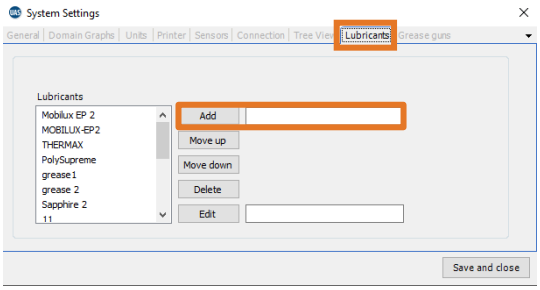
Next tab – **Connection** – In case you need to configure a Proxy Server, due to your company restriction, to connect to internet, fill the necessary information here:



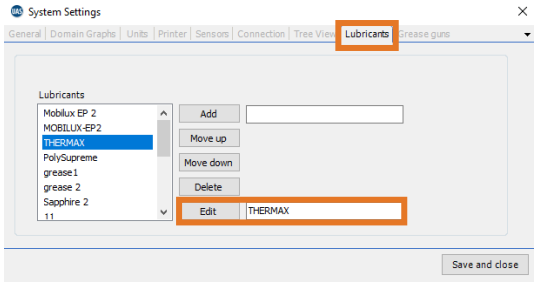
Next tab – **Tree View** – contains setting for Tree Structure appearance in top pane, the way levels will be visually connected. Settings also contain a choice for preferred Dashboard type in case you are using LUBExpert alongside other instruments or SDT270 with LUBExpert features. Since LUBESense1 (sensor used by LUBExpert) results are displayed with specific graphs, and it is possible that within one node you might have multiple sensors or both Lubrication and Condition Monitoring results, you may choose the preferred dashboard to be displayed when you select Measurement Point, for fast data preview. Once you select sensor within that Measurement Point, a specific dashboard of that sensor will be displayed.



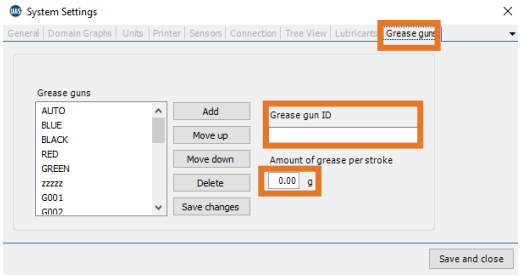
Next tab – **Lubricants** – is a database of your Lubricants. For use of LUBExpert, populating this database is mandatory, as each Lubrication point must have Lubricant type assigned.
Add Lubricant name in highlighted window (up to 12 characters) and click **Add.**



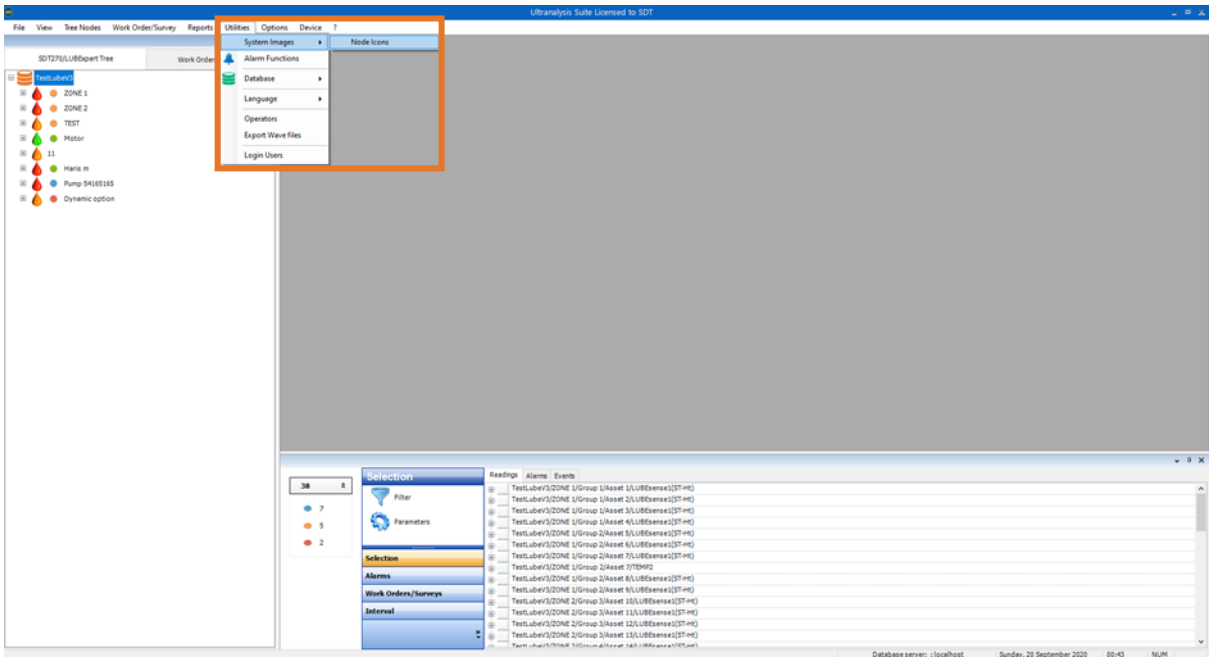
If you need to edit lubricant name, select Lubricant in the list, edit name in highlighted field and click on **Edit**. If you want to delete Lubricant, select it, and click on Delete. You can arrange how Lubricants appear in the list by selecting Lubricant and **Move up** and **Move down** buttons. Once you finished it, click on **Save and close**.



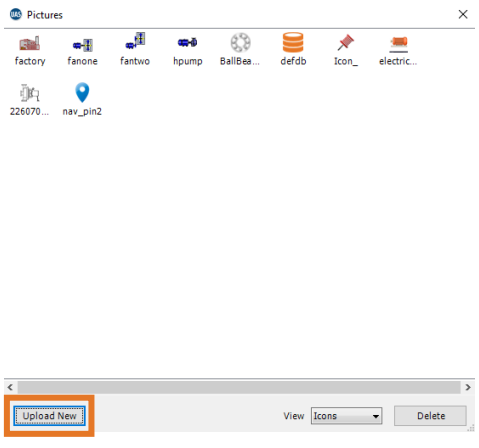
Last tab – **Grease guns** – is a database containing your Grease guns. Same as with Lubricants, if you are using LUBExpert or SDT270 with LUBExpert features, it is mandatory to populate this database, as each Lubrication point needs to have Grease gun assigned. Type Grease gun name (up to 5 characters) in **Grease gun ID** window, enter **Amount of grease per stroke** value (mandatory) and click on **Add**. To edit, select Grease gun from the list, change data and click on **Save changes**. Once finished, click on **Save and close**.
You can find more details about LUBExpert features and functions in the dedicated LUBExpert manual, embedded in your UAS3.



Node Icons (later explained in node setting), can be uploaded and managed in through **System images** feature. **Click on Utilities, System Images, Node Icons**.



A window will pop up where you can view existing **Node Icons** or upload new ones.



10. Creating and Editing Tree Structure

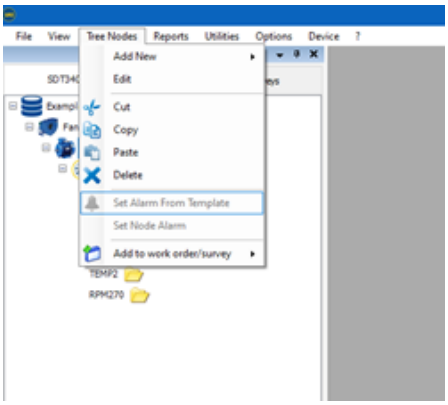
As mentioned before, building a tree structure is like laying a foundation: If done correctly, all further actions will be much easier. Decide about Tree Structure logic and take following into consideration: What assets are connected by process? What assets are connected by location? What assets belong to the same type, or same manufacturer? What assets are redundancy?

There are many criteria, but the target is always the same: Your data needs to be organized in a way that reflects reality. The tree structure needs to offer easy overview, filtering, and conclusion to one who uses it, as well as clean and straightforward work order/survey for one collecting data/inspecting. Take good care about names: lower case, upper case, space … makes a difference.

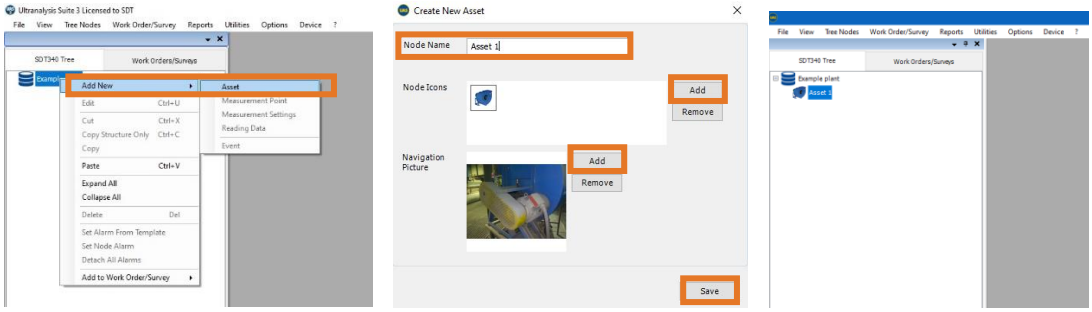
Nomenclature needs to be decided, and whatever the decision is, all involved need to follow it. Otherwise, database will be useless, source of many frustrations and it will consume a lot of your time and time of those who need to collect data. Apart of proper creation of Tree Structure, each measurement point needs strictly defined measurement settings.

10.1. Adding Nodes

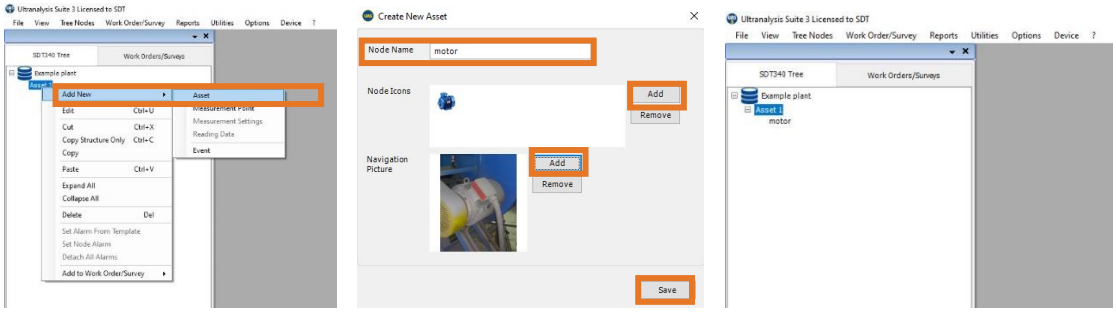
Note!
All functions explained here, done directly in the Tree Structure with right and left click, can also be executed from Top toolbar, selecting Tree Nodes, as shown below:



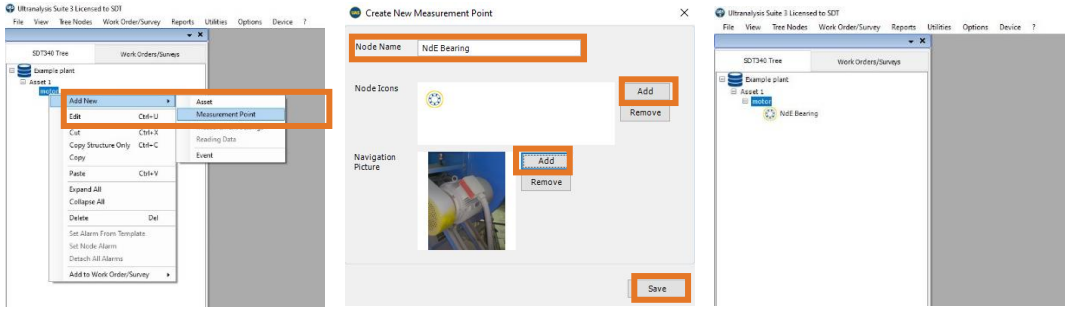
Right click on the Database Name or on an existing Node. On the drop-down menu select **Add New** and then select **Asset.** Add **Node Name** (up to 30 characters). You can add **Node Icon** and **Navigation Picture** to your asset, as shown below.



Now there is a first level in your **Tree Structure.** At this point, we can add **Asset, Measurement Point** or **Measurement Settings** to already added **Asset 1**. Let us add another **Asset,** in this case an electrical motor. Right click on **Asset 1, Add New,** and select **Asset.** Same as in previous step, you can add **Node Icon** and **Navigation Picture.**



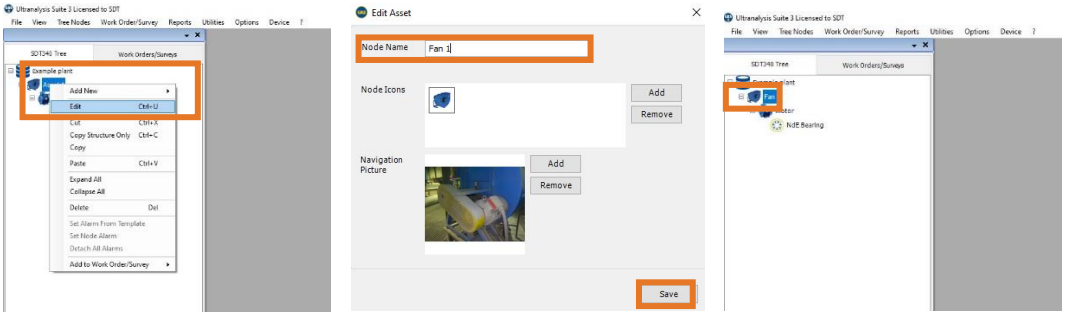
At this stage, we added Asset, then we added an electrical motor that is part of that **Asset**. Now, let us add **Measurement Point**, a bearing. Right click on **motor, Add New**, and select **Measurement Point.**



As you can see, we did not use all the available levels, as we did not need them. At this stage, we arrived at **Measurement Point.** Next (and only) thing we can do, and need to do, on **Measurement Point** is **Measurement Settings**. But first, let us **Edit** a **Node**.

10.2. Editing Nodes

In case you need to edit any of data you added to node, right click on **Node** you want to edit and select **Edit**. As we previously added **Asset 1**, we will change it now in **Fan 1**.



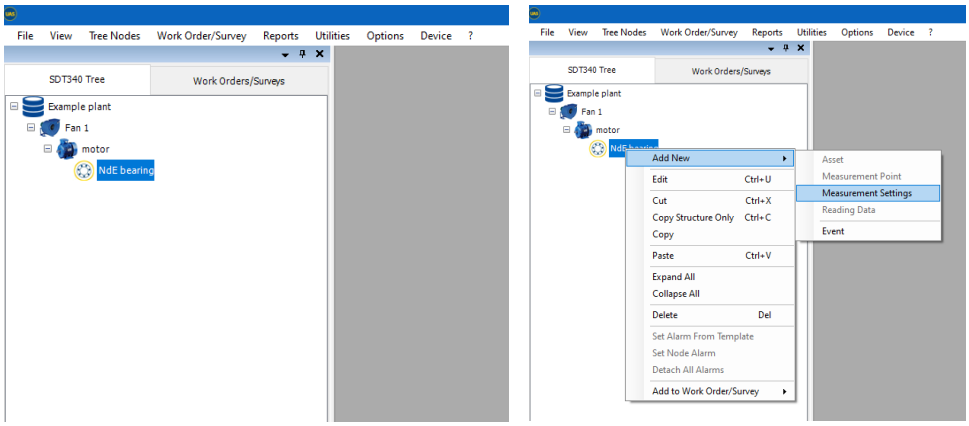
10.3. Adding a Measurement Settings

Following **Tree Structure** architecture and naming importance, **Measurement Settings** are critically important and often partially determine the quality and usefulness of collected data. **Measurement Settings** contain information about the type of the sensor used, interval of data collection, acquisition time. In some cases, also filter frequency, sampling rate, emissivity. In case of Lubrication, **Measurement Settings** contain even more information. Let us see case by case.

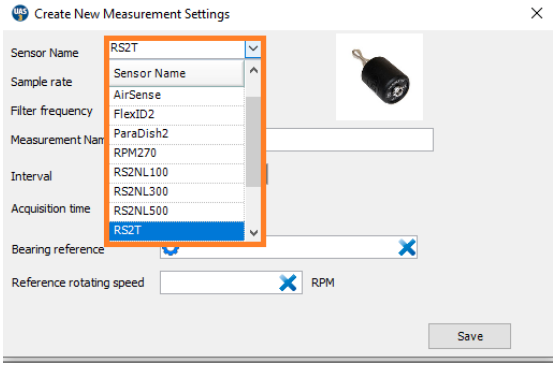
Note that **Measurement Settings** can be added only to **Measurement Point** and cannot exist in same parent node at the same level as **Asset** or **Measurement Point**.

10.3.1. Measurement Settings for SDT340

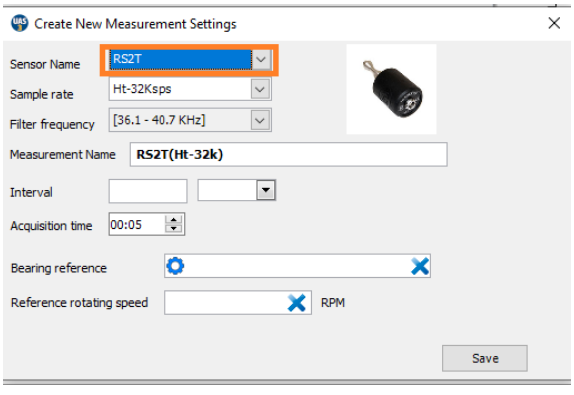
In case of previously added **Motor NdE bearing** in **Fan 1**, we would like to define several different measurements that need to be collected regularly.



Create a new Measurement Settings by clicking on Add New/Measurement Settings, a new window that pops up will look like this:



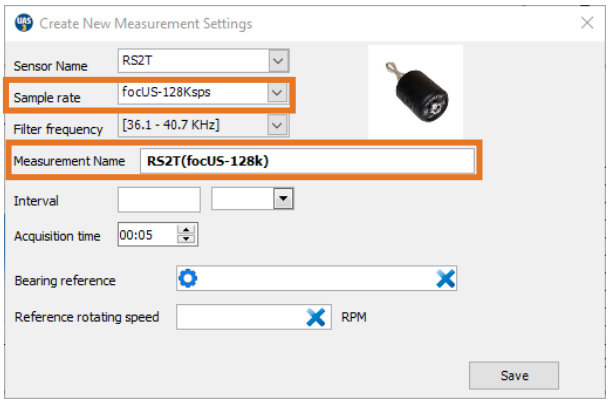
First, choose a sensor. In **Sensor Name** window, press arrow for drop down menu to show the compatible sensors. Select one sensor and continue with its settings. In this case, we will choose **Ultrasound sensor** of type **RS2T**. The described procedure is relatively common to all available sensors.



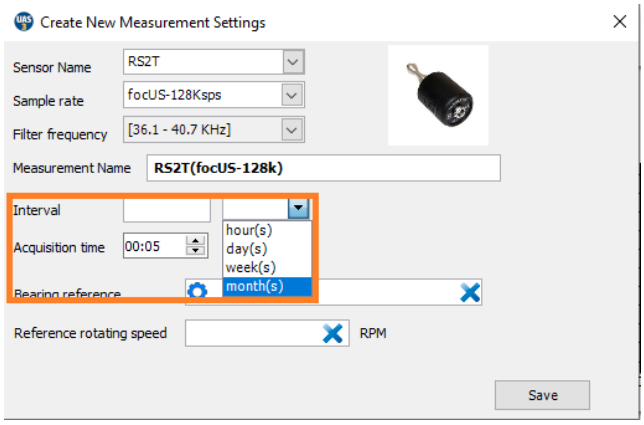
Next, we need to select **Sample Rate**. Left click on **Sample Rate** window arrow for drop down menu and select needed **Sample Rate**. You can choose between 32.000, 128.000, and 256.000 samples per second for contact sensors while Sampling rate for airborne sensors is fixed at 32.000 samples per second.

In practice, ultrasound signals are always acquired at 256 ksps and filtered then eventually heterodyned and/or down sampled, depending on user settings. User can acquire raw data (not audible, in Focus Mode on SDT340 with the compatible sensors only), heterodyned data (at 32 ksps on SDT340 or at 8 ksps on SDT270), audible and vibration data.

The **Measurement Name** is generated according to the selected sampling rate. The associated field cannot be modified by the user. **Filter Frequency Setting** for **Ultrasound** sensors is fixed at the displayed frequency band.



The mandatory field **Interval** defines how often data should be collected. It will help you organize your surveys/work orders better by being able to know what tasks need to be done in coming period. Interval definition is product of your understanding of the asset and needs to come from your Criticality Analysis, Failure Mode & Effect Analysis, DIPF Curve for certain asset and certain defects, sometimes even from Failure Rate and Root Cause Analysis. Interval too long can result in anomaly development not being detected at early stage, and interval too short will have a detrimental effect of your work optimization, spending your resources unnecessarily (in this case, manpower). **Interval** can be defined in **Hours, Days, Weeks**, and **Months**. Left click on time unit window, select unit, and enter your interval.

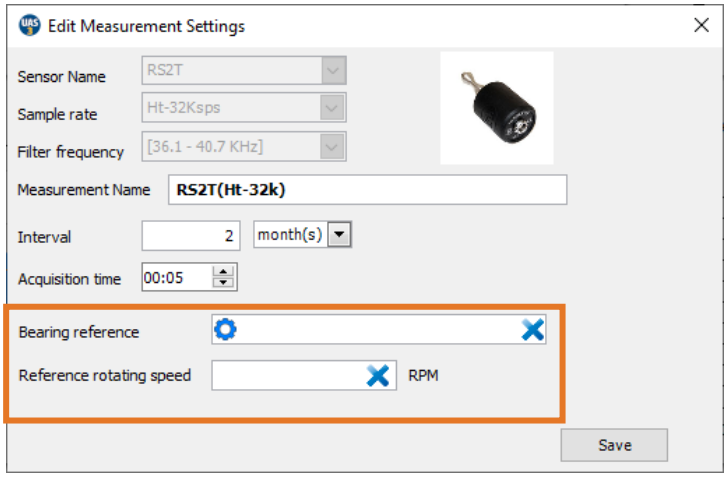


Finally, as mandatory fields, you need to define **Acquisition Time**. Acquisition time denotes duration of a single measurement, or length of a signal. **Acquisition Time** needs to be decided based on asset operation conditions. The primary factor affecting acquisition time is rotating speed (in case of rotating assets) or process itself. In case of rotating assets, we would like to record at least 3-5 revolutions, preferably up to 10 revolutions. As not all Assets inspected by Ultrasound are rotating, consider the process itself. Take hydraulic valve as example and consider that you need to wait for its operation as well as record the operation itself.

Not that in SDT340 maximum Acquisition Time depends on the following considerations:

- **32.000 samples per second - maximum Acquisition Time is 600 seconds (10 minutes);**
- **128.000 samples per second - maximum Acquisition Time is 150 seconds (2 minutes and 30s);**
- **256.000 samples per second - maximum Acquisition Time is 75 seconds (1 minute and 15s).**

On certain measurement settings, User can also associate a bearing reference to the measurement setting, by filling the latest optional fields **Bearing reference** and **Reference rotating speed.** These fields will enable a visual analysis tool , in the associated charts, that can be used to identify some predefined recurrencies, in the time waveform and/or in FFT/FFT envelope.



This option is explicitly available for the following sensors RS1T, RS1NL100-300-500, RS2T, RS2NL100-300-500, LUBESense1 and ACC100/AC1, defined in dynamic mode. Once defined for one compatible sensor, these settings are automatically inherited to the other settings and/or compatible sensors, defined within the same measurement point.

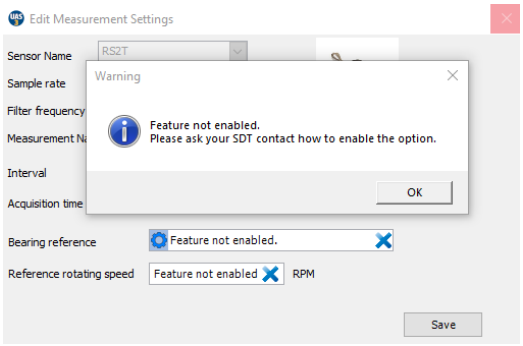
The four possible internal bearing defect frequencies are usually identified as follows:

- BPFO (Ball Pass Frequency Outer), refers to the number of impacts per row that pass-through a given point of the outer race each time the shaft makes a complete rotation.
- BPFI (Ball Pass Frequency Inner), refers to the number of impacts per row that pass-through a given point of the inner track each time the shaft makes a complete rotation.
- 2x BSF (Ball Spin Frequency) refers to the number of impacts that a rolling element generates each time the shaft makes a complete rotation. We often consider twice the frequency since the impact occurs on each ring.
- FTF (Fundamental Train Frequency) refers physically to the number of rotations that makes the cage each time the shaft makes a complete rotation.

For instance, in case of electric motors, user can easily refer to the name plate to identify the **Bearing reference** as well as the nominal/**Reference rotating speed**, that can be adjusted later.

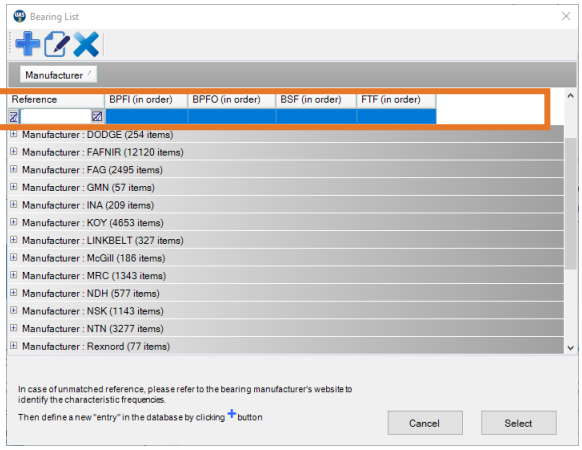
Since v 1925, for a quick and easy identification of the detect, UAS3 includes a bearing toolbox as well as a bearing database containing more than 50,000 common references, expressed in order (i.e. at 1 Hz = 60 RPM/CPM). Please refer to section **3.5** to unlock this optional feature.

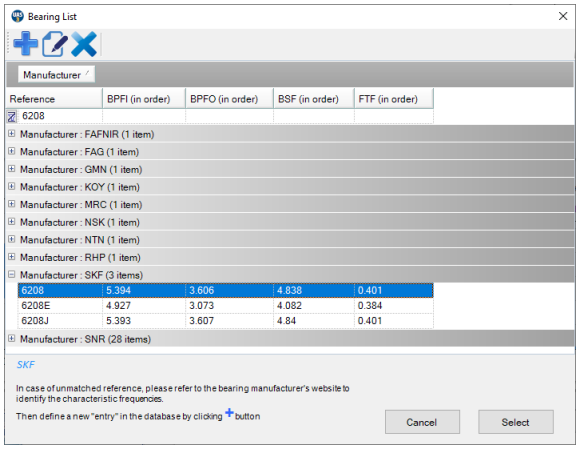
By default, the bearing toolbox is not enabled in the software. An additional license is required to unlock this feature.



Once activated, by clicking on , user can:

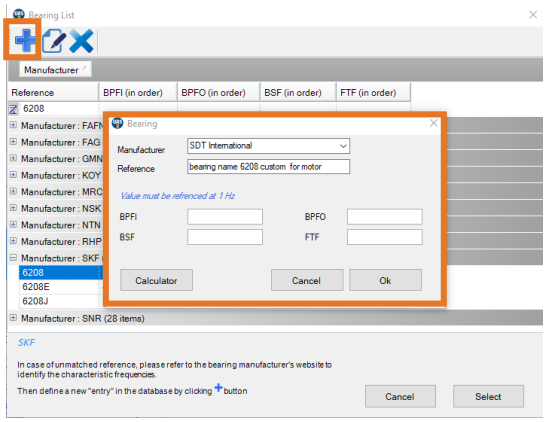
a) Browse the database to find the bearing reference that can be associated with the current measurement settings/point.

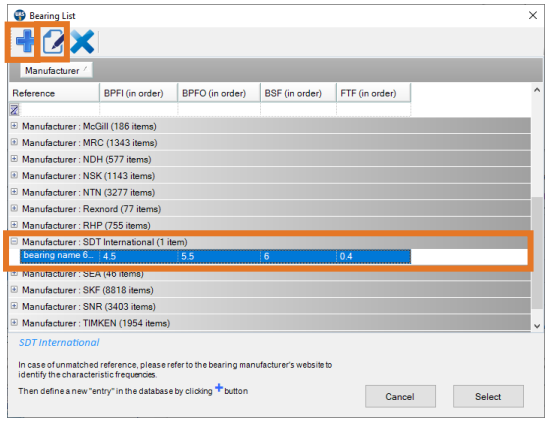




In case of missing or uncomplete reference, user can also pick up the closest reference, even from another bearing' manufacturer while being aware that post-analysis could lead to inaccuracies/frequency shift.

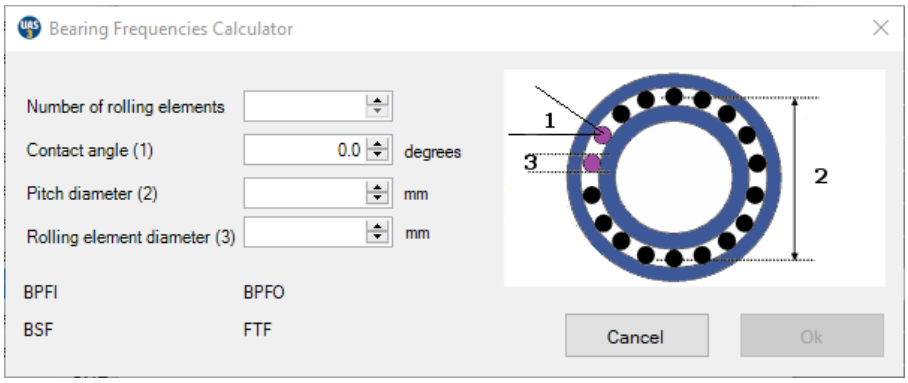
b) Add a custom reference by clicking on





Prefer this option, especially if you already know the target frequencies expressed in order, through other systems or software. In case of doubt, please refer to the website of the bearing' manufacturer.

Otherwise, click on Calculator and a new window, requiring advanced details used to calculate the characteristic defect frequencies, will pop-up.

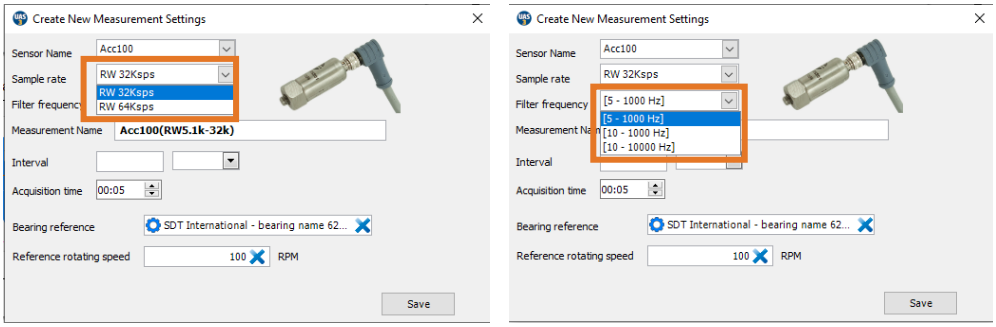


Each bearing has its own geometric characteristics from which the following recurrencies/frequencies are calculated. Assuming capture with the appropriate sensor settings and specifications, these periodic signatures could appear in the spectrum and/or in the time waveform.

Once added from the bearing calculator or from manual entries, the custom bearing reference is added in the database. User can edit a custom entry by clicking on and/or delete it by clicking on .

Only custom references added by the user can be deleted. Custom references are shared with every tree structure created in the same data folder but not at the upper level (in case of several data folder)

In case, we choose **Accelerometer**, some details will be slightly different. Choose the sensor, in this case **Acc100** (for 100 mV/g of type IEPE on SDT 340).



Next, we need to select **Sample Rate**. Left click on **Sample Rate** window arrow for drop down menu and select needed **Sample Rate**. You can choose between 32.000 (RW 32 Ksps) and 64.000 (RW 64 Ksps) samples per second.

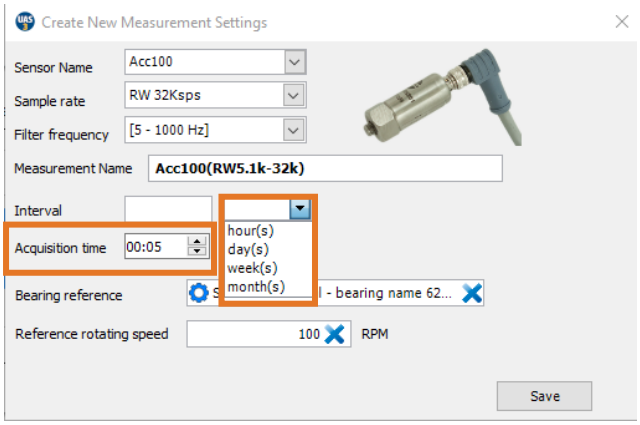
Ksps refers to Kilo samples per second (or kHz).

Filter Frequency Setting for **Vibration** sensor can be adjusted in three ranges:

- **5 – 1000 Hz**
- **10 – 1000 Hz**
- **10 – 10000 Hz**

Measurement Name reflects your Frequency range settings as well as the sample rate, therefore considering different settings practically as different sensors, displaying it separately in **Measurement Point**.

Interval defines how often data needs to be collected, and it is a mandatory field. It will help you organize your surveys/work orders better by being able to know what tasks need to be done in coming period. Interval definition is product of your understanding of the asset and needs to come from your Criticality Analysis, Failure Mode & Effect Analysis, DIPF Curve for certain asset and certain defects, sometimes even from Failure Rate and Root Cause Analysis. Interval too long can result in anomaly development not being detected at early stage, and interval too short will have a detrimental effect of your work optimization, spending your resources unnecessarily (in this case, manpower). **Interval** in UAS3 **Measurement Settings** can be defined in **Hours, Days, Weeks**, and **Months**. Left click on time unit window, select unit, and enter the value in **Interval** window.



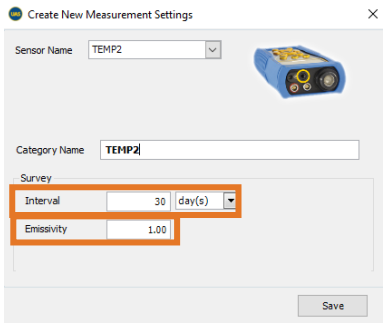
Finally, as mandatory fields, user needs to define **Acquisition Time**. Acquisition time is the duration of a single measurement. **Acquisition Time** needs to be decided based on asset operation conditions, as discussed above.

The remaining optional settings associated with the bearing database are identical to those discussed previously on RS2T and won't be aborded.

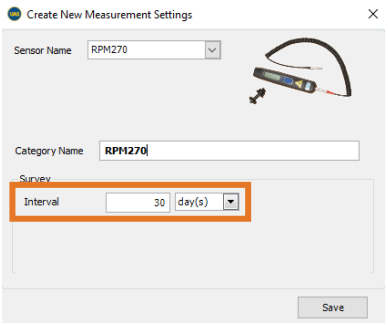
Not that in SDT340 maximum Acquisition Time depends on the following considerations:

- **32.000 samples per second - maximum Acquisition Time is 600 seconds (10 minutes);**
- **64.000 samples per second - maximum Acquisition Time is 300 seconds (5 minutes).**

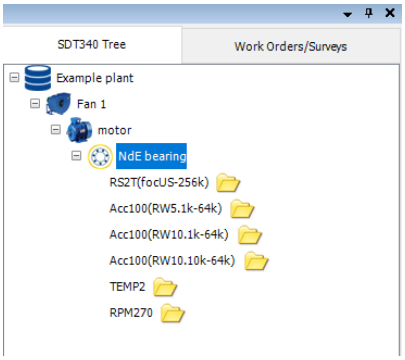
If **Temperature Sensor** is selected, **Interval** and **Emissivity** need to be defined.
Considering **Interval**, all mentioned before applies. Of course, Interval for all different measurements taken on one Asset should be the same, for practical reason. If they differ as outcome of analysis, shortest Interval should be the choice.
In regard to **Emissivity**, you can look up in publicly available material about **Emissivity** for each surface material or look up for procedure to measure it yourself. However, for comparison and trending purposes, leaving **Emissivity** at value 1 would not be a mistake, but consider that temperature value in your reading is not exact.



You can also add **RPM** sensor, in case you only need to define Interval. To perform the associated measurement, you will need to place reflective tape on the moving part.



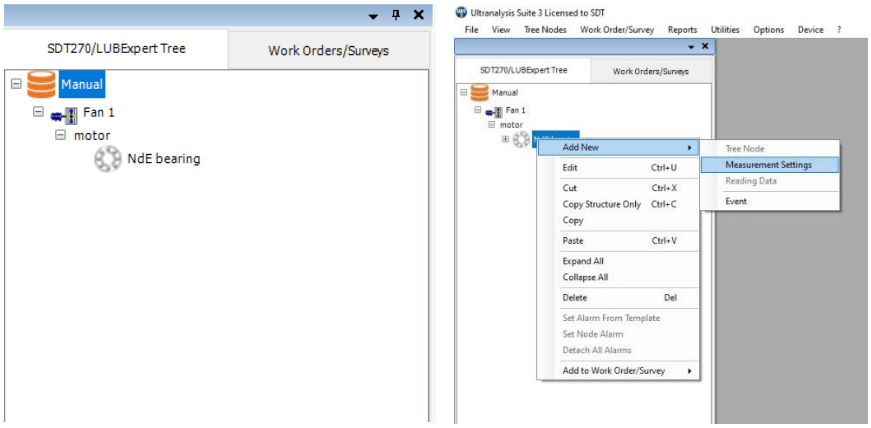
Now, when we added as many **Measurement Settings** in our **Measurement Point** as we need, it will look like this:



The folder icon, next to your sensor level means that it does not contain any data, yet.

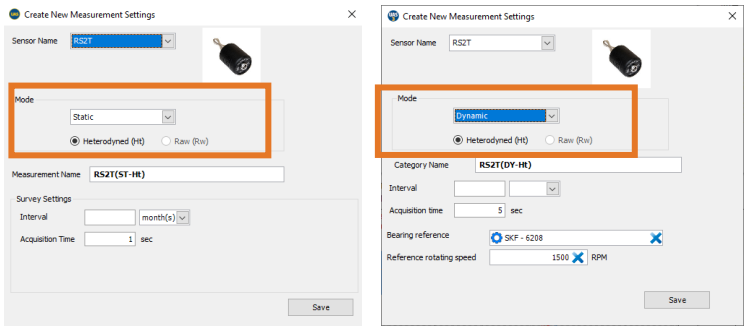
10.3.2. Measurement Settings for SDT270

When building Tree Structure for SDT270 and/or LUBExpert, there is a small difference; instead of Asset, Measurement Point and Measurement Settings, you will see Tree Node and Measurement Settings. In case of previously added **Motor NdE bearing** in **Fan 1**, we would like to define several different measurements that need to be collected regularly.



Create Measurement Settings

First, in **Sensor Name** field, press arrow for drop down menu. Only sensors you selected in System Settings will be displayed. Select a sensor and continue with settings. In this case, we will choose **Ultrasound sensor** of type RS2T.



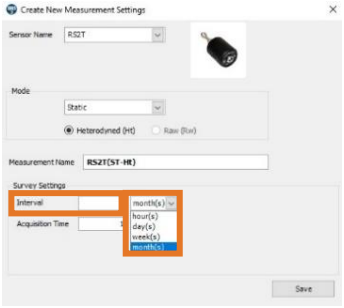
Sample Rate in SDT270 is fixed for all sensors, so you will not be setting it as a measurement parameter. However, there are additional settings that need to be done in SDT270 and LUBExpert that are not needed in SDT340, designed for dynamic acquisitions only.

Setting **Dynamic** or/and **Static** measurement mode.

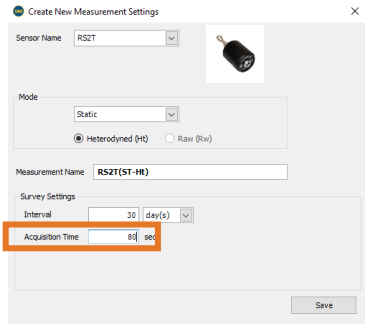
When using SDT270 with Dynamic measurement feature, you need both Dynamic and Static settings in your Measurement Point (Tree Node). In case Static point is not defined it will be auto created with first measurement (if measurement is performed in Survey Mode, through Work Order).

Measurement Name will be generated, containing Sensor name, Measurement Mode (ST or DY, Static or Dynamic) and it will contain Ht or Rw (Heterodyned for Ultrasound and Raw for Vibration).

Interval defines how often data needs to be collected, and it is a mandatory field. It will help you organize your surveys/work orders better by being able to know what tasks need to be done in coming period. Interval definition is product of your understanding of the asset and needs to come from your Criticality Analysis, Failure Mode & Effect Analysis, DIPF Curve for certain asset and certain defects, sometimes even from Failure Rate and Root Cause Analysis. Interval too long can result in anomaly development not being detected at early stage, and interval too short will have a detrimental effect of your work optimization, spending your resources unnecessarily (in this case, manpower). **Interval** in UAS3 **Measurement Settings** can be defined in **Hours, Days, Weeks,** and **Months**. Left click on time unit window, select unit, and enter the value in **Interval** window.



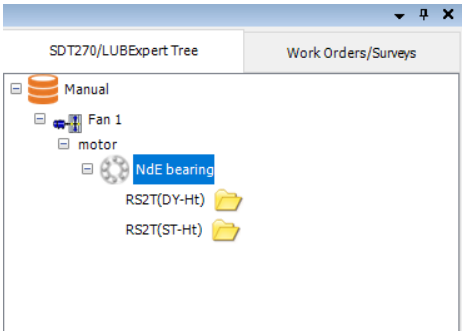
Finally, you need to define **Acquisition Time**. Acquisition time is the duration of a single measurement, recorded reading. **Acquisition Time** needs to be decided based on asset operation conditions. The primary factor affecting acquisition time is rotating speed (in case of rotating assets) or process itself. In case of bearings, we would like to record at least 3-5 revolutions, preferably up to 10 revolutions. As not all Assets inspected by Ultrasound are rotating, consider the process itself. Take hydraulic valve as example and consider that you need to wait for its operation as well as record the operation itself.



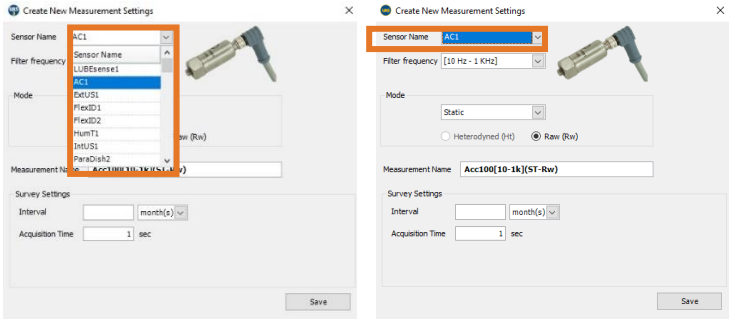
Note that the maximum **Acquisition Time** for SDT270 is limited at 80 seconds.

Now, if you prepare settings for Dynamic readings, add new settings with all equal parameters except Measurement Mode – choose Static. Or vice versa.

Your settings will look like this:

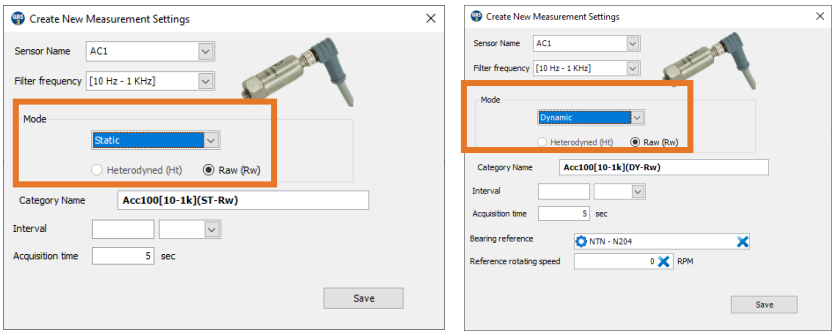


In case we choose **Accelerometer AC1,** some details will be different.



Sample Rate in SDT270 is fixed, so there will be no settings displayed.
Filter Frequency Setting for **Vibration** sensor in SDT270 can be adjusted in two ranges (compared to 3 ranges in SDT 340):

- **10 – 1000 Hz**
- **10 – 10000 Hz**



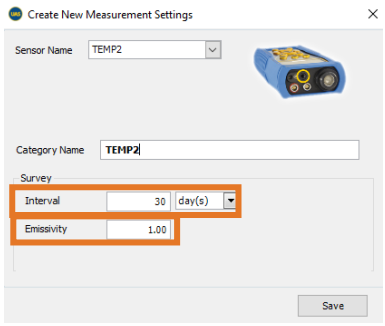
Once **Dynamic** or **Static** mode is selected (same approach as with Ultrasonic sensors), **Measurement Name** will reflect your Frequency range settings, therefore considering different Frequency range practically as a different sensor, displaying it separately in **Measurement Point**.

Interval and **Acquisition Time** are set equally as in Ultrasonic sensor.

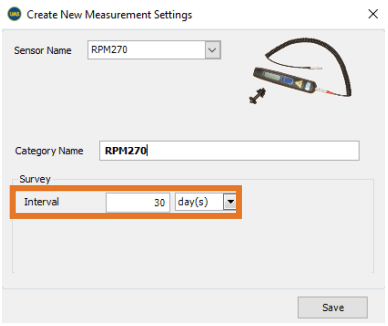
The optional fields**, Bearing reference** and **Reference rotating speed** are exclusively available in **Dynamic** measurement mode as in Ultrasonic contact sensor RS2T, LUBESense1 and RS2NL100-300-500.

The bearing toolbox is exclusively available in Dynamic measurement mode, with the compatible sensors.

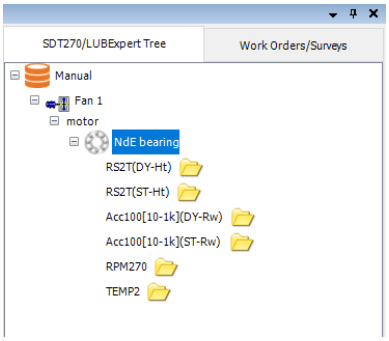
If **Temperature Sensor** is selected, **Interval** and **Emissivity** need to be defined.
Considering **Interval**, all mentioned before applies. Of course, Interval for all different measurements taken on one Asset should be the same, for practical reason. If they differ as outcome of analysis, shortest Interval should be the choice.
In regard to **Emissivity**, you can look up in publicly available material about **Emissivity** for each surface material or look up for procedure to measure it yourself. However, for comparison and trending purposes, leaving **Emissivity** at value 1 would not be a mistake, but consider that temperature value in your reading is not exact.



You can also add **RPM** sensor, in case you only need to define Interval. To execute the measurement, you will need to place reflective tape, so please refer to SDT340/270 manual.



Now, when we added as many **Measurement Settings** in our **Measurement Point** as we need, it will look like this:



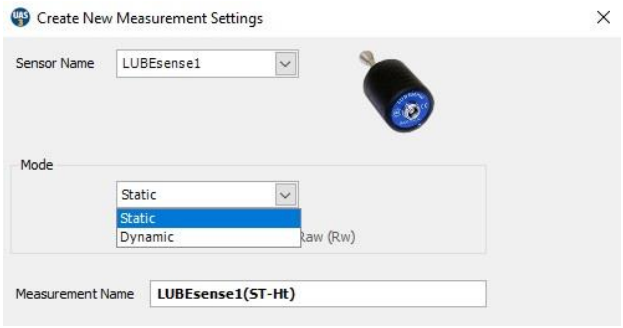
The folder icon next to your sensor level means that it does not contain any data yet.

10.3.3. Measurement Settings for LUBExpert

Assigning LUBExpert Sensors

If you followed the instructions to go into LUBExpert Mode, the list of available sensors should only be two (LUBESense1 and TEMP2). The other sensors are still visible but inactive. Choose LUBESense1 to create an ultrasound measurement node and TEMP2 to create a temperature measurement node as required. The settings related to TEMP2 common to SDT340 and SDT270 have been described in the previous sections.

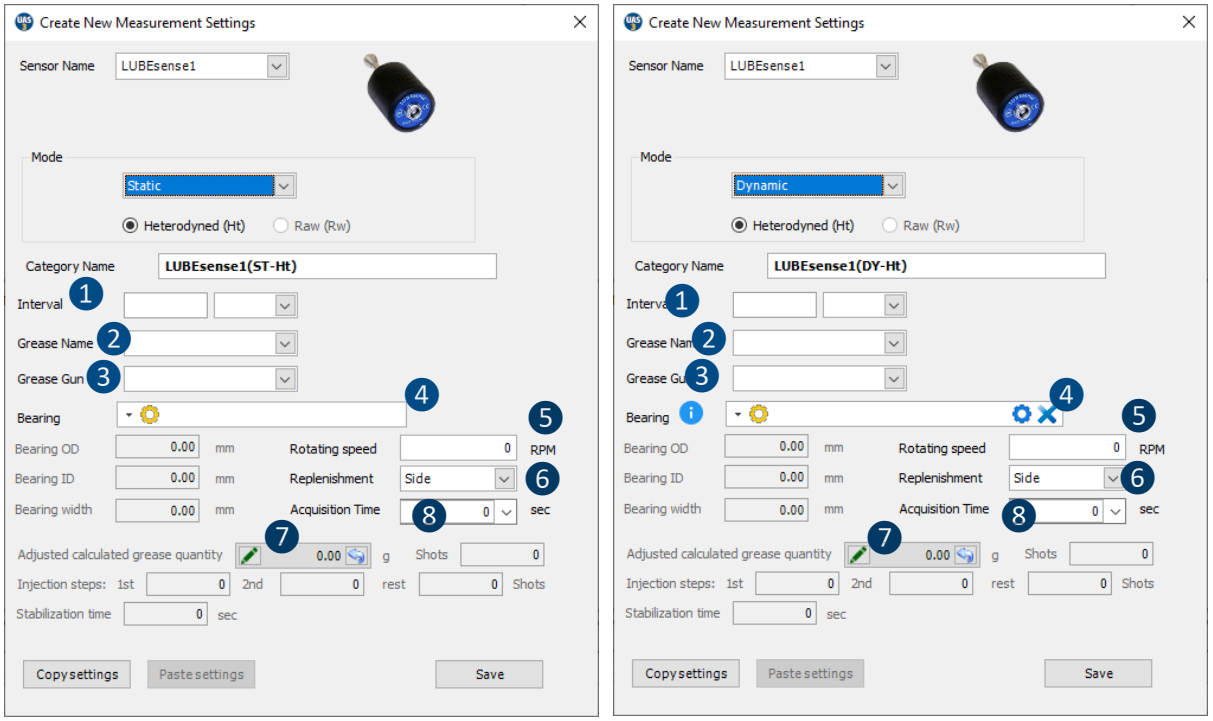
For ultrasound measurements, as described above, UAS3 gives you two modes, either **Static** or **Dynamic** and for temperature you can only set the measurement **Interval** and the **emissivity**.



LUBExpert instrument, in standard version, does not measure Dynamic data, but LUBExpert Dynamic does. Go to System Info/License Info, if **D** is assigned as **option**, you can pick up dynamic data or contact us to unlock this feature.

In case you operate with LUBExpert standard, choose Static measurement settings, otherwise your instrument will not recognize Dynamic settings. LUBExpert Dynamic will accept Dynamic measurement settings and collect Dynamic data during grease replenishment process.

Same happens if you are using an SDT270DU with the LUBExpert App installed, choosing Dynamic here will instruct your SDT270DU to collect both Dynamic and Static data simultaneously.



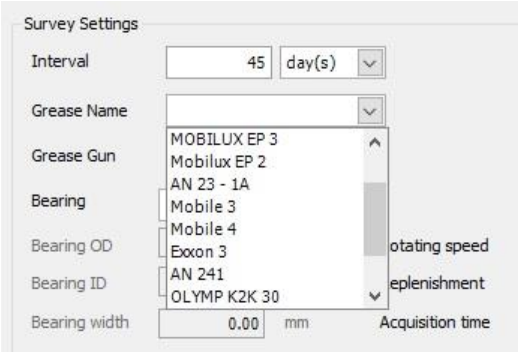
Setting the interval of data collection 1

For LUBESense1, in both modes, the choice to set your preferred data collection **Interval** in months, weeks, days, or hours is made here

Note that this field is not intended to be the re-greasing interval. This field is your data collection interval. Condition assessment based on measured ultrasound data will be the trigger to perform grease replenishment (or not) as well as the quantity of grease required to restore an optimal lubrication regime to the bearing.

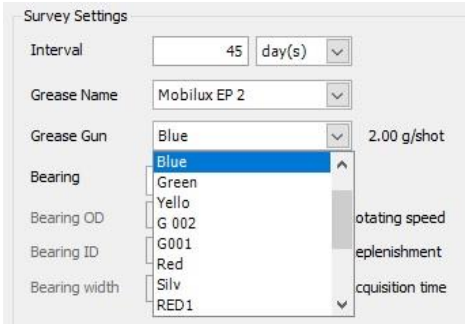
Setting Grease Name 2

Earlier we described how to define a list of all the lubricant types used in your plant under “Lubricant Management”. With the “Create New Measurement” dialogue box open, here you select the grease name for this bearing using the drop-down box beside field **Grease Name**.



Setting Grease Gun 3

Earlier we described how to manage your inventory of grease guns under “Grease Gun Management”. In that section, you named your grease gun and entered its grease nominal quantity per stroke. Now, as you create measurement collection points in UAS3, it is important to assign the correct grease gun to the correct asset. Click on the drop-down box and scroll to the grease gun name to be used.

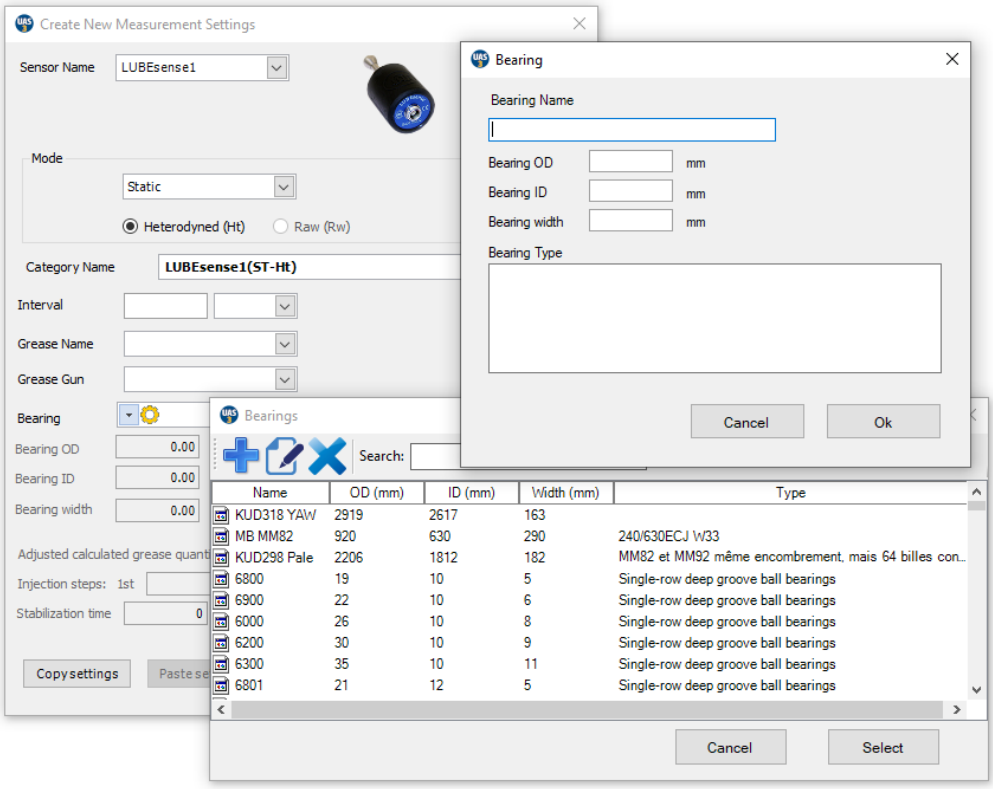


Assigning bearing data to Lube point 4

UAS3 manages a bearing database containing the dimensions of common references that are required to estimate the theorical amount of grease, in term of free volume available in the bearing.

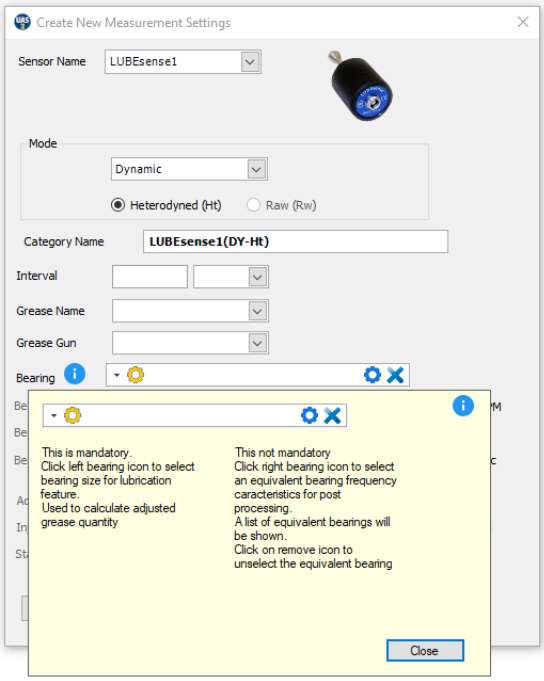
In the field **Bearing**, you must assign the first bearing data to the lube point, so all the necessary and automatic settings are then filled by UAS3. By clicking , you will see all the bearing references currently available within the UAS3 bearing database. Use the search bar to find your reference.

Alternatively, in case of missing reference, you can click “CREATE” and add new bearing references. Click “EDIT” or “DELETE” to manage your own references.

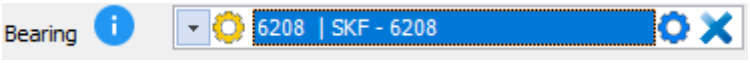


In case you do not know the type of bearing installed, create a new one with a temporary name and approximate size and input accurate data at the first possible opportunity.

In **Dynamic** mode, user can also select, with , the fault frequencies of the concerned bearing, which differs from the last bearing database. This part already discussed earlier won't be aborded. Users can refer to the last sections dedicated to SDT340 and SDT270, to get further information.



A use case applied on reference SKF 6208 is explained hereunder:



Where “6208”, on the left, refers to the standard dimensions used to compute the amount of grease. This entry is mandatory and will be used, in LUBExpert, during grease replenishment process.

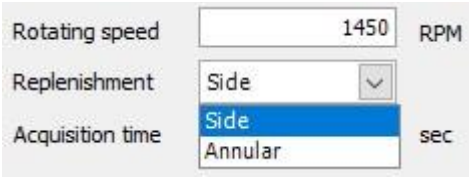
“SKF – 6208” refers to the specific manufacturer reference, having its own defect frequencies. This optional entry will be used for further analysis and diagnostic, in UAS3.

Setting rotating speed 5

In order to complete the setup, UAS3 also needs information about the rotating speed of the selected lubrication point. In case you are not sure about the rotating speed, or it is variable, set the lowest expected rotating speed.

Side or Annular replenishment 6

Choose grease replenishment configuration: side or annular. Select “side” or “annular” from the drop-down menu. Note! If you chose to edit calculated grease quantity manually, this field will be blocked.



Once you have selected a bearing as well as its replenishment position, OD, ID and Width are defined, and grease quantity is calculated and adjusted according to selected grease pump output. This quantity is used as a safety point only in case of “Suspected Bearing Failure” status and to provide automatic recommendation to “Shorten Interval” that you have selected. Based on asset data selected at this point, UAS3 is also able to calculate steps in your guided lubrication process. In this example, step one will be 5 shots injection, step two 3 shots, step 3 and all following steps 2 shots.

Manual input of grease quantity 7

By default, once the required field is filled, the prescribed amount of lubricant is estimated under purely geometric considerations, corresponding to approximately 30% of the free volume in the bearing.

The user can manually change this initial prescription (for example, in case of internal procedures based on adjusted amount of lubricant). Choose and enter your adjusted prescription. In this case, all pre-calculations will be done based on your input. Manually edited quantity will be shown in Italic. If you want to go back to automatically calculated qty, simply press the “go back” arrow. Note that the bearing must be selected, at least a temporary one, with an approximate size.

Acquisition time 8

Based on rotating speed, UAS3 will automatically calculate minimum and recommended acquisition time. Recommended time is the result of positive experiences, but if desired, you can choose minimum time or any other acquisition time, but not less than minimum time and not greater than 80 seconds.

Based on previously inserted data, UAS3 automatically calculates the **stabilization time** and the **injection steps**, that will be automatically applied in LUBExpert, to ensure consistent comparisons between each step.

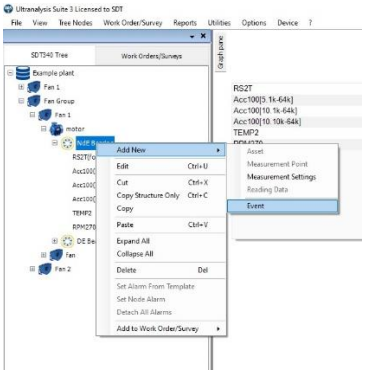
Press “SAVE” and all settings for the selected asset are ready. These settings are assigned to the selected lubrication point and go with it when workorders are transferred to your LUBExpert instrument. No further settings need to be done (nor can be done) in LUBExpert once in the field. This enables your grease technician to have comfortable, fast, and safe work in the field, as well as tight work control and dependable data for the Lubrication Manager.

10.4. Adding an Event

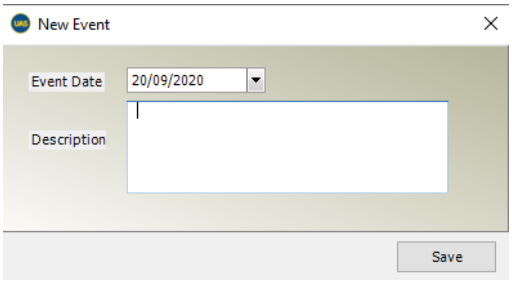
Event is additional textual information assigned to asset. It contains a certain message (what) and date (when). Events can be added in UAS3 and in instrument itself (as automatic or manually added messages). Adding events has a great value for better understanding of data and for easier use of database. They represent certain observations or comments, some action that is important to be logged, represent Lubrication decision flow, but are also highly valuable as flags in time making your searches or analytics easier.

Event can be assigned to **Asset, Measurement Point** (SDT340), and **Tree Node** (SDT270 & LUBExpert). Even can not be added at sensor level.

Right click on **Tree Node**, choose **Add New** and click on **Event**.



Event window will pop up:



Enter Description of **Event** and click on **Save**. Even is added and it will be displayed in **Static Trend** and **Bottom Pane**, and it can be used in data filtering.

Manually added events in UAS3, or manually added messages in instrument (both treated as events) are marked with **(M)**.

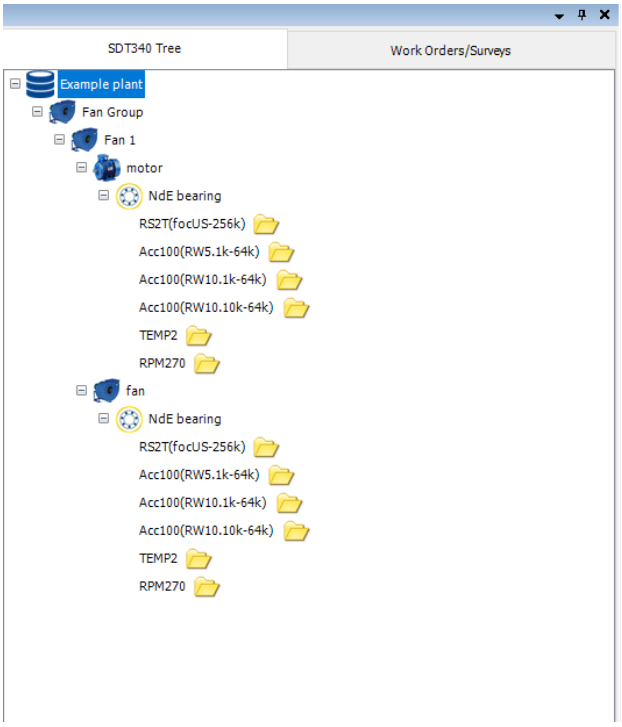
Automatically added messages in instrument (LUBExpert) are equally treated as events and marked with **(A)**.

10.5. Copying and Pasting Nodes

Once engaged in building a database, you will often face similar equipment, similar configurations, sometimes practically identical groups, or processes. Obviously, there will be lots of copy/paste at

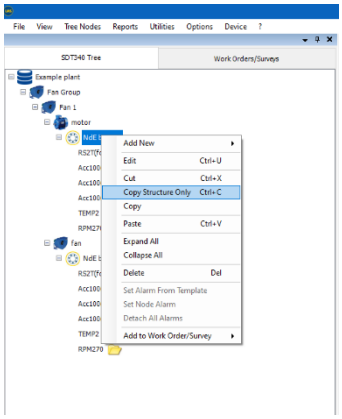
certain point. You can cut, copy and paste Measurement Settings (Sensor level), Asset Component, Asset or entire group (branch). Look at situation below:

In our Database Root, Example Plant, we created a Fan Group. Within Fan Group we have Fan 1 containing motor and fan. Both motor and fan contain one Measurement Point each, with detailed Measurement Settings. But, in reality, we have several fans in this Fan Group, both motor and fan have two bearings, of course, and throughout the plant, we have several Fan Groups like this one.

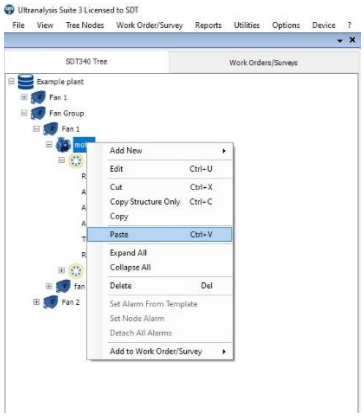


Let us start with completing motor and fan. Right click on NdE bearing (or use Top toolbar commands), move one level up (parent node, motor) and paste it. Note that there are two tools: Copy Structure Only – Structure will be copied with all settings, but measurement data will not be copied, very useful when building Tree Structure or expanding it.

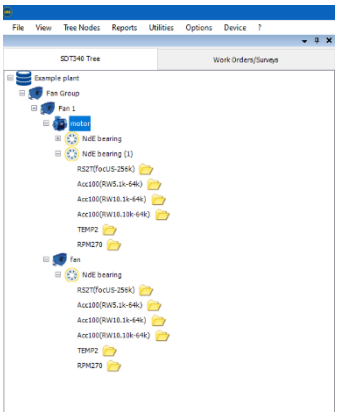
Copy – Entire point will be copied, including measurement data. Very useful when component or Asset are moved to a different location, or when partial backup needs to be done.



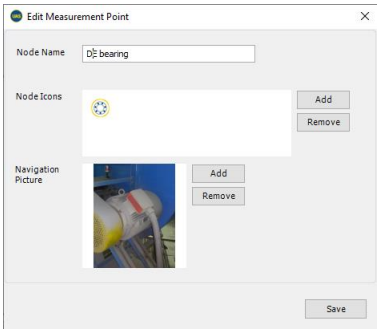
Select one level up (parent node, motor) and click on **Paste.**



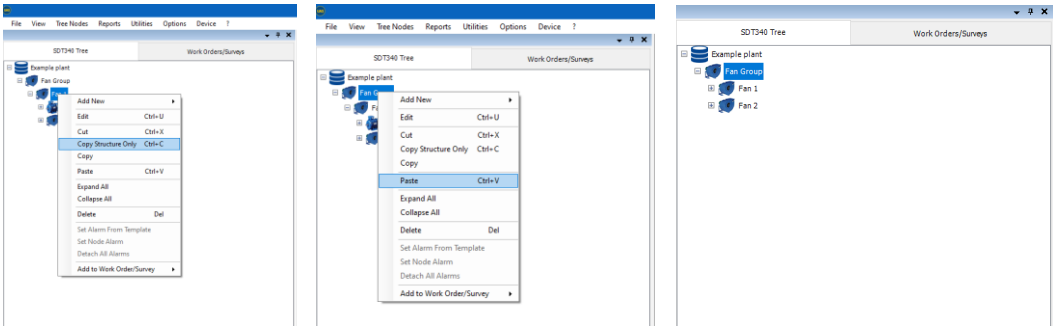
NdE bearing is now pasted in Node motor, with name NdE bearing (1).



Now right click on newly pasted NdE bearing (1) and select **Edit** and rename it to DE bearing.



Now we have completed motor and fan, but we might want to copy/paste entire Fan 1, as we have more than one Fan in Fan Group**.** Process is same. Right click on Fan 1, select **Copy Structure Only** (if we don't want to copy measurement data as well), right click on Fan Group (parent node) and select **Paste. Edit** the name (example Fan 2).



Note!
*Sensor Level (Measurement) cannot be pasted into the **Node** that already contains same **Measurement Name** or **Category Name**.*
***Sensor Level** (Measurement) cannot be pasted into the **Node** that contains other nodes, it can only be pasted into **Measurement Point** level.*

*If you need to copy/paste certain nodes into another Tree Structure, the process is same as shown here for copy/paste within same Tree Structure. **Copy Node** you need, open another **Tree Structure** and **Paste** it.*

10.6. Drag and drop Data

Measurement Settings (Sensor Level) can be copied from Bottom Pane into the Tree Structure. To select the data you want to move, press, and hold on the left button of your mouse.

Use **Shift** and **Ctrl** to select multiple data.

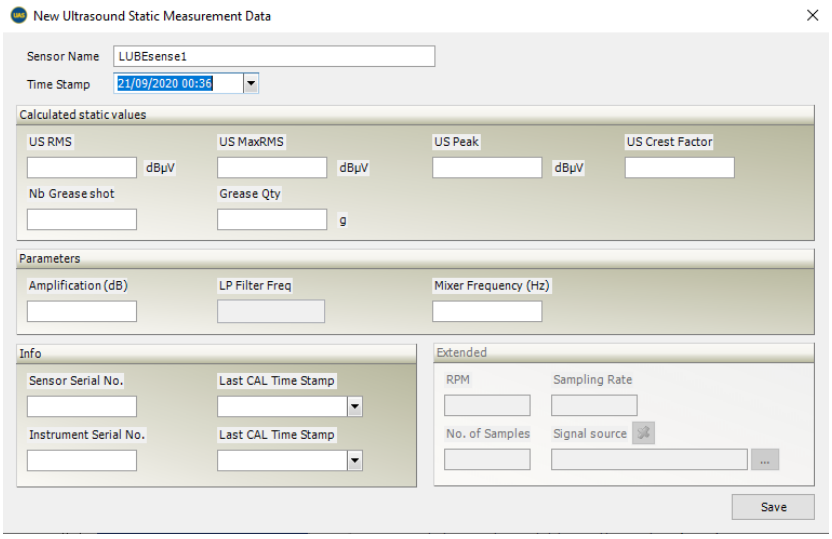
Drag the data to the desired Location on the Top Pane.

Hoover your mouse over desired location in the Tree Structure, and it will open child nodes down to the measurement level where you can paste. Drop the data by releasing the left button of the mouse. Equally, you can drag and drop data within the Tree Structure.

10.7. Insert a Static Data

UAS3 allows you to insert static data manually. Right click on a Static Measurement. On the drop-down menu, select **Add New/Reading Data**.

The following window is displayed:



The field **Sensor Name** is filled automatically by UAS3.
Choose the date of the Data by clicking the drop-down menu **Time Stamp**.

Please fill the field **RMS** (for US sensors and accelerometers), or **Value** (for the other sensors) with a numerical value. This field is mandatory while the following are optional.

Click **Save** to finish the operation.

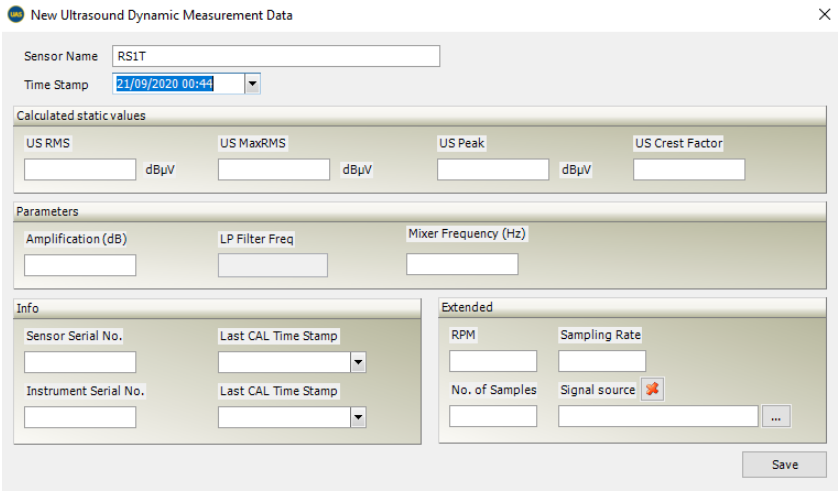
10.8. Import Dynamic Data or Wave file

You can import a wave file into UAS3, and you will be able to analyze the time signal and eventually the spectrum. However, it is possible that values (amplitudes) will not be accurate since not all data (amplification for instance) will not be available.

To import Dynamic Data, right click on a Dynamic Measurement.

On the drop-down menu, select **Add New/Reading Data**.

The following window is displayed:



Click the browse button , placed under the field **Signal Source** and then select the name of the wave file and its location.

Click **Save** to finish the operation.

10.9. Working with Work Orders/ Surveys

Work Order/Survey is an organized task extracted from **Tree Structure**. It contains selected **Assets** and **Measurement Points** in pre-defined order, all **Measurement Settings** and **Alarms**, allowing field operator to execute data collection in clear, fast and an efficient manner. Clear, fast, and efficient also results in **Safe**, by minimizing field work. Executing task through **Work Order/Survey** assures that data is collected using same settings, thus being comparable for further analysis.

Work Order/Survey is created by selecting and adding items from your **Tree Structure**.

- One item can be in several **Work Order/Survey**.
- **Work Order/Survey** does not affect **Tree Structure**.
- You can create as many **Work Order/Survey** as you need, no limitations.
- **Work Order/Survey** can contain items from one **Tree Structure** only.

Work Order/Survey must be designed with practicality of field work in mind.
Way the **Assets** are organized in **Tree Structure** should reflect needs of person using UAS3, to be able to overview Data in most efficient and logical manner.
The way the **Measurement Points** are organized in **Work Order/Survey** must reflect needs of person using instrument in the field, they should be set in logical order that reflect reality of work.

Those two aspects do not necessarily align. The needs might be different. For that reason, you are able to organize your **Work Orders/Surveys** in different ways and independently of the **Tree Structure** sequence.

In practice, you need to consider several aspects:

- What Assets are in the same area?
- What Assets operate at the same time?
- What is the best sequence of data collection, regarding ability to approach Asset?
- What are the competences and clearances of field technician (electrician? mechanic? process?)
- What Assets require data collection at the same or similar interval?
- How much time will it take to execute a Work Order/Survey (do not make it a big, boring job, multiple smaller tasks are more likely to get done properly)?

Best practice is to consult field team and understand what the safest, most comfortable, and most efficient way is to collect data in the field. As a person generating **Work Orders/Surveys**, you should create one, walk it yourself, consult others, adjust it, and only then consider it final.

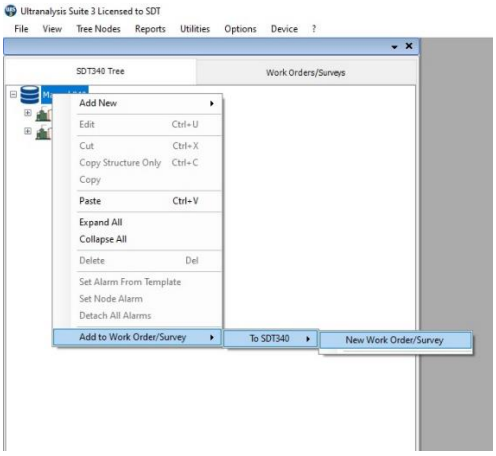
Items can be added to **Work Order/Survey** in several ways.

- Add items from the **Tree Structure** (using mouse right click or **Top toolbar** commands)
  - You can add single measurement
  - You can add any tree node and it will contain all child nodes
- Add items from the **Bottom Pane**
  - Select items and add them
  - Filter items based on certain criteria and add them
- Add items from **To-Do** List
  - Search items by their data collection due date and add them

Here is how to do it:

10.9.1. Add entire Tree Structure to Work Order/Survey

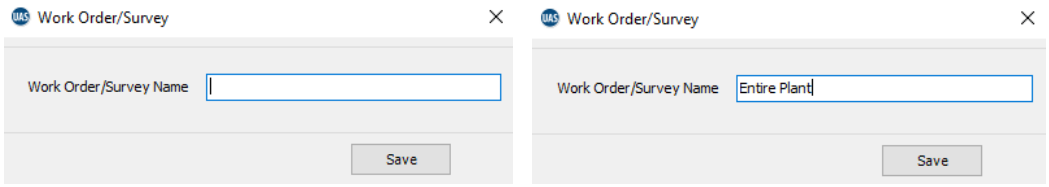
Right click on 1st level of **Tree Structure, Database root** and select **Add to Work Order/Survey,** choose instrument you work with, and choose if you want to add items to **New Work Order/Survey** or to **Add to Existing.**



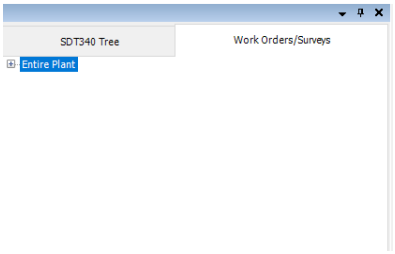
Work Order/Survey window will pop up where you need to assign **Work Order/Survey Name.**

Use a name that is intuitive and can be easily understood by everyone.

Once a name is assigned, press **Save**.

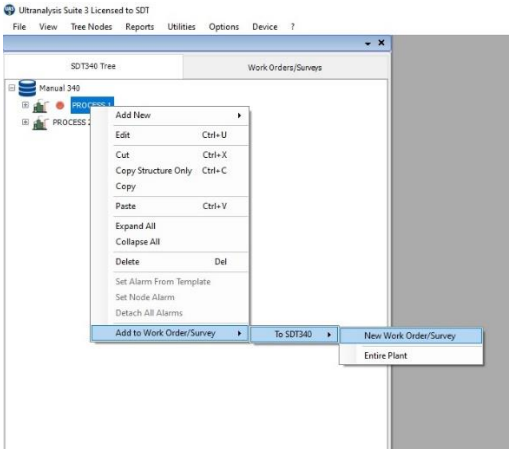


Your **Work Order/Survey** is generated. It is placed in Top Pane, in **Work Orders/Surveys** tab.



10.9.2. Add certain Nodes from Tree Structure to Work Order/Survey

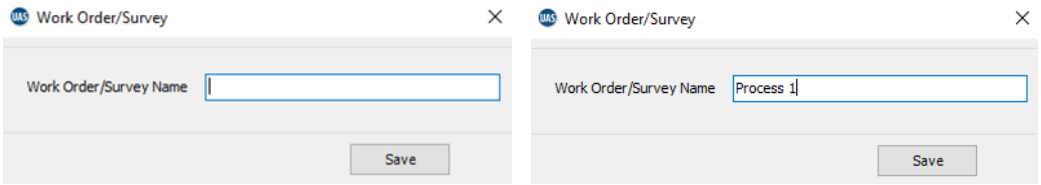
Right click on the **Node** you want to add and select **Add to Work Order/Survey**, choose instrument you work with, and choose if you want to add **Node** to **New Work Order/Survey** or to **Add to Existing**.



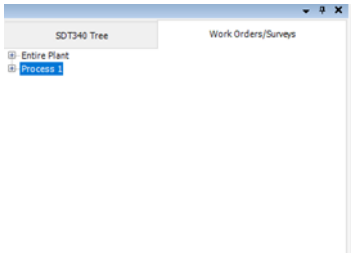
Work Order/Survey window will pop up where you need to assign **Work Order/Survey Name.**

Use a name that is intuitive and can be easily understood by everyone.

Once a name is assigned, press **Save**.

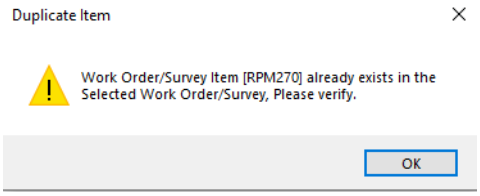


This new **Work Order/Survey** is added to list of **Work Orders/Surveys**:



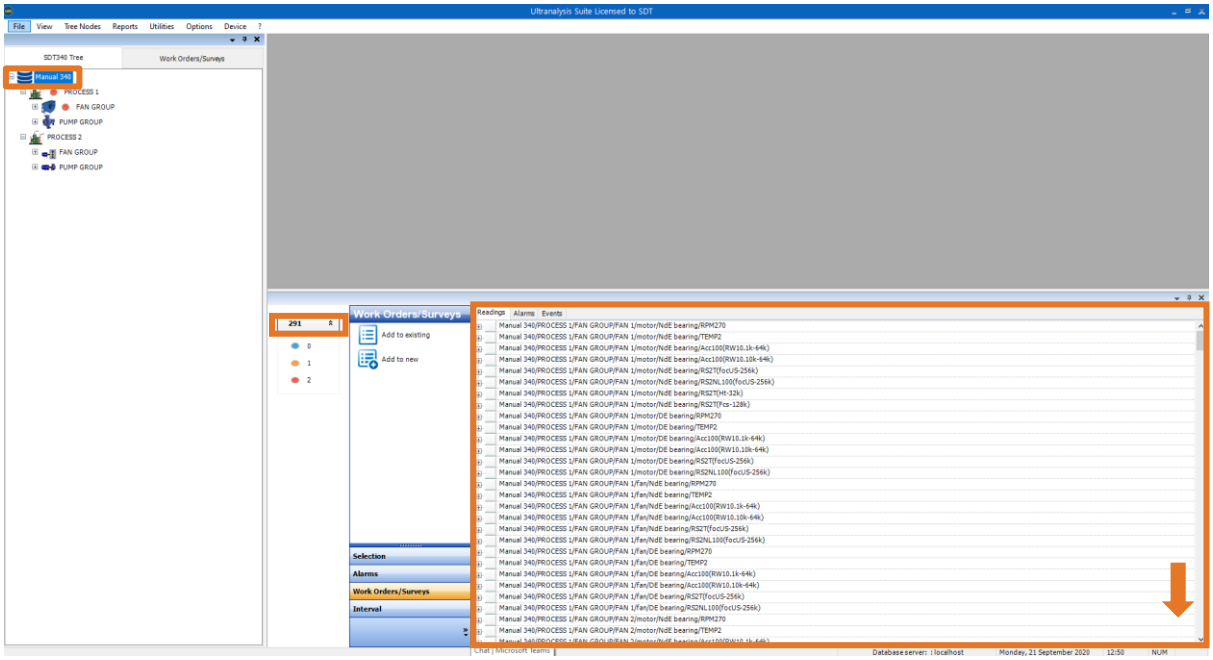
You can do the same with any portion or single item from your Tree Structure.

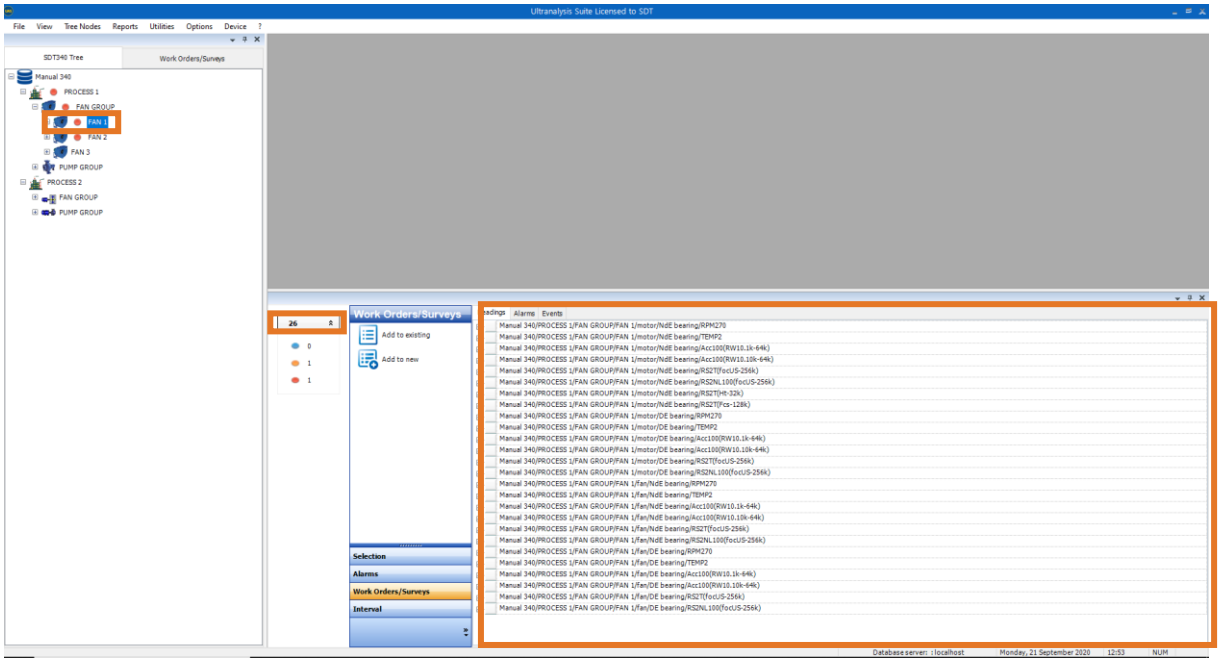
However, if you try to add an item to existing Work Order/Survey, and that item already exists there, UAS3 will warn you that item will be duplicated and ask for confirmation.



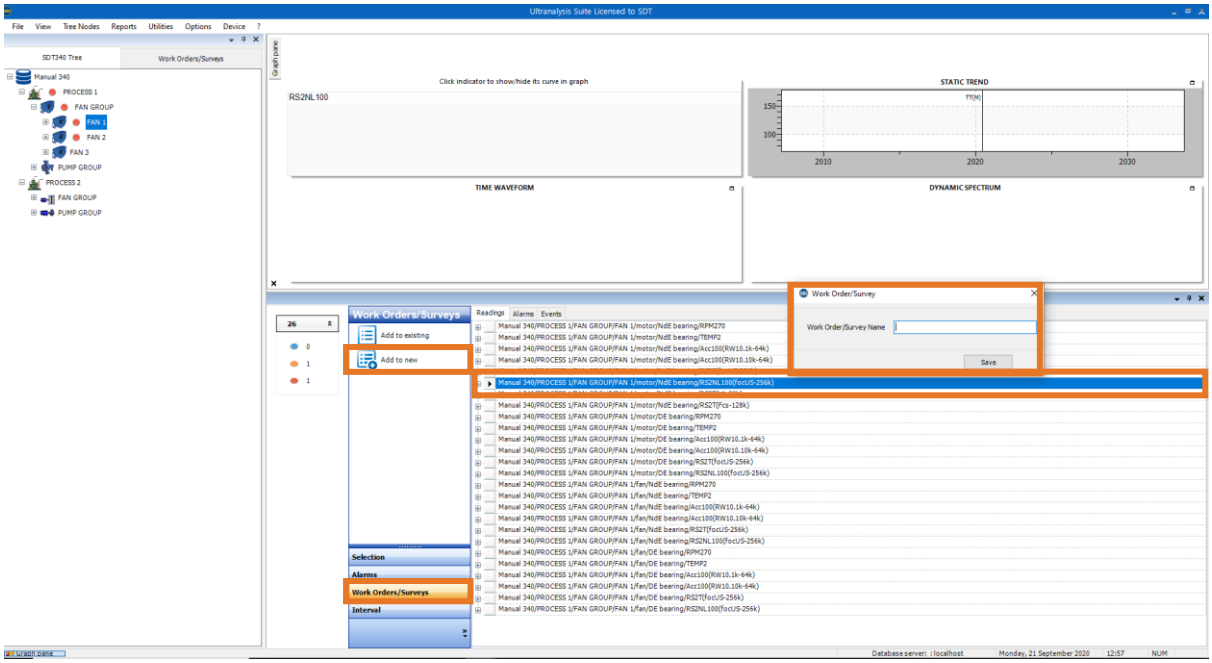
10.9.3. Add items from Bottom Pane to Work Order/Survey

Bottom Pane displays all measurements contained in Tree node you selected:

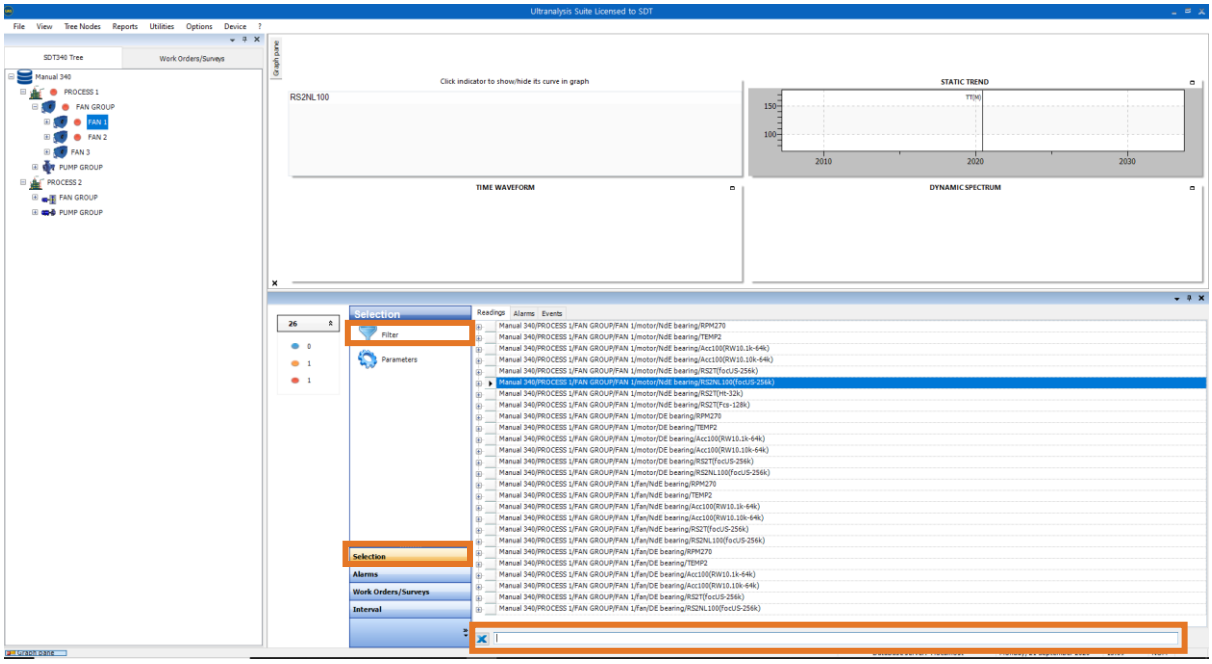




From **Bottom Pane** you can select any measurement (left click on the measurement), selecting **Work Orders/Surveys** in the Toolbox and add it to new **Work Order/Survey** or to existing one, as below:



Instead of selecting items individually, you can Filter them by certain criteria and add them as a group. Select Selection in the Toolbox, select Filter, and small Filter window will appear at the bottom of Bottom Pane, as below:



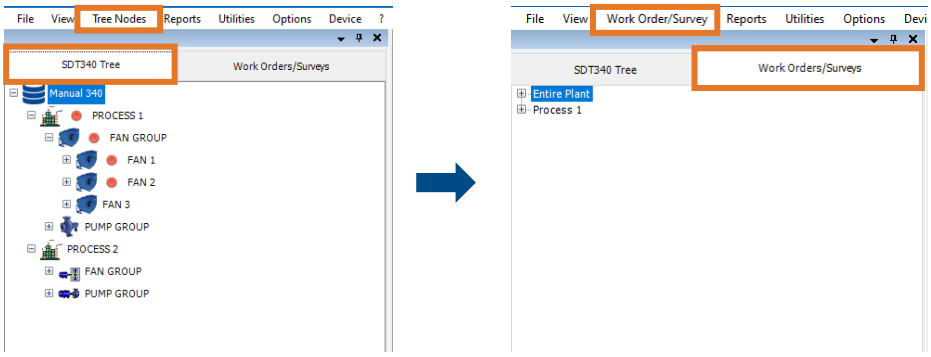
Use the Filter window to enter criteria. As you enter one criterion, the list will be narrowed to all items containing criteria (word) you entered. Use ";" to add more criteria and narrow your search further.

Once you are done with filtering, you can select from the list in Bottom Pane, and add it to Work Order/Survey. To select multiple items, use "shift" or "ctrl".

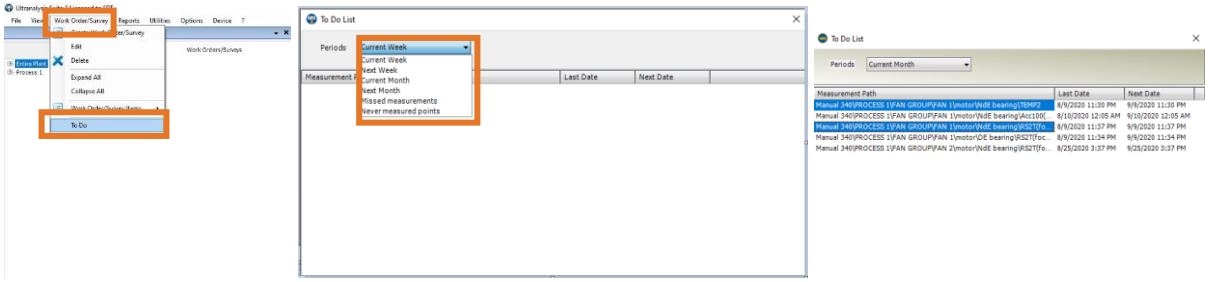
10.9.4. Add items from To-Do List to Work Order/Survey

To-Do List contains items based on data collection due date (based on interval you defined in settings). Due date consideration for each item starts with the first data collection.

In **Top Pane**, select **Work Orders/Surveys** tab and **Work Order/Survey** button will appear in **Top toolbar** instead of **Tree Nodes**.



Left click on **Work Order/Survey** in **Top toolbar** and left click on **To Do**. **To Do** window will appear, where you can select period or two additional criteria; Missed measurements and Never measured points.



Once criteria are selected, all items that meat criteria will appear. The due date is quite clear criteria, and it filters data collection scheduled in period you choose, according to their set interval (consider that interval starts the count once first ever measurement has been taken). Missed measurement is a very useful criteria, as it will filter out all data collection tasks with past due date (as those do not fall into previously mentioned criteria). Never measured points criteria filters out all measurement points with no data (newly introduced to database, newly installed assets …) reminding you that it needs to be done. From this window, you can select filtered points (single or multiple select) and with right click add them to new or existing **Work Order/Survey.**

10.9.5. Change Measurement order in Work Order/Survey

You can re-order the sequence of data collection and grouping Measurements into an order which is more efficient from a data collection point of view simply by selecting a Measurement and while holding the left mouse button, dragging it to a new position and then release the left mouse button.

This does not affect the Tree Structure in any way and how the data is stored in the database, it just makes it easier for you to collect it.

10.10. Importing Lubrication Bearing

You can import the user defined bearing from a delimited file or from the clipboard. A delimited file is a stream text file of records, which consists of fields that are ordered by column and separated by a character separator.

In this case the file must mandatorily contain four fields: the bearing name, the bearing inner diameter, the bearing outer diameter and the bearing width.

Each line contains one bearing data.

The first line could contain the name of the fields also separated by the same separator.

Example of data:

Name;Inner Diameter;Outer Diameter;Width
6800;10;19;5
6900;10;22;6
6000;10;26;8
6200;10;30;9
6300;10;35;11
6801;12;21;5
6901;12;24;6
16001;12;28;7
6001;12;28;8
6201;12;32;10
6301;12;37;12

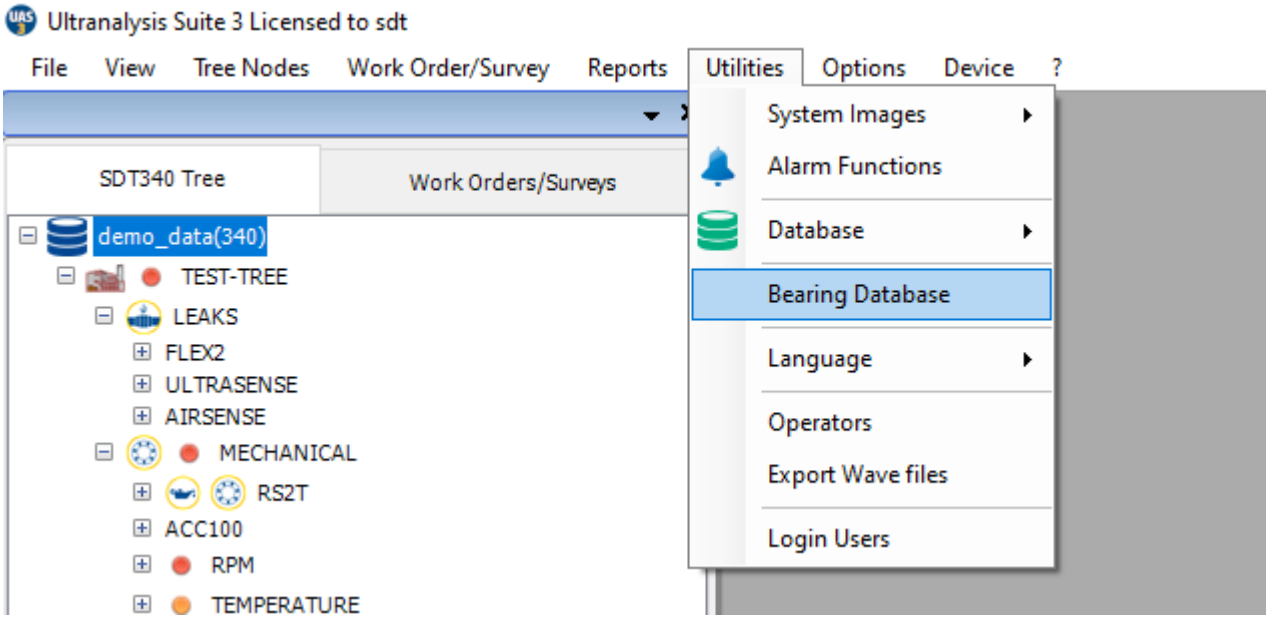
6802;15;24;5

In this example the first line contains the field's name. The separator is a semicolon.

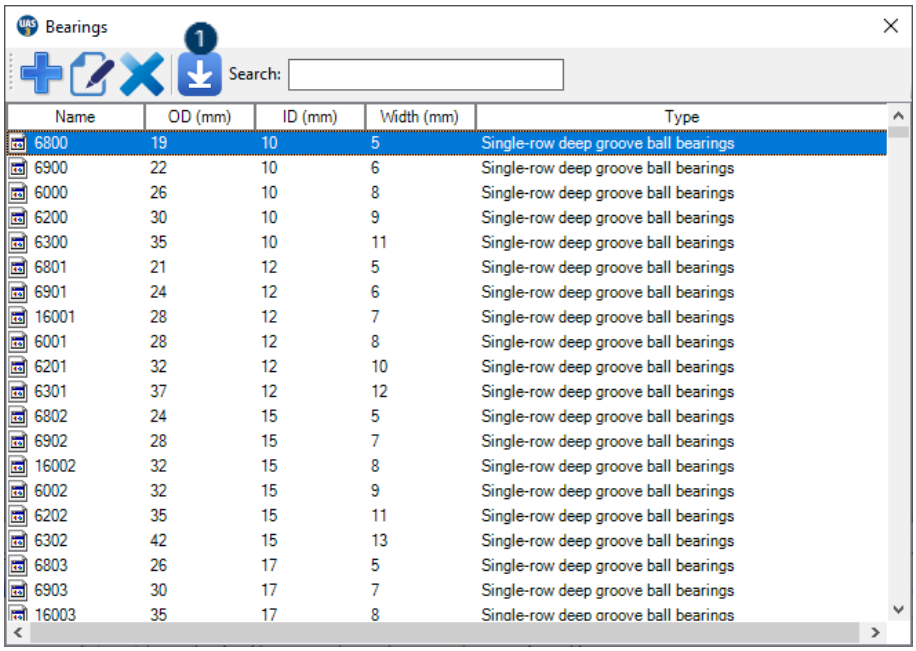
UAS3 already contains an embedded bearing database which cannot be changed.

You could create a user defined bearing from the bearing database list when you want to attach a bearing to a measurement setting. See UAS3 user manual chapter **10.3.3 Assigning bearing data to Lube point**.

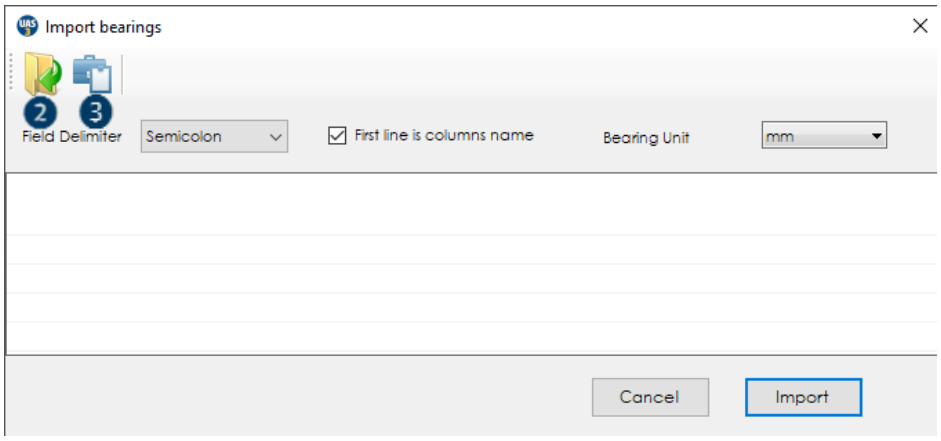
To start the importation, click on **Utilities/Bearing Database/Import Lubrication Bearing** in the top toolbar, as shown below:



The list of existing bearings will be shown as below:



1 Click on the button represented by a down arrow to open the import screen feature.

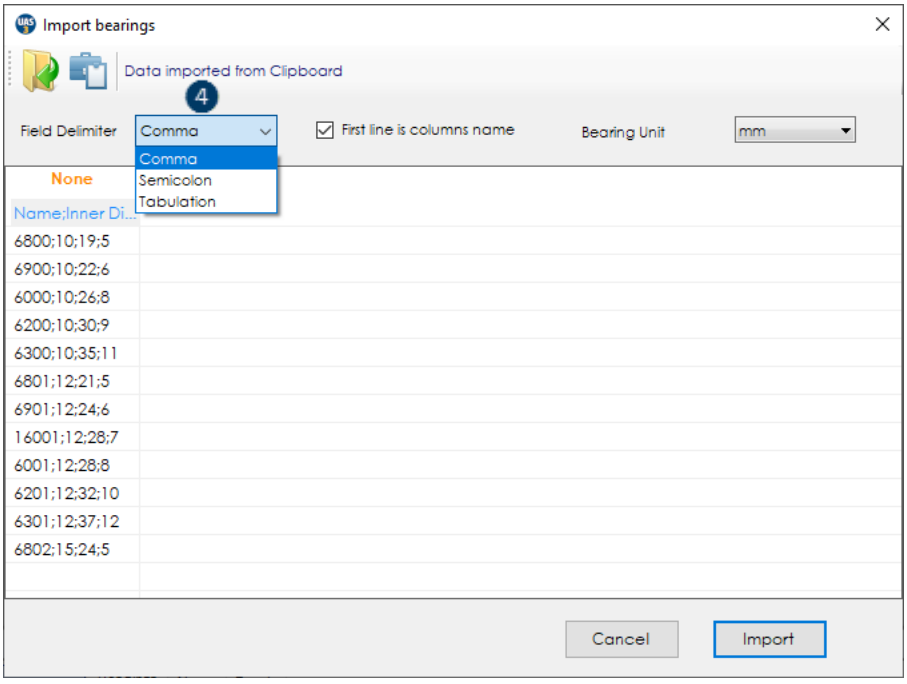


2 Click on this button to select a file to import.

3 Click on this button to import data from the Clipboard.

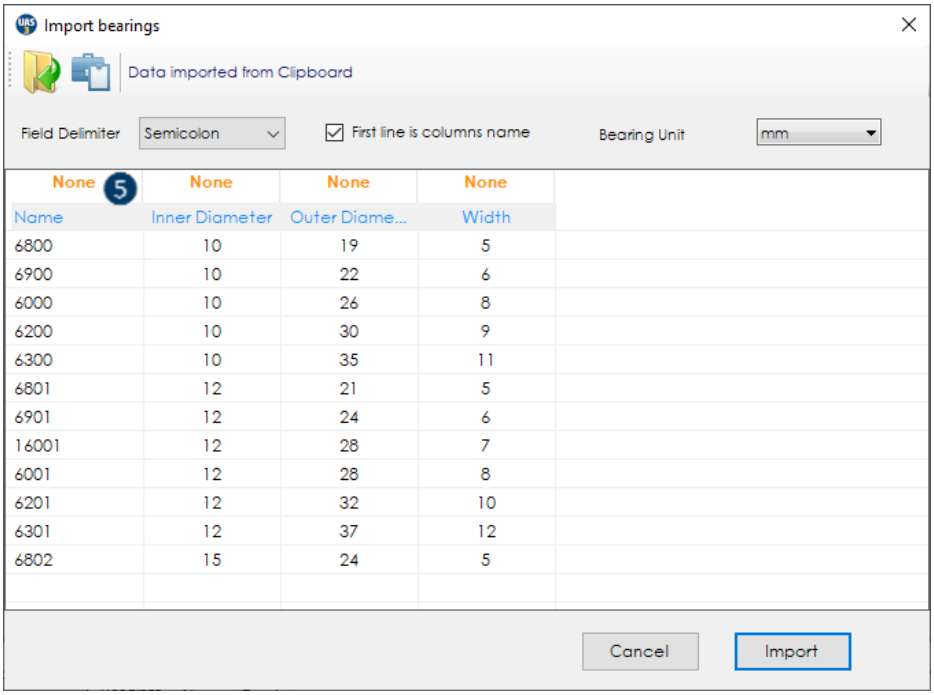
Here after is the example of data imported from the Clipboard. The separator does not correspond to the selected one.

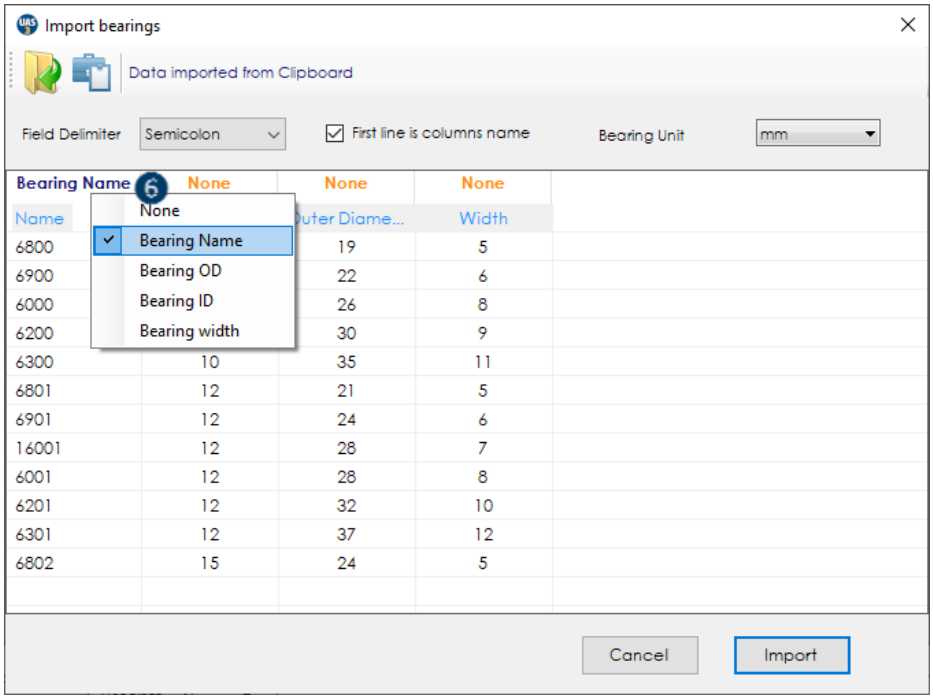
4 Select the corresponding separator and check if the first line contains text data (often the name of the columns)



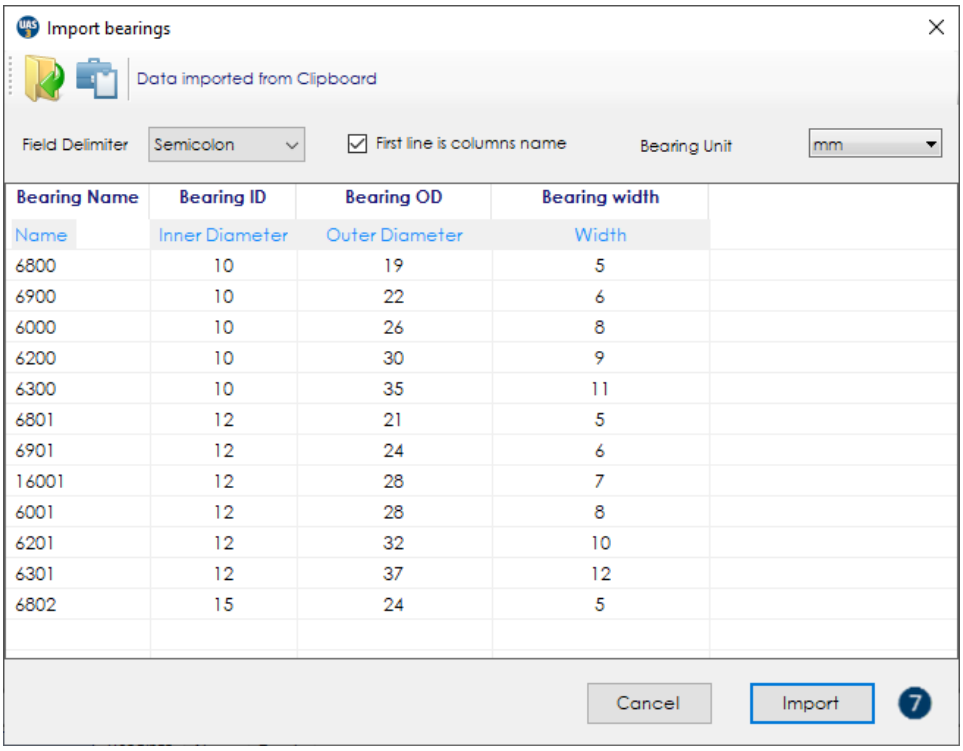
Once you select the correct separator, check the content of the first line and the unit of bearing measure (mm or inches). You are now ready to configure the column content.

5 All columns are marked as None.





6 Click on the column header to open a list which display five choices for the column content. You must tell UAS3 where is the column for the bearing name, the bearing inner diameter, the bearing outer diameter and the bearing width.



7 You can start the importation.

Useful information: UAS3 retains the last configuration and last imported file. When you start importing next time, UAS3 will automatically open the last file and apply the last configuration. In this case, you don't have to configure each time you plan to import similar bearing data.

Important: UAS3 already contains an embedded bearing database. Those bearings cannot be replaced or deleted.
If you want to import a user defined bearing with the same name and different characteristics, you should rename it before.

11. Managing Alarms

Alarms are a highly important aspect of Condition Monitoring, Condition Based Lubrication, and virtually any kind of measurement that needs to be compared with previous condition or any reference value. Alarms make managing database, decisions, and tasks much easier, and in some cases, they determine the field work. UAS3 offers an excellent alarm system, covering all your needs, and still easy to work with. Alarms thresholds should be set based on data, understanding assets behavior and condition. This is a topic of our training, so feel free to contact us.

As an introduction, let us start with **basic rules**, instructions:

- If working with SDT270 or LUBExpert database, Alarms can only be attached to Static measurement, as there are both Dynamic and Static
- If working with SDT340 database, Alarms can be attached Measurement, as there is no difference between Dynamic and Static, it is unique measurement point.

Types of Alarms:

- Absolute
  - Absolute Alarm monitors measurement value and compares it with defined alarm thresholds, triggers if measured value exceeds thresholds.
- Safe
  - Safe Alarm monitors measurement value and checking if it is within defined range, where lower and upper threshold is defined.
- Relative
  - Relative alarm monitors relationship of the measured value with first measurement, previous measurement, or referent measurement, whether increasing or decreasing.

Alarms monitor indicators:

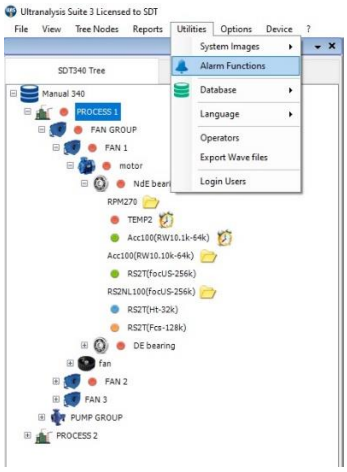
- RMS
- Max RMS
- Peak
- Crest Factor

Alarms differ by way they are created and managed:

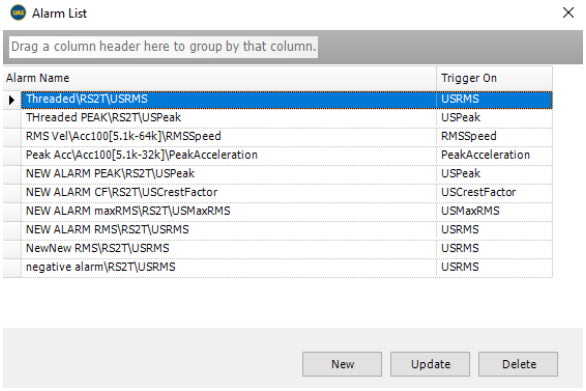
- Alarms in Template
  - This is where you create your alarms to use them frequently, on many assets. Consider it as “alarm bank”. You create an alarm, save it, and apply it when and where you need it.
- Node Alarms
  - Locally created alarm (in the measurement itself). It is not saved in the “alarm bank”, it is considered custom. If needed, it can be transformed to template alarm.

11.1. Creating Alarm in Template

In Top toolbar, left click on **Utilities** and select **Alarm Functions**, as below:

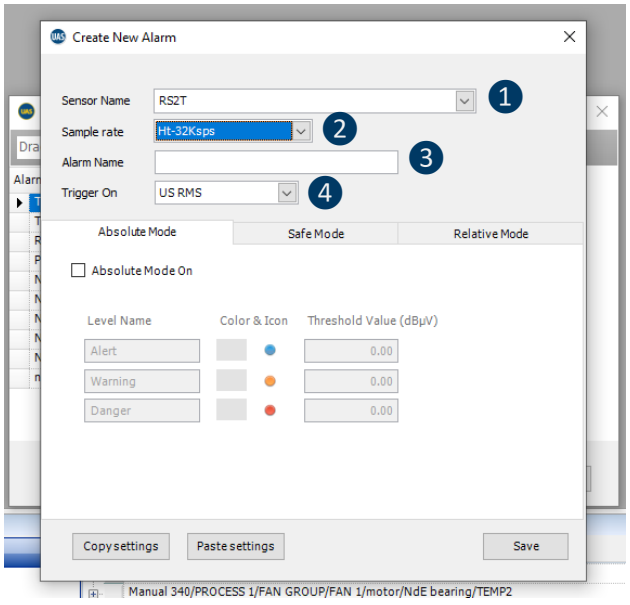


Right click **Alarm Functions** and **Alarm List** window will pop up, for alarm management:



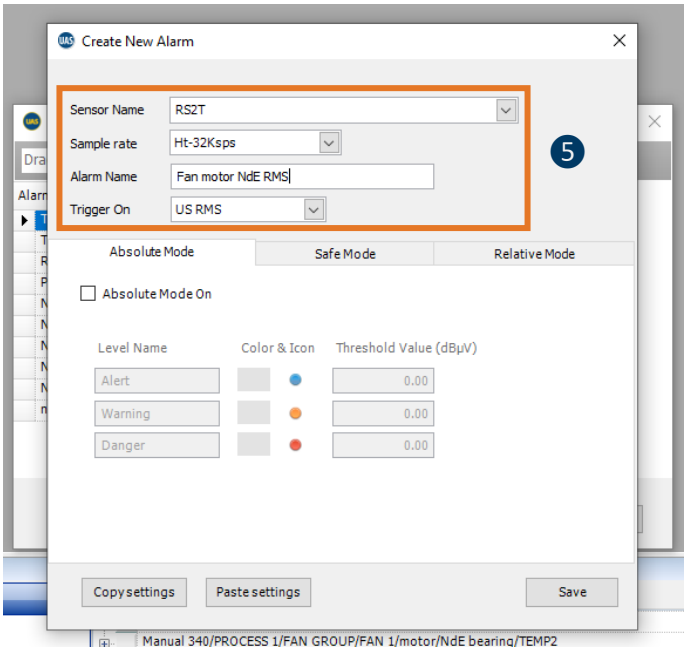
Here, you see **Alarms** that you already created. You can delete them, update them (change the settings), or create new ones.

First, let us create **New Alarm.** Left click on **New Alarm** (at the bottom of Alarm List window):

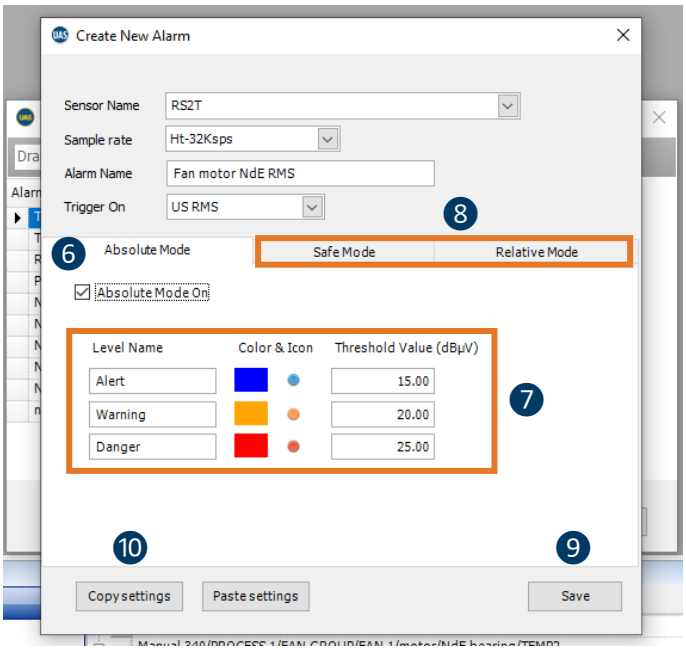


1. Choose sensor that alarm will be applied to
   - Each defined alarm is defined for one sensor.
2. Choose sampling rate (for SDT 340 only)
   - Different sampling rates define measurements as different, even if sensor type is the same.
3. Choose Alarm Name
   - Choose intuitive name. Soon you might have lots of alarms here, and it is important to be able to differentiate them easily.
4. Choose indicator to be monitored
   - Each alarm monitors one indicator. To monitor other indicator as well, create additional alarm.

5 Here we decided to create and alarm for RS2T sensor, for the measurement of 32.000 samples per second, we gave it a name “Fan motor NdE RMS” (as we need it for that position), and this alarm will monitor RMS value.



Now we can define Alarm’s thresholds, starting with Absolute Mode, as below:



6 Left click on Absolute Mode On checkbox to activate this alarm Mode.

7 Enter alarm threshold values for Alert, Warning and Danger. Warning value must be higher than Alert value and Danger value higher than Warning value.

8 If we plan to ad Safe Mode and Relative Mode, we will click on their tabs, and not save the alarm yet.

9 If we plan to add only Absolute Mode, we will click on Save.

10 If we plan to add more alarms with similar settings, we can use Copy settings/Paste settings function.

Let us add Safe Mode as well:

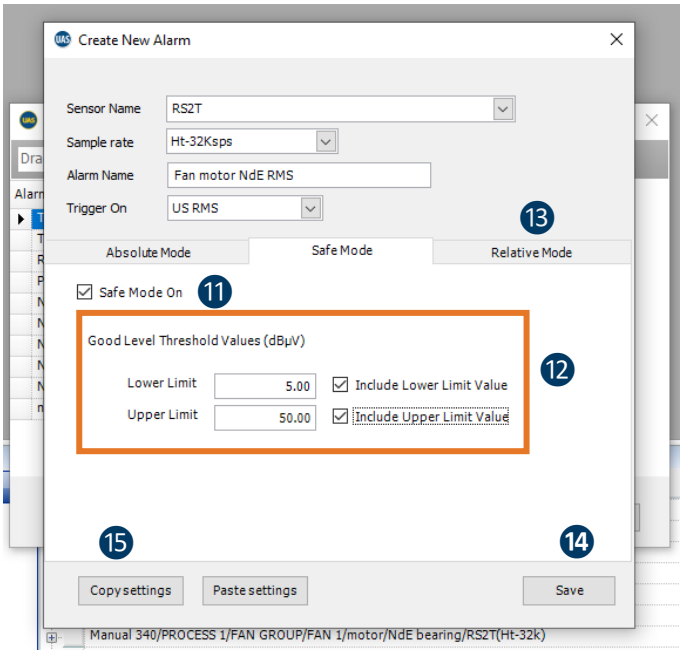
11 Left click on Safe Mode On checkbox to activate this alarm mode.

12 Enter alarm threshold values for Lower and Upper Limit and confirm if threshold should be included.

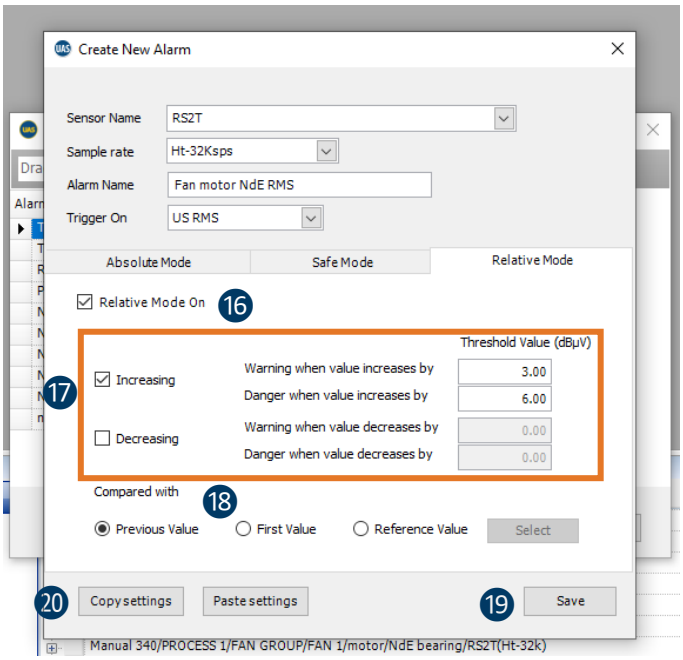
13 If we plan to add Relative Mode as well, we will click on its tab, and not save the alarm yet.

14 If we plan to add only Absolute and Safe Mode, we will click on Save.

15 If we plan to add more alarms with similar settings, we can use Copy settings/Paste settings function.



Add Relative Mode also:



16 Left click on Relative Mode On checkbox to activate this alarm mode.

17 Enter alarm threshold values for Lower and Upper Limit and confirm if threshold should be included.

18 Define reference for comparison.

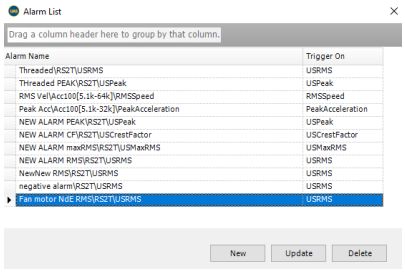
19 If we finished setting, we will press Save.

20 If we plan to add more alarms with similar settings, we can use Copy settings/Paste settings function.

Our Alarm is defined:

Same way, we can define alarms based on other indicators and on other sensors.

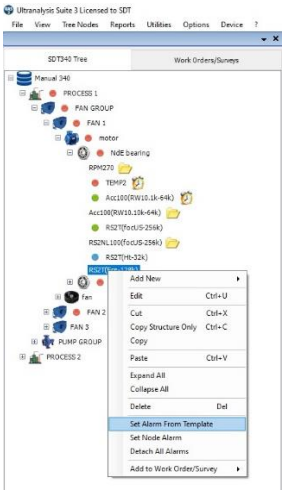
Four alarms can be attached to one single measurement, one per each indicator, each alarm in three different modes, providing excellent coverage.



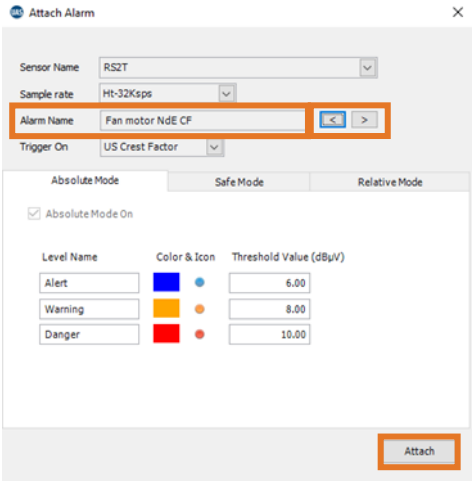
11.2. Assigning Alarm from Template to single measurement

Alarm from Template can be assigned to single measurement in several ways, but directly by selecting a measurement in **Tree Structure** is certainly the most simple and straightforward.

To do that, right click on measurement (in case you are working with SDT270 or LUBExpert, choose Static measurement) and select **Set Alarm from Template***:*



And **Attach Alarm** window will pop up:

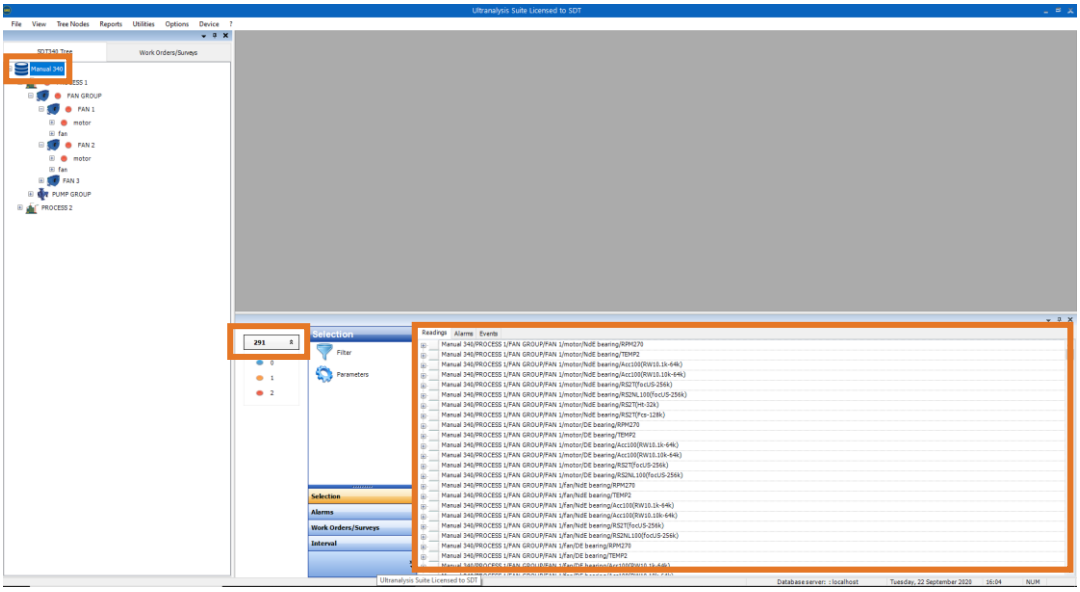


UAS3 automatically filters available Alarms for the sensor in the measurement you selected, making search much faster and easier. All you need to do now is browse through the alarm using left and right arrows in Alarm Name field and look for the alarm you created for this measurement point. Once you find the right alarm, simply click Attach. An alarm is attached and you can proceed attaching other alarms if needed.

11.3. Assigning Alarm from Template to multiple measurements

Alarm from Template can be assigned to multiple measurements from the Bottom Pane.

To do that, select the node in your Tree Structure that contains all that you want to find and add alarm to. Left click on that node and look at the Bottom Pane.



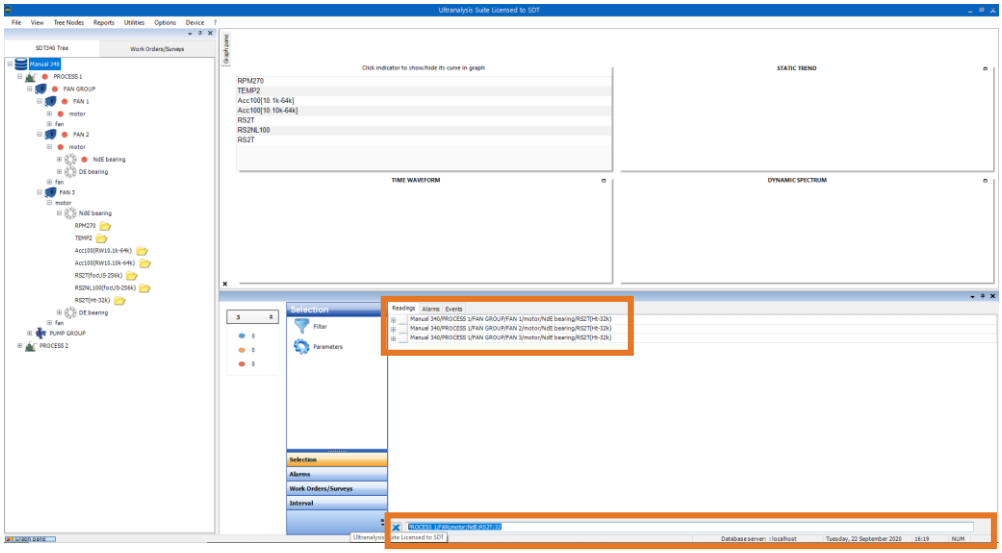
I selected Database Root, 1st level, and all measurement it contains are now displayed in Bottom Pane. All 291 of them, as you can see right above the traffic lights.

Next thing you need to do is to filter measurements you are interested in. Let us say that you want all NdE bearings on all electrical motors on fans, measured with RS2T sensor at 32.000 samples per second, in Process 1.

Left click on Selection in Bottom Pane toolbox and select Filter. Search bar on the bottom of Bottom Pane will appear and you should enter search criteria. NOTE! If you work with SDT270 or LUBExpert, add additional criteria: ST (to filter out Static measurements only).

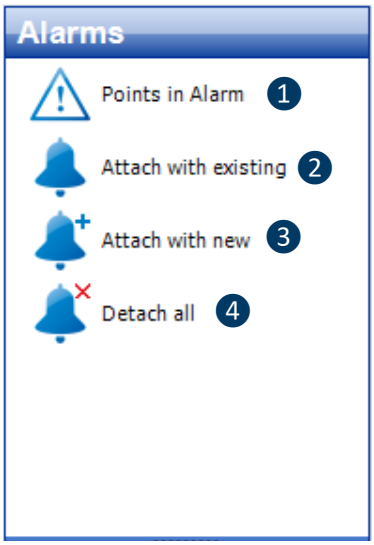
In this case: **PROCESS 1; FAN; motor; NdE; RS2T; 32**

We filtered out all measurement that comply with criteria, and here they are, three of them:



Now, you need to select all three measurements by using **shift** or **ctrl.** Then left click **Alarms** tab in **Bottom Pane** toolbox.

Alarm field appears in Bottom Pane toolbox. Let us examine offered commands:



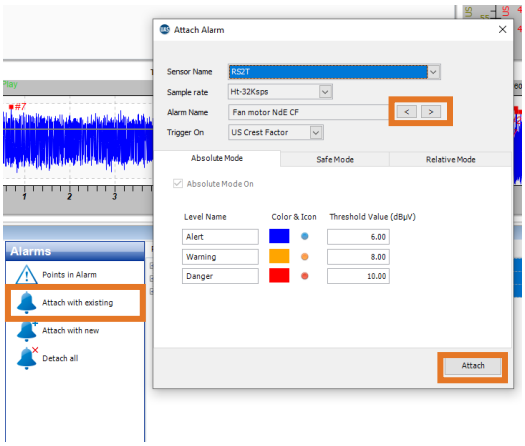
1. Show all points in alarm
2. Attach existing alarm to selected measurements
3. Attach with new alarm (direct link to creating a new alarm)
4. Detach all existing alarms from selected, measurements

Since you already created **Alarm**, you should choose **Attach with existing** (left click on it), and Alarm windows will appear.

Select alarm you want to attach (browse through the alarm list with arrows in **Alarm Name** field) and click on **Attach.**

Alarm is now attached to all three measurements.

Repeat it if you want to attach more alarms.

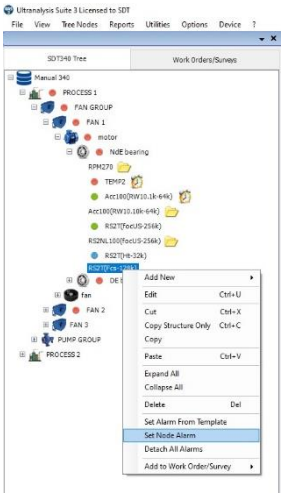


11.4. Setting Node alarm to measurement point

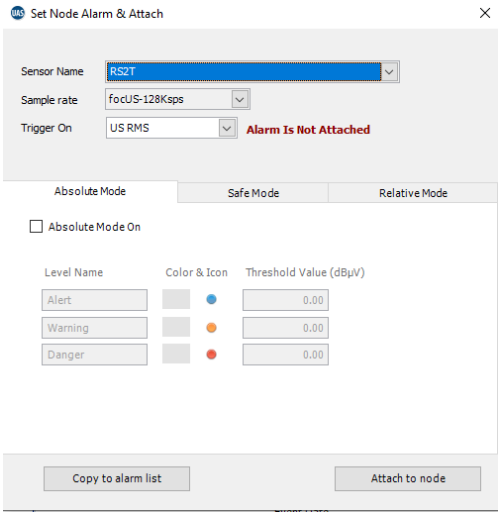
As mentioned before, **Node Alarm** is a locally created alarm (in the measurement itself). It is not saved in the “alarm bank” and it is considered custom. If needed, it can be transformed to template alarm.

Let us see how you will create/assign this alarm:

Right click on measurement you want assign **Node Alarm** to and choose **Set Node Alarm**, as below:

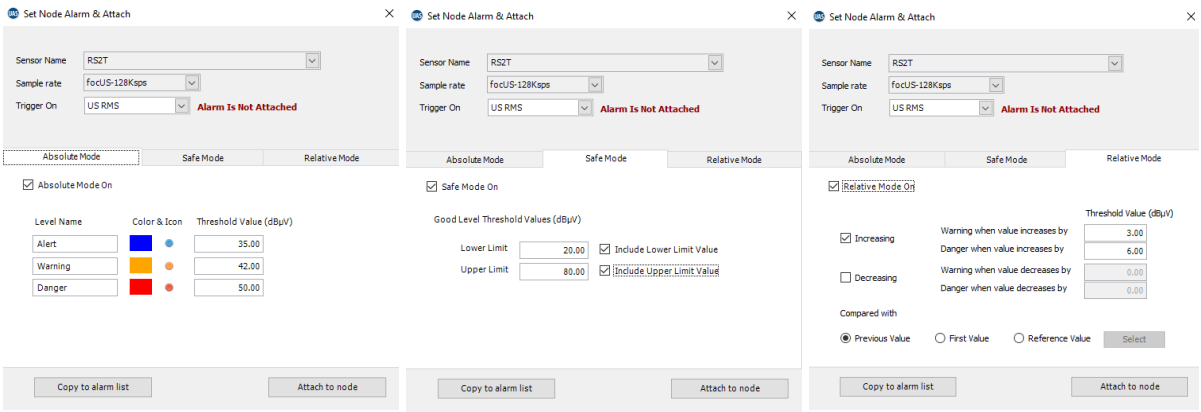


Set Node Alarm window will pop up



Process of defining alarm parameters is the same as it is in **Alarm in Template:**

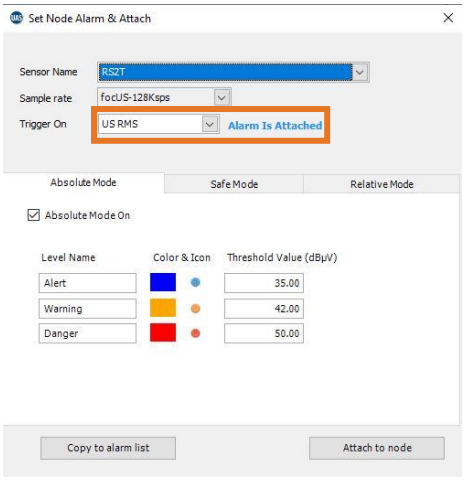
- Sensor field and Sample Rate fields are not editable – it is the same sensor and same Sample Rate as in measurement point you selected.
- You need to choose the indicator you want your Alarm to monitor: RMS, max RMS, Peak, and Crest Factor.
- Activate and assign thresholds to Absolute, Safe and Relative Mode, or just one or two of them.



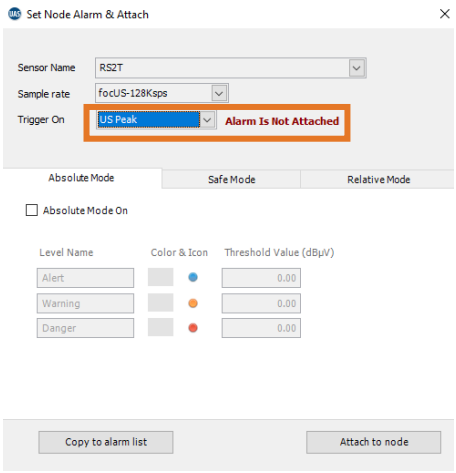
All is set, and now click on **Attach to node** and your **Node Alarm** monitoring RMS is attached and active. Now you can add another alarm, monitoring another indicator.

Node alarm is assigned to selected node only and does not exist in Templates (“Alarm Bank”).

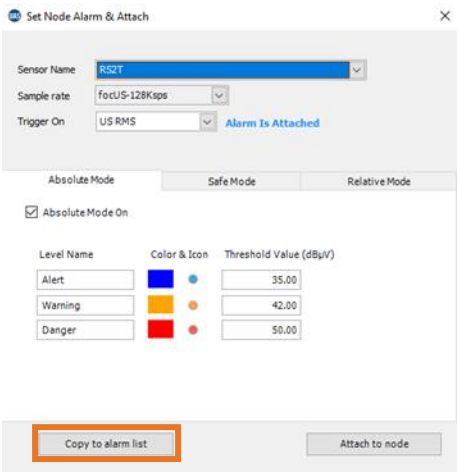
When you try to assign next Node Alarm to same measurement (after you assigned one as in previous example), you will be warned about alarm that is already assigned, as below:



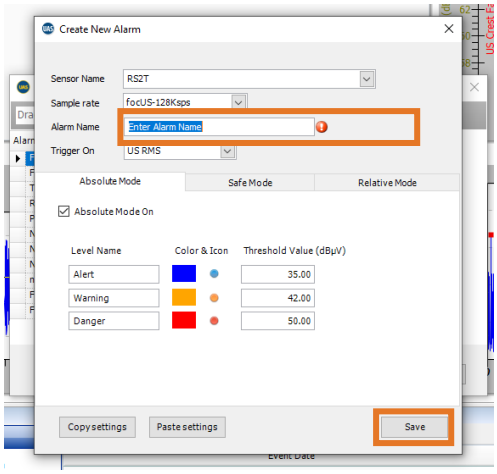
Alarm on RMS indicator is already attached. Change indicator and see if another indicator can be attached.



If, at any moment, you decide to use this **Node Alarm** for other measurement positions as well, click on **Copy to alarm list**, and you can add it to template:



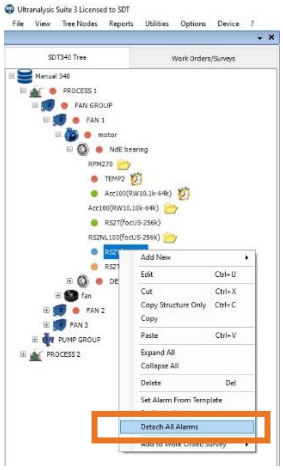
Click on Copy to alarm list and Create **New Alarm** window will pop up. Now, you need to assign a name to this alarm, and you will have it in **Template Alarm** as well.



11.5. Detaching Alarms

Alarm can be detached from a single measurement or multiple measurement.

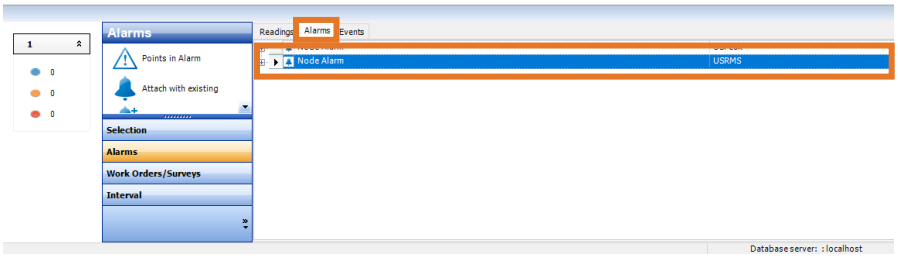
Same as attaching alarm in **Tree Structure**, right click on measurement and select **Detach All Alarms.**



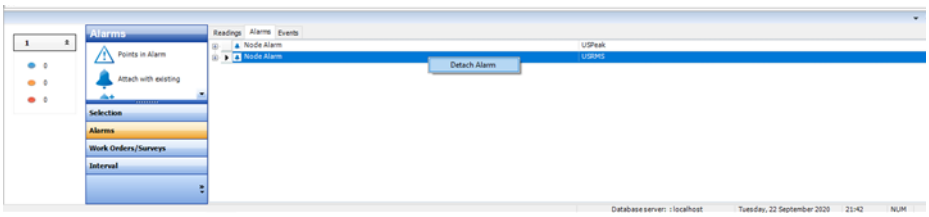
If there is more than one alarm attached to measurement point, and single or more alarms should be removed, not all:

Left click on measurement in **Tree Structure.**

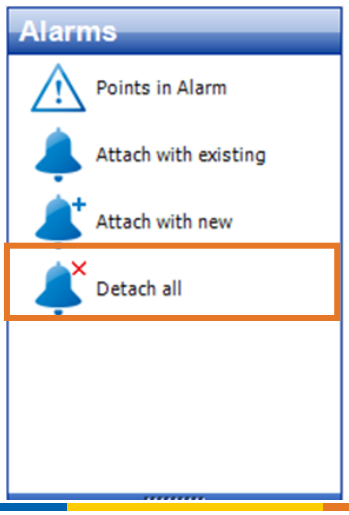
In **Bottom Pane** select **Alarms** tab and you will have all attached alarms displayed:



Right click on each of the alarms enables you do detach single alarm, while leaving all other alarms attached.



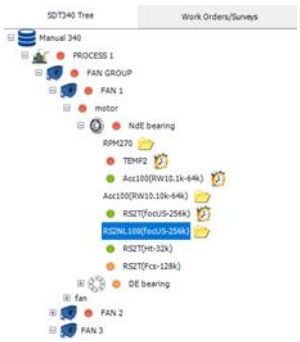
Alarm can also be detached in **Bottom Pane**, where you can also detach alarm from multiple measurement points. Select measurement in the same way as you selected them in attaching process and click on **Alarms** in **Bottom Pane** toolbox.



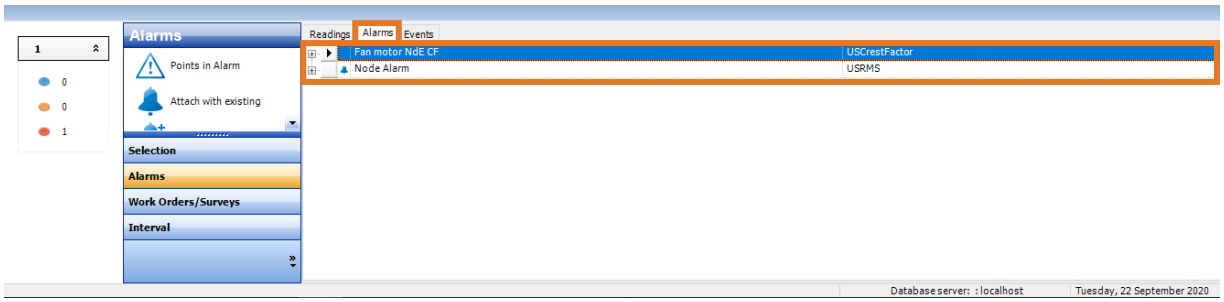
Simply click on **Detach all**, and alarms will be removed from all selected measurements.

11.6. Overview of attached alarms

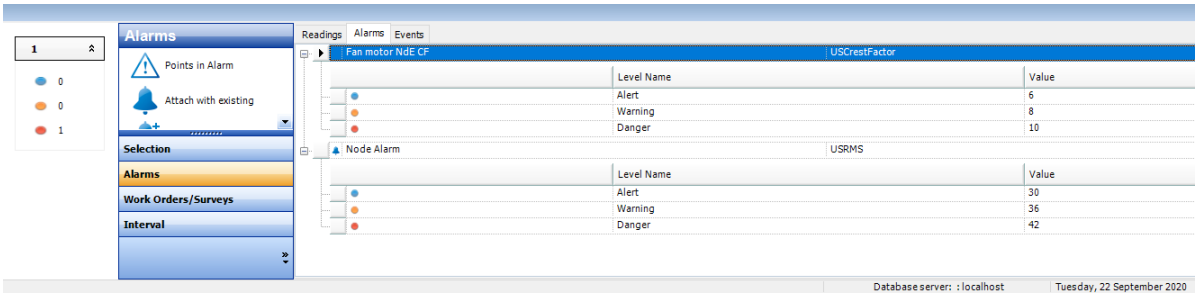
To overview alarms attached to measurement point, left click on measurement point.



In the **Bottom Pane** select **Alarms** tab and you will have all attached alarms displayed. The small bell icon indicates **Node Alarm**, while alarm without bell icon is **Alarm from Template.**



Left click on small "**+**" in a box next to alarm name and details about assigned alarm will be displayed.



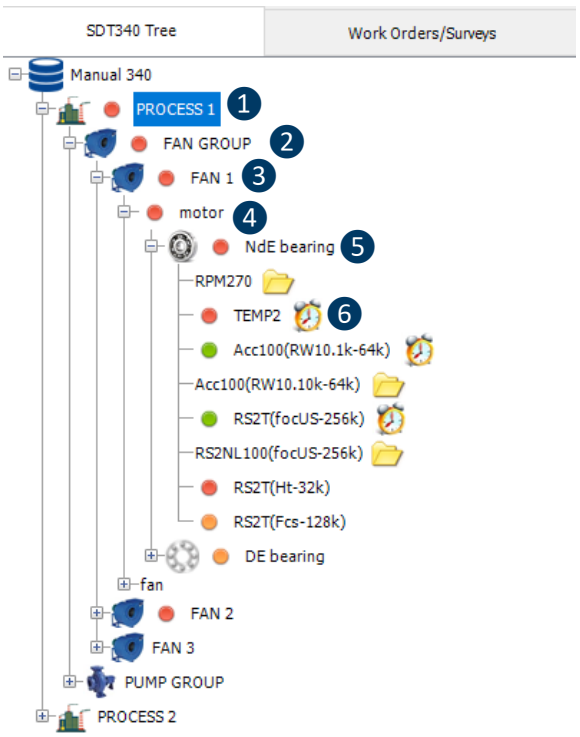
11.7. Alarm status displayed

Once an alarm is triggered by measurement outside of alarm threshold, it will be displayed in several ways and several places.

11.7.1. Alarm status displayed in Tree Structure through Traffic lights

- No traffic light – Alarm not assigned or assigned but still no measurement recorded.
- Green – Alarm assigned, but not triggered.
- Blue – Alert
- Orange – Warning
- Red – Danger

Alarms are triggered at measurement level, but they are transferred through hierarchy to each **Parent Node.** Each **Parent Node** will be assigned with the highest triggered alarm among all measurement points in all child nodes.

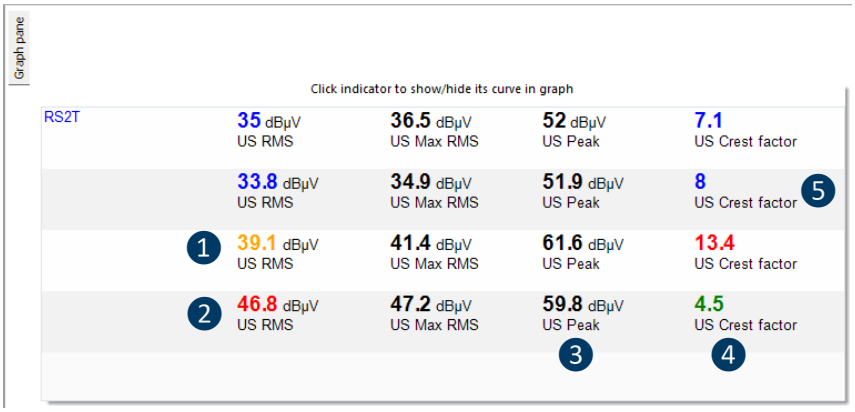


1. PROCESS 1 - **Danger** status (Child Node FAN Group is in **Danger** status)
2. FAN GROUP - **Danger** status (Child Nodes FAN1 & Fan2 in **Danger** status)
3. FAN 1 - **Danger** status (Motor is in **Danger** status)
4. Motor - **Danger** status (NdE bearing is in **Danger** status)
5. NdE bearing - **Danger** status (At least one of the measurements is in **Danger** status)
6. TEMP2 & RS2T 34k triggered **Danger** status

11.7.2. Alarm status displayed in measurement Matrix

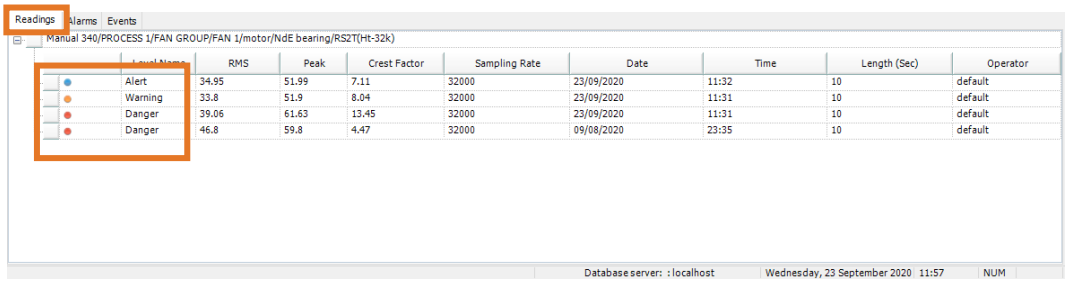
Once an alarm is triggered by measurement outside of alarm threshold range, it will also be displayed in measurement **Matrix**. Indicator triggering alarm will be displayed in color corresponding with triggered alarm level. In case as below, **Matrix** is showing four most recent readings and showing us alarm status for each indicator:

1. Alarm assigned and in **Warning** status
2. Alarm assigned and in **Danger** status
3. Alarm **NOT** assigned
4. Alarm assigned and **NOT** triggered
5. Alarm assigned and in **Alert** status



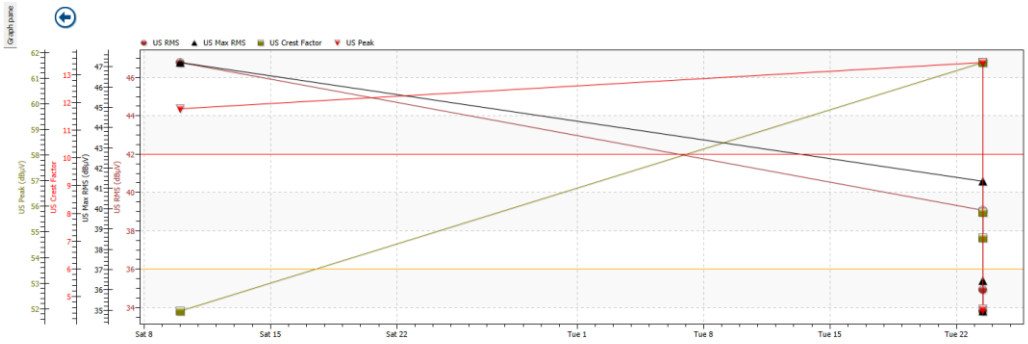
11.7.3. Alarm status displayed in Bottom Pane

When measurement is selected in **Tree Structure, Bottom Pane** displays readings details in **Readings** tab. **Traffic lights** indications represent alarm status. No matter how many indicators have assigned alarm or how many of them are triggered to any status, highest alarm level be displayed in front of the reading data, as shown below:



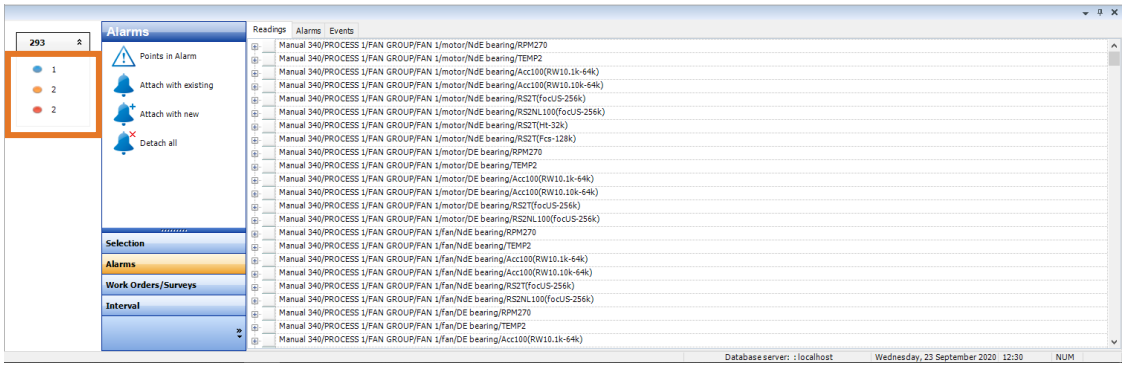
11.7.4. Alarm status displayed in Static Trend Graph

Alarm threshold levels are shown in **Static Trend Graph** as lines in color corresponding with alarm level (Red, Orange and Blue), as below:

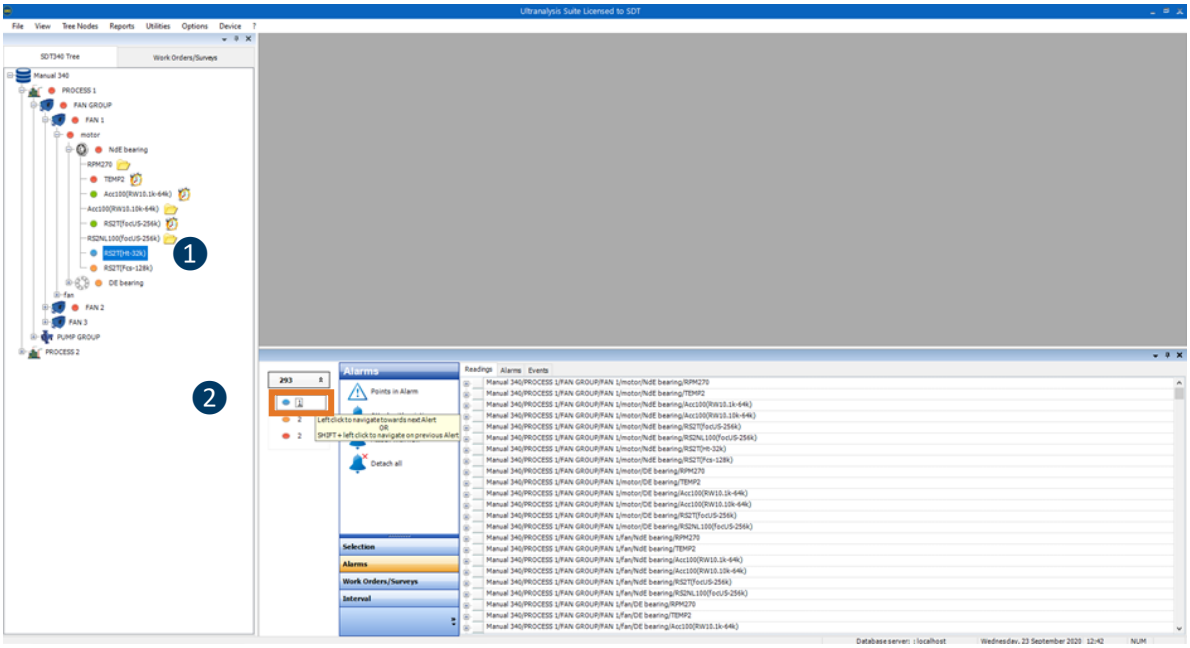


11.8. Shortcut to points in alarm

Bottom Pane toolbox contains an interactive **Traffic Lights Tool** that displays the total number of measurements in alarm for each alarm level.



Left click on alarm level and your **Tree Structure** will open the measurement in alarm, as below:



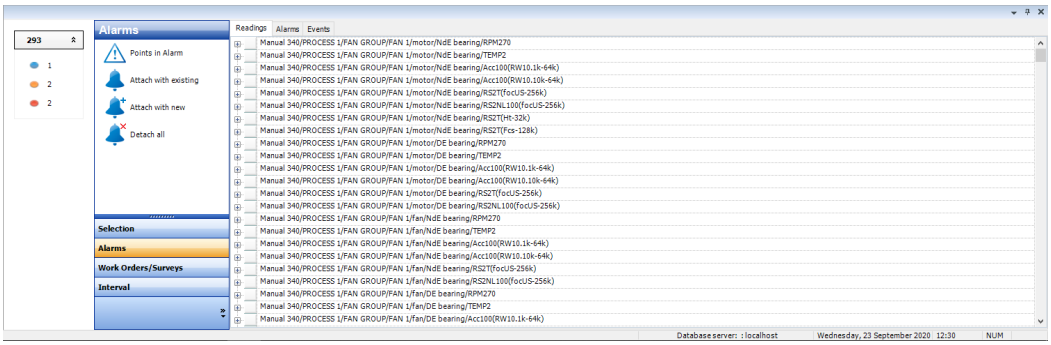
1 Point in alarm displayed

2 Left click on alarm indicator

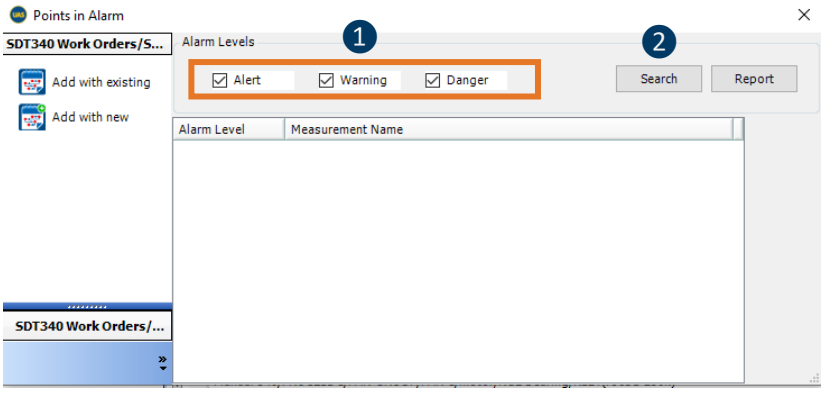
If there is more than one point in alarm at certain alarm level, every time you left click on alarm indicator, next measurement in alarm will be displayed.

11.9. Overview and action on points in alarm

In **Bottom Pane** toolbox, left click on **Alarms** and select **Points in Alarm**:



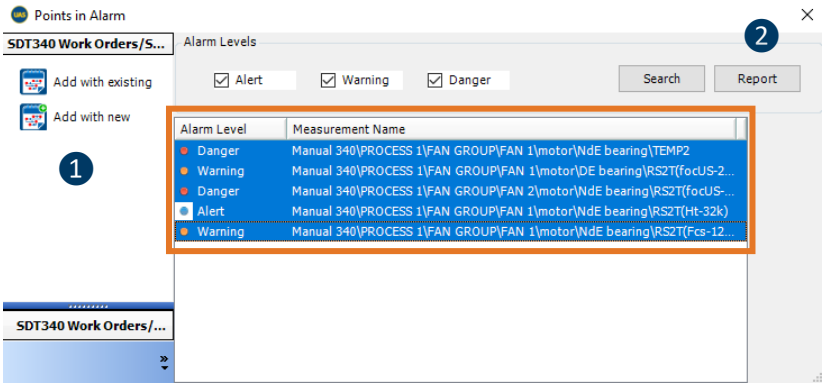
Points in Alarm window will pop up:



1 Select alarm level to search for points in alarm

2 Click on **Search**

All measurement points in selected alarm(s) will be displayed. Select measurement point(s).



1 Add selected measurement point in alarm to existing or new survey

2 Generate **Report** containing all selected **Points in Alarm**

12. Upload and download between UAS3 and your SDT Instrument

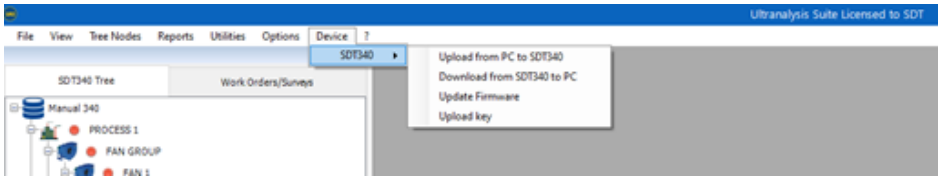
Instrument (SDT340, SDT270 or LUBExpert) functions as slave to the UAS3 software.

That practically means that Instrument receives Database, Work orders, Alarms, and all other information to work with, from UAS3. Instrument will work with what was uploaded. To make it simple and practical:

- Instrument can work with one database (Tree Structure) at the time, the one uploaded;
- UAS3 uploads one database (Tree Structure) to instrument at the time;
- Once database (Tree Structure) uploaded, it contains all information from UAS3 database;
- Uploading new database (Tree Structure) deletes existing one in the instrument;
- Instrument can "serve" several UAS3 software, always downloading data to same one.

In practical operation, when we decide to collect data, inspect or replenish grease, we will upload that database (Tree Structure) and our instrument is ready to collect data using settings defined in Tree Structure, store data in exact positions, execute work orders, react to assigned alarms.

Once instrument is connected to UAS3 via USB cable, left click on Device in top toolbar and there are several actions you can perform:



Instrument update and upgrade functions:

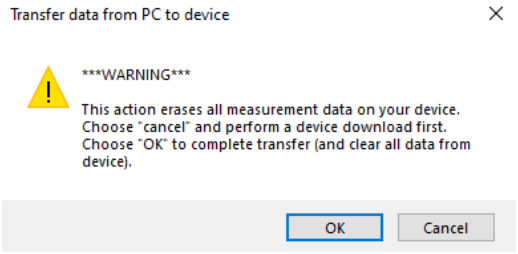
- **Upload key** – when instrument is upgraded with new functionalities, purchased key needs to be uploaded, this function enables that;
- **Update firmware** – as our users, in case of updates on instrument's firmware, you will be informed to perform update, this function enables that.

Database and collected data transfer:

- **Upload from PC to SDT340** – this function performs transfer of database (Tree Structure) from your UAS3 to your instrument. It is performed as follows:
  - Power on your instrument and connect it with you PC via USB cable;
  - Left click on **Upload from PC to SDT340** and transfer window will pop up.

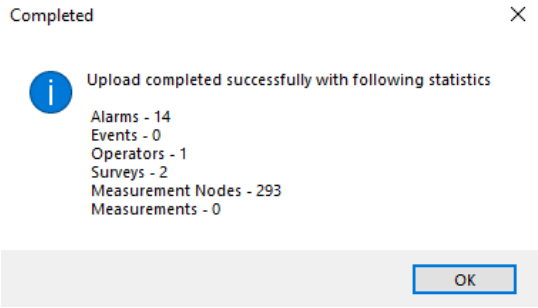
The instrument is properly connected and recognized, and you need to press **Transfer** button.

Following message will pop up every time transfer from PC to instrument is attempted:



In case you have data from previous data collection/inspection, new upload will erase it, so make sure that data from instrument is downloaded. If it is, press **Ok** and transfer will begin:

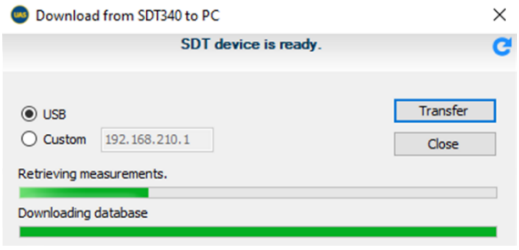
Once finished, data transfer confirmation will pop up:



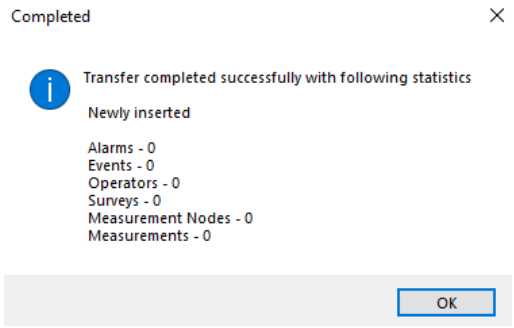
Data is transferred and you are ready for fieldwork (from the data standpoint).

- **Download from SDT340 to PC** – this function performs transfer of collected data from your instrument to UAS3. It is performed as follows:
    - Power on your instrument and connect it with you PC via USB cable;
    - Left click on **Download from SDT340 to PC** and transfer window will pop up.

The instrument is properly connected and recognized, and you need to press **Transfer** button.



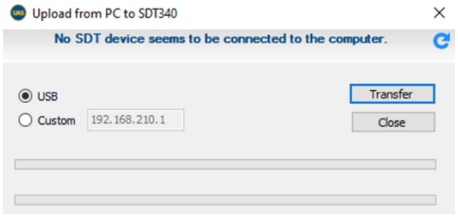
Once finished, data transfer confirmation will pop up:



Your collected data is now in UAS3, ready to be overviewed and analyzed.

NOTE!

In case following window appears:



Check if the instrument is powered on, check connection and click on refresh icon in top right corner.

Do not change database while instrument is collecting data in the field.

In case you are not downloading to same PC where it was uploaded from, and database will not be recognized, UAS3 will create Rescue Node, so you will not lose your data. Copy data from Rescue Node and paste it to the right place (using backup procedure, explained later).

13. Data overview and analysis - Top, Graph, and Bottom Pane

Once collected data is downloaded to UAS3, it should be overviewed, alarms acknowledged, analysis done if needed – data should be used for what their purpose is: better understanding of asset's condition and extracting actionable conclusions from collected data.
Task of UAS3 in that process is to display all collected data in most optimal and useful way and provide tools to work with data.

13.1. Top Pane

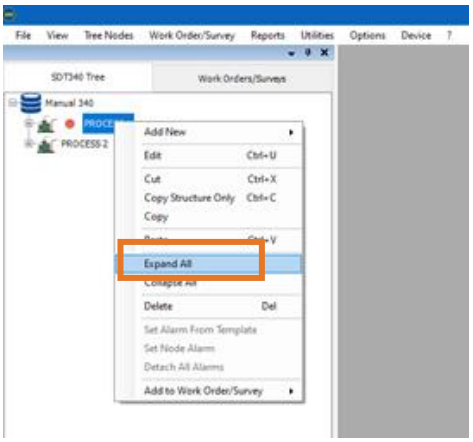
1. Instrument tab (SDT340 or SDT270/LUBExpert)
2. **Tree Structure** in collapsed state

Primary nodes displayed.

Alarm indicator active, showing **DANGER** alarm condition of at least one of the nodes within (in this case) PROCESS 1.

3. Number of measurements within selected **Node**
4. Number of measurements in alarm, shown per alarm level, interactively opening measurement (as explained in **Managing Alarms** section)

Tree Structure can be fully expanded by selecting **Expand All** and collapsed by selecting **Collapse All**. Both commands apply to selected Node only.



Selecting Nodes, opening child Nodes, or closing to Parent node can also be done using arrows on your keyboard, as follows:

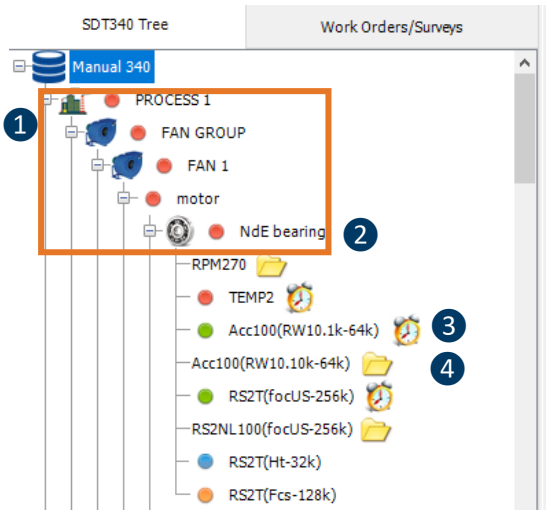
Up – moves selection up through opened items.

Down – moves selection down through opened items.

Right – opens nodes and measurements contained in selected item.

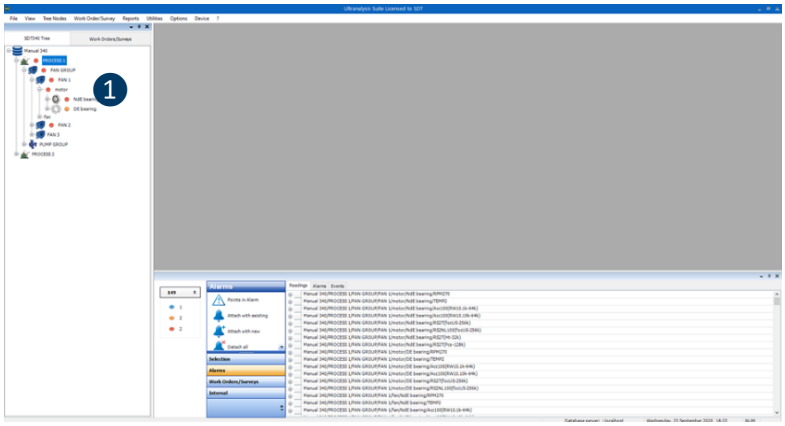
Left – closes nodes and measurements contained in selected item.

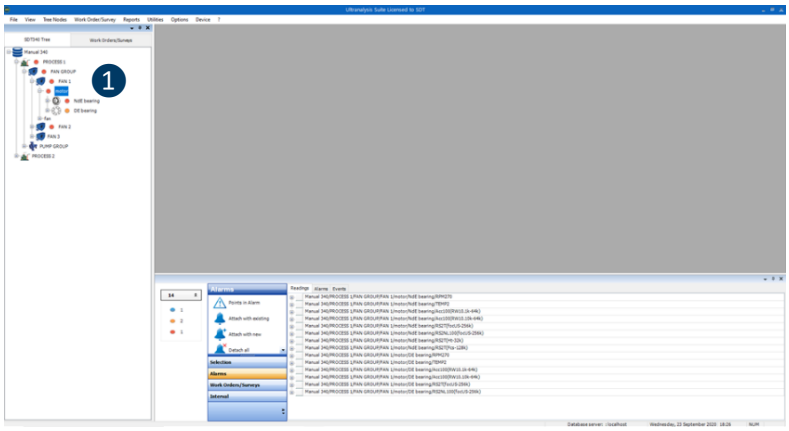
Tree Structure itself contains important additional information:



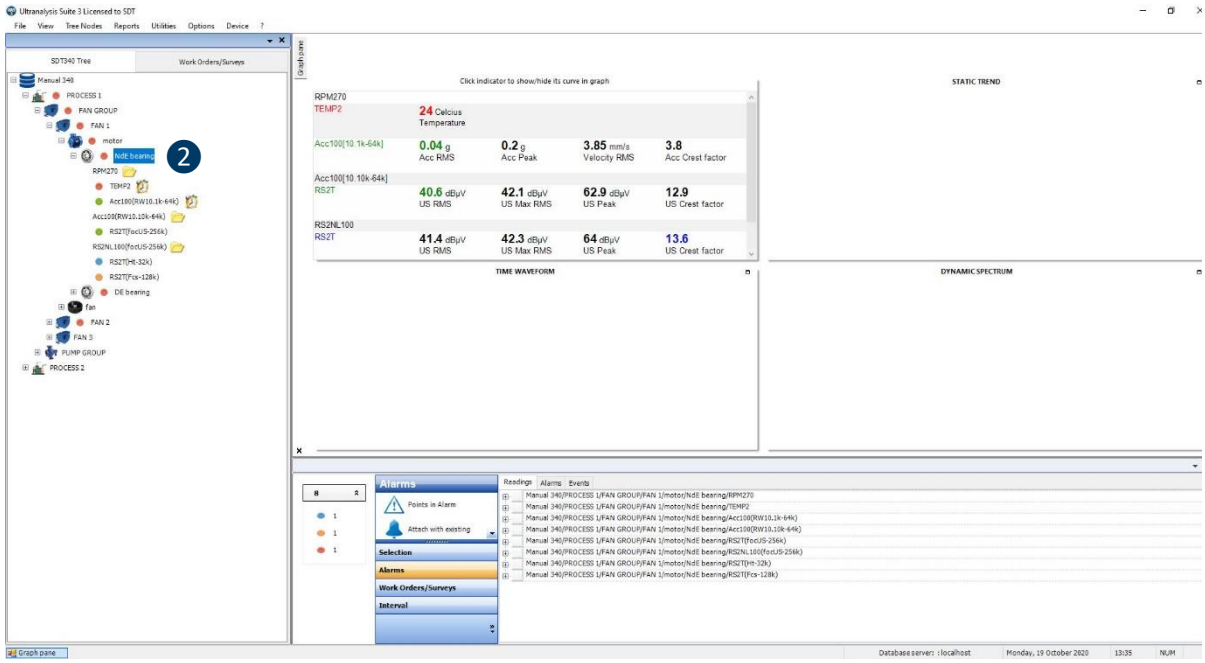
1. Alarm status of the Node
2. Alarm status of the measurement, where data triggered alarm
3. Clock icon indicating that data collection is overdue, based on assigned interval
4. Folder icon, indicating that measurement point does not contain any data

To display data for each of nodes or measurement, select it and data available for that node or measurement will be displayed in Graph Pane and Bottom Pane:





1 When Node containing other nodes, but not directly measurements is selected, Graph Pane does not display data, and Bottom Pane displays all measurements within selected Node



2 When Node containing measurements is selected, Graph Pane shows Matrix, containing most recent reading for each sensor contained, but not displaying Static Trend Graph, Time domain and Frequency domain. Bottom Pane contains all measurements in selected Node and Events displayed when Events tab is selected.

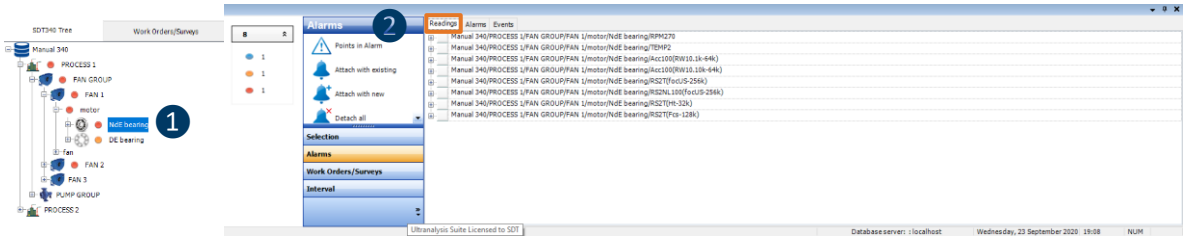
13.2. Bottom Pane

Bottom Pane contains huge amount of data related to collected data (readings), Alarms and Events.

As mentioned above, displayed data depends on selected Node level.

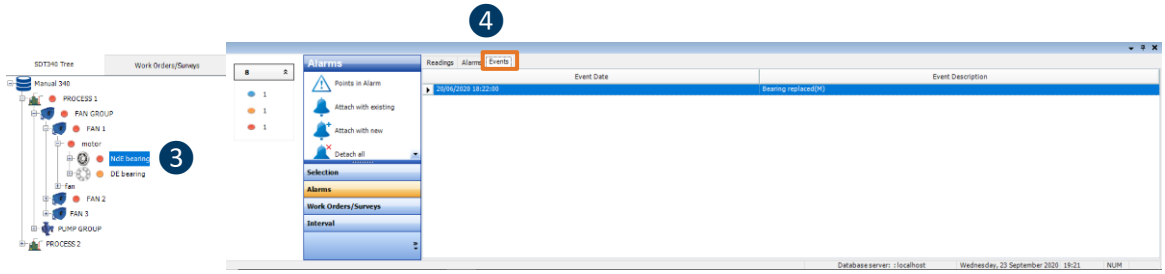
At any level higher than measurement point, **Bottom Pane** will display all measurement points selected **Node** contains and all Events assigned to selected **Node**.

13.2.1. Visualization



1 Node (not measurement) is selected

2 If Readings tab is selected, Bottom Pane displays all measurement points Node contains

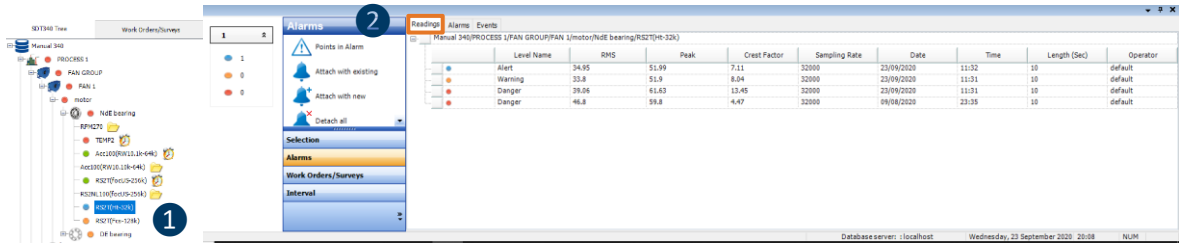


3 Node (not measurement) is selected

4 If Events tab is selected, Bottom Pane displays all Events added to selected Node. Event can be edited if right click on selected event.

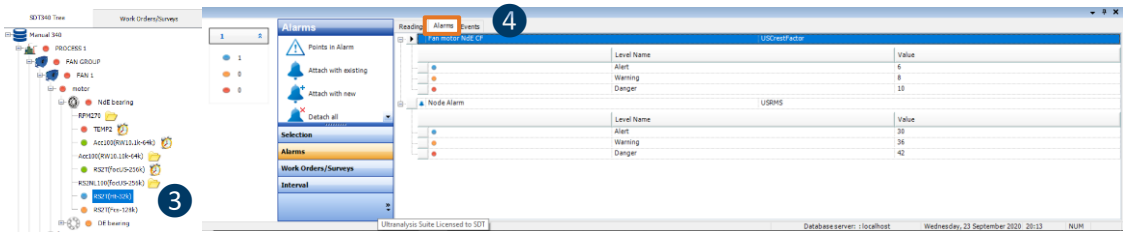
If measurement is selected, Bottom Pane displays all readings and alarms.

Events are not assigned to measurement at the sensor level, but to node (asset, component, or non-repairable item):



1 Measurement (sensor level) is selected

2 If Readings tab is selected, Bottom Pane displays all reading data for all readings unless otherwise set (most recent, in certain period)

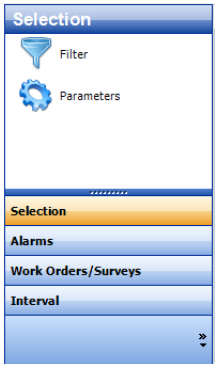


3 Measurement (sensor level) is selected

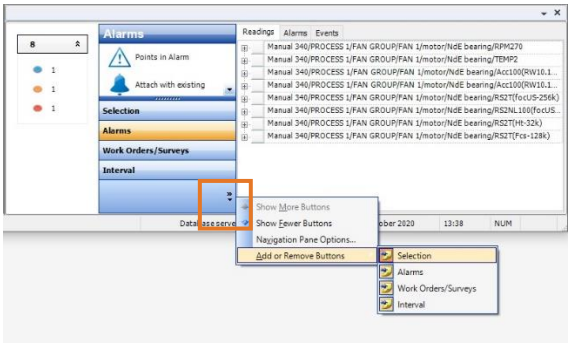
4 If Alarms tab is selected, Bottom Pane displays all alarms assigned to this measurement point, including details

13.2.2. Customizing Toolbox

Bottom pane Toolbox provides several tools to apply action on selected items in Bottom Pane. Tools display can be customized by removing or adding tools.

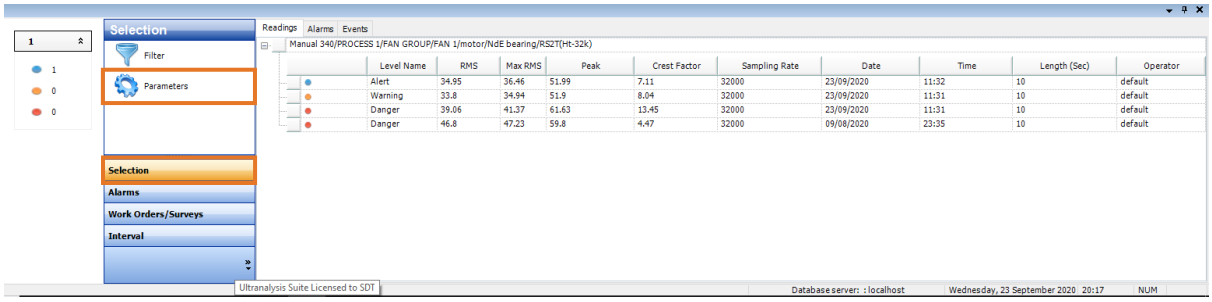


All tools displayed



Click on arrow at the bottom to hide or show tools

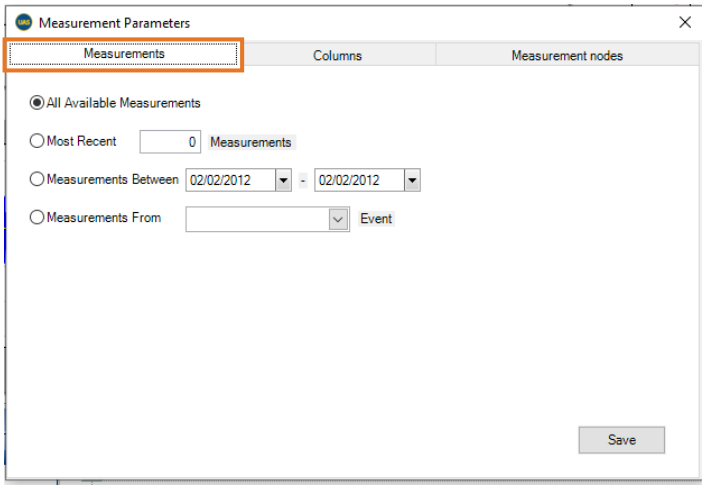
13.2.3. Toolbox - Selection – Parameters



As mentioned, if measurement (sensor level) is selected, Bottom Pane contains reading data.

Exact data to be displayed can be customized by selecting **Selection** in Bottom Pane toolbar, then selecting **Parameters.**

Measurement Parameters window will pop up.



First tab, **Measurement*s***, enables you to define measurements you want to see:

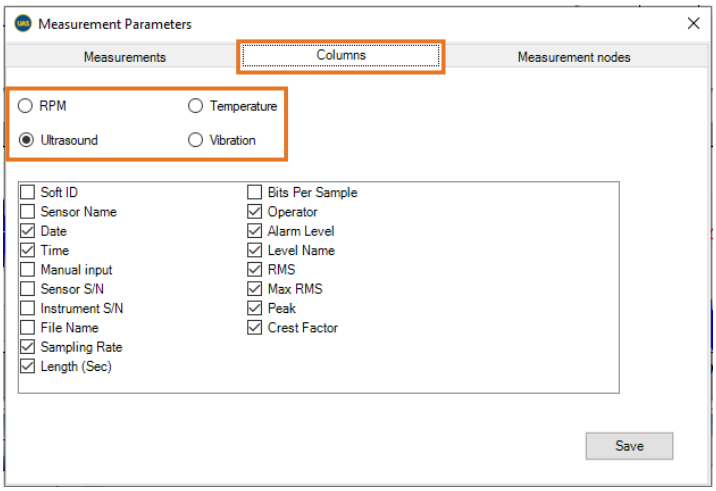
- **All Available Measurements** - all measurements will be displayed, entire history;
- **Most Recent** - allows you to enter how many most recent measurements should be displayed;

- **Measurement Between** – allows you to set date range to display measurements;
- **Measurements From** – allows you to select the event and display measurements only after that event.

The second tab, **Columns**, enables you to define data to be displayed in Bottom Pane.

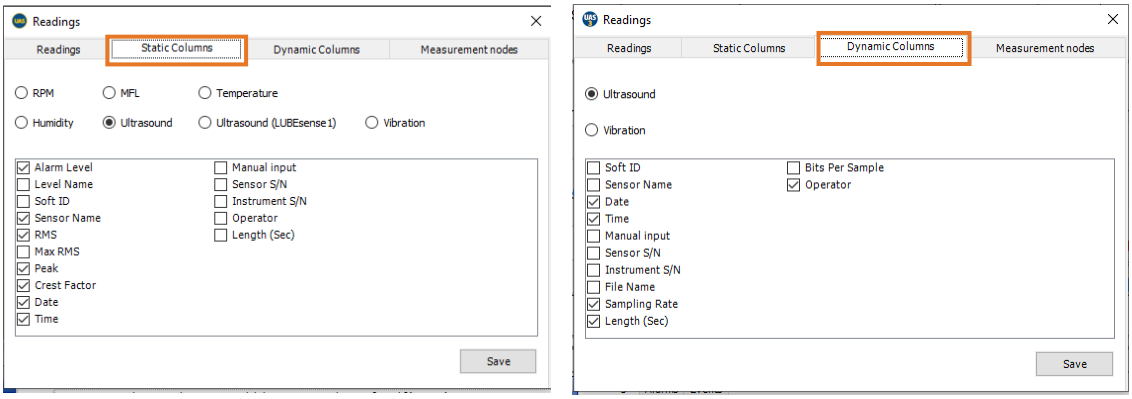
It is slightly different for SDT340, SDT270 and LUBExpert, so both will be explained.

13.2.4. SDT 340 Measurement Parameters/Columns



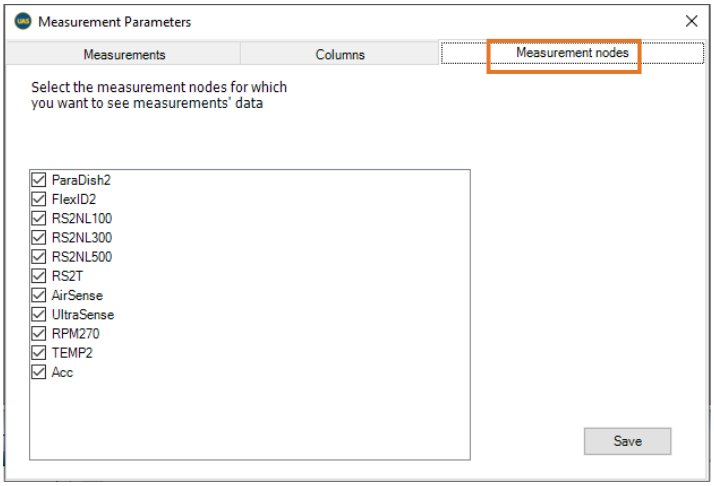
You can decide what to display different data for each sensor. Select sensor (RPM, Temperature, Ultrasound, Vibration) and check all data you want to display in the bottom pane. It is a matter of practicality and personal affinity, some users want to see all, some want to see only certain items.

13.2.5. SDT 270 Measurement Parameters/Columns

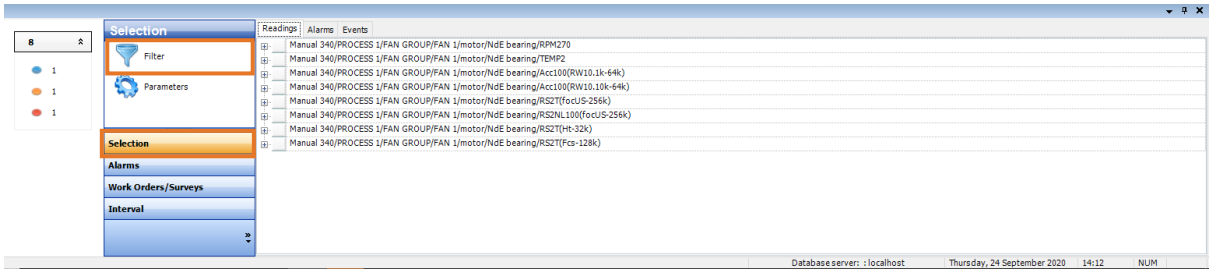


Since measurements in SDT270 and LUBExpert are separate for Dynamic and Static mode, the same applies for Columns. In both Static and Dynamic columns settings, select sensor and after that check all data you want displayed. What you see on screen as checked is just a personal affinity, you should customize it any way you find most suitable.

Third tab, **Measurements Nodes,** enables you to select measurement nodes, sensors, for which measurement data you want to be displayed.

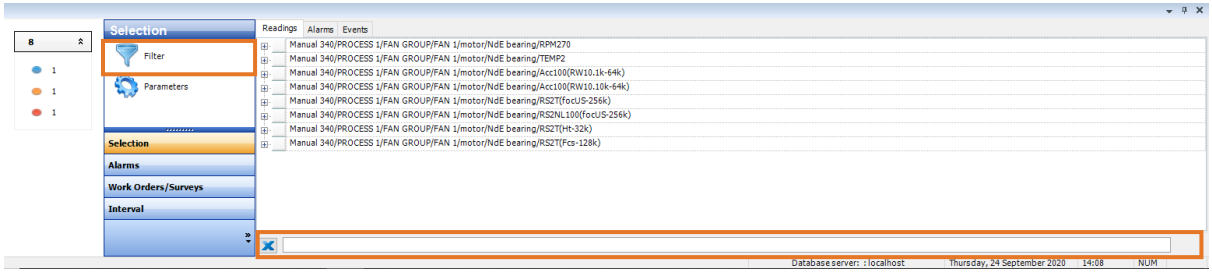


13.2.6. Toolbox - Selection – Filter



The filter function was explained before, in the section about creating a Work Order/Survey, as well as in Alarm section. Filter serves a purpose to search group of items based on certain criteria.

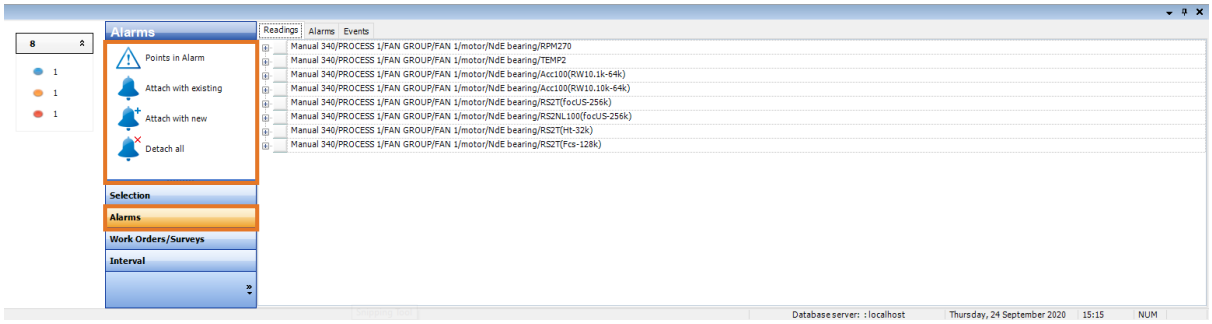
Left click on filter and filter bar will appear at the bottom of Bottom Pane, as below:



Enter criteria separated by ";" and no spacing. All items displayed in Bottom Pane will be filtered based on criteria. You can select them individually or multiple (use shift or ctrl) and you can apply other tools on selected group.

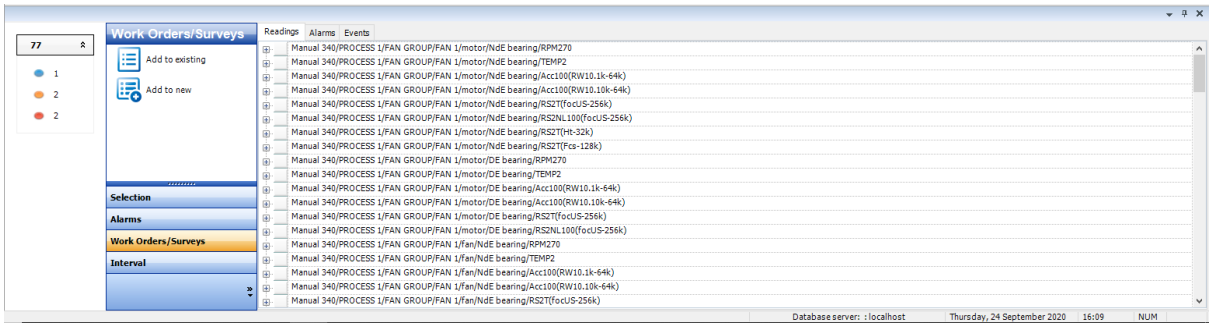
13.2.7. Toolbox – Alarms

As already explained in the section about alarms, Bottom Pane toolbox contains tools and functionalities to apply alarms on multiple items.



Please refer to **Managing Alarms** section, where functionalities are explained in detail.

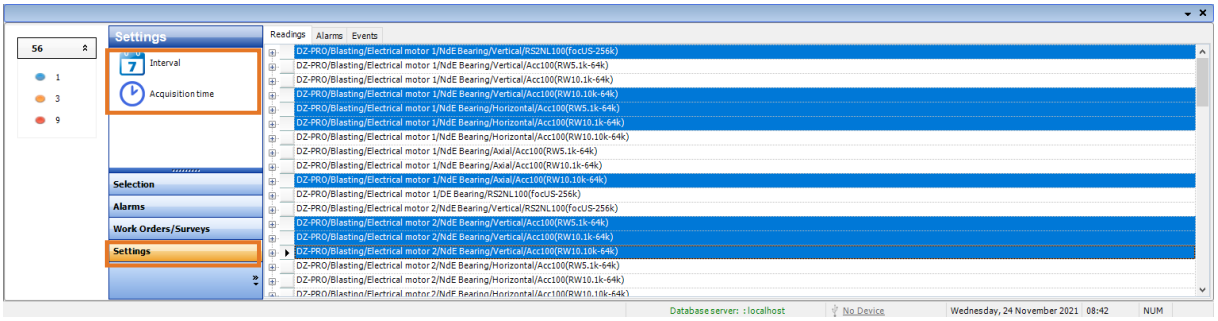
13.2.8. Toolbox – Work Orders/Surveys



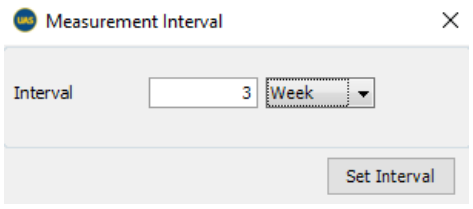
Please refer to **Add items from Bottom Pane to Work Order/Survey** section.

13.2.9. Toolbox – Interval & Acquisition time

As explained previously, setting intervals is both mandatory and very useful, enabling numerous other functions as well as making work much easier and better organized. While Interval is set in each measurement point settings individually, in Bottom Pane it can be done both for individual and multiple measurements.



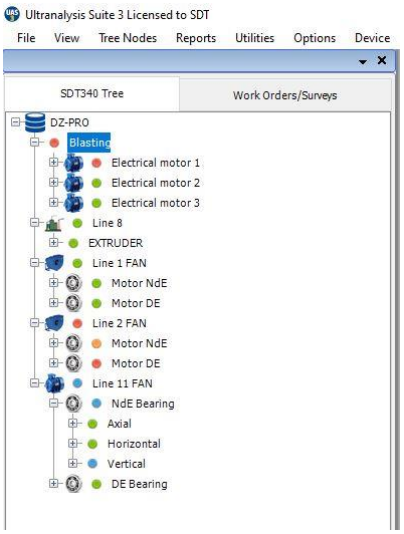
Select items in **Bottom Pane** you want to apply action to (using **Filter** or manually), left click on Interval in **Bottom Pane** toolbox and left click on **Set Interval** tool. **Measurement Interval** window will pop up, to set interval.

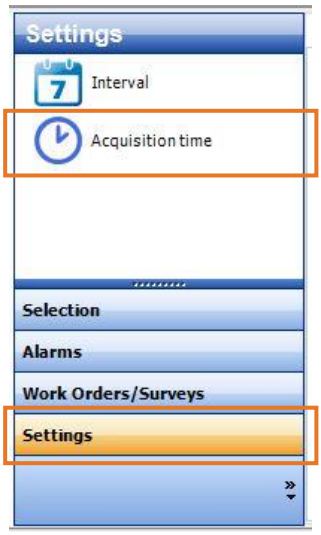


Enter time unit, enter intended interval, and click on **Set Interval**. Interval is now changed in all selected measurements.

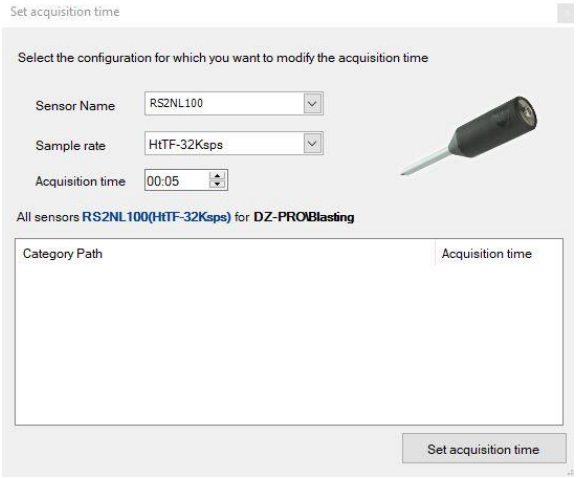
This is very useful function, and it becomes very handy in situations when data shows possible problem or deterioration on some assets, when first action needs to be to shorten the interval.

In the same menu, you can set/change acquisition time for multiple measurement points. Select a node (asset/group of assets) and select “Settings” and “Acquisition time” in the bottom toolbox.

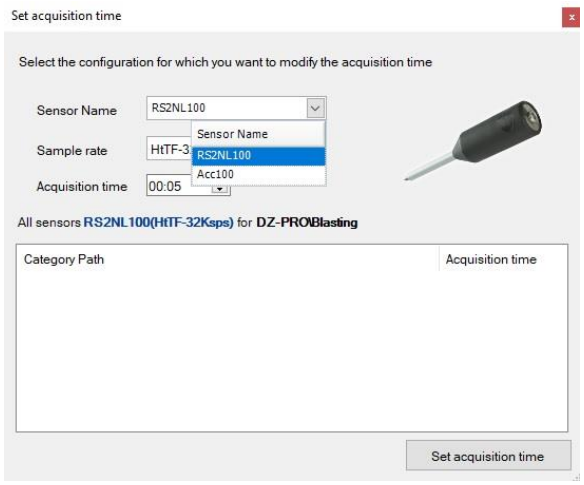


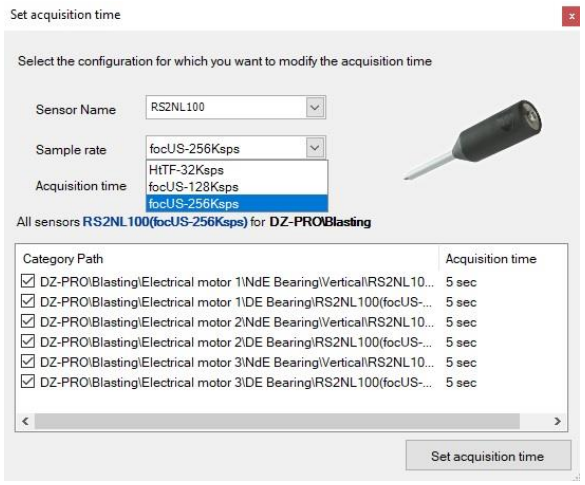


Acquisition time settings menu will pop up:

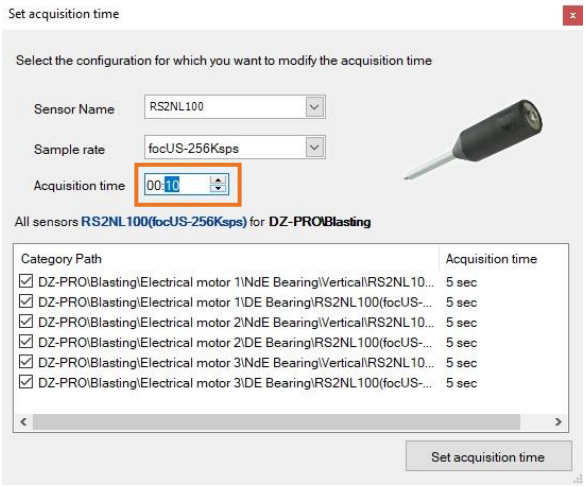


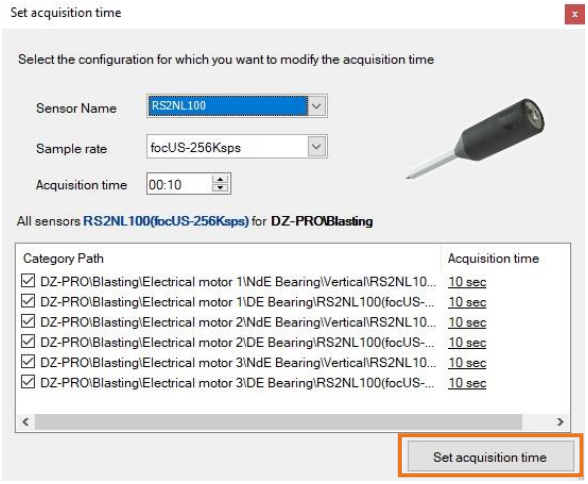
Select sensor and sampling rate to have all matching measurement settings (nodes) displayed:





All matching measurement settings will be selected automatically. If you want to change the acquisition time for just some of them, you can de-select them individually. Next, enter the new acquisition time and select the “Set acquisition time” button in the bottom right corner.



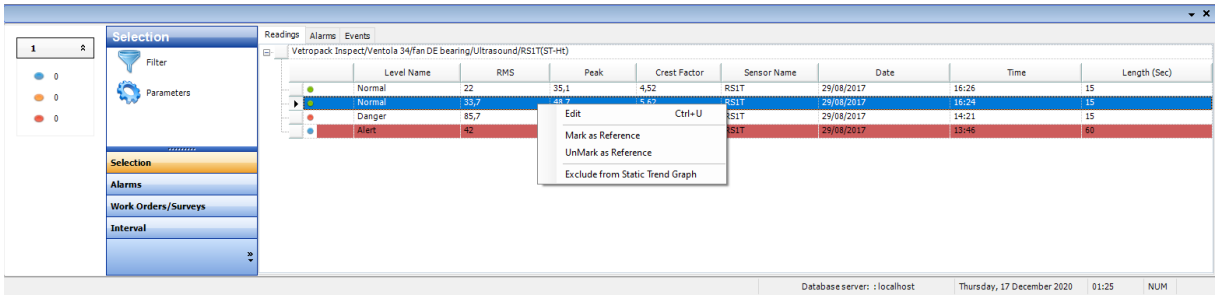


The acquisition time for all selected measurement settings is now set to new value.

13.2.10. Edit, Delete, Exclude from Trend and setting measurement as reference

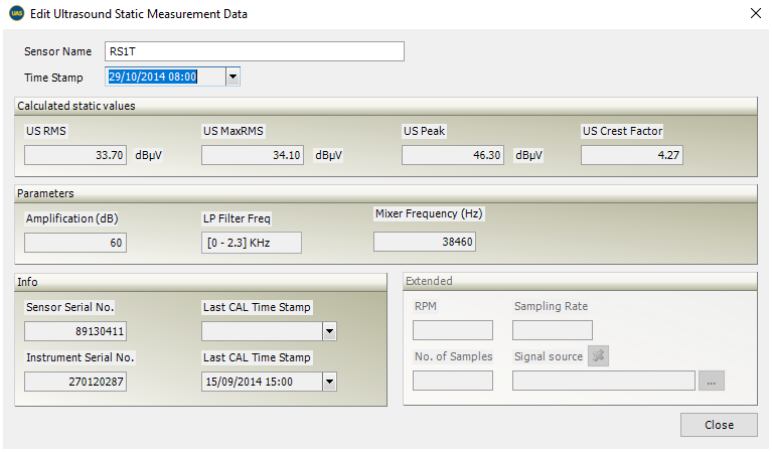
There are additional actions that can be taken in measurement itself:

- **Edit** - opens measurement details to be overviewed;
- **Mark as Reference** – sets measurement as reference, to be used in Relative Alarm settings;
- **Unmark as Reference** – cancels the reference setting;
- **Delete** – select reading and use “delete” on you keyboard;
- **Colored highlight –** warns you that highlighted measurement has different acquisition time than one in current settings;
- **Exclude from Static Trend Graph –** this allows you to hide measurement from the graph and it is particularly useful to hide measurement with different acquisition time and have a consistent trend.



Left click on measurement to select it, then right click to open available functions.

When **Edit** is selected, window with additional measurement information will pop up, as below:

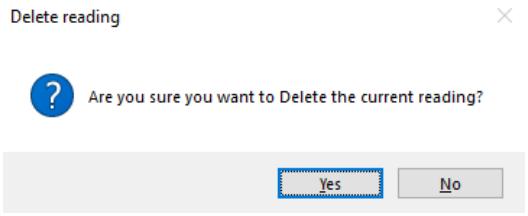


This window offers some additional information about measurement (amplification, mixer frequency, filter, calibration data ...).

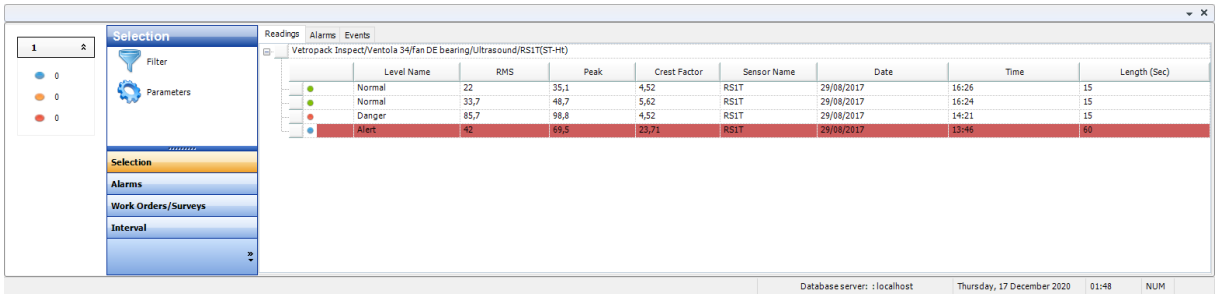
When **Mark as Reference** is selected, measurement will be marked with no further dialog.

When **Unmark as Reference** is selected, measurement will be unmarked with no further dialog.

To **Delete** measurement, left click to select the measurement and press **Delete** on your PC keyboard and confirmation will be required.

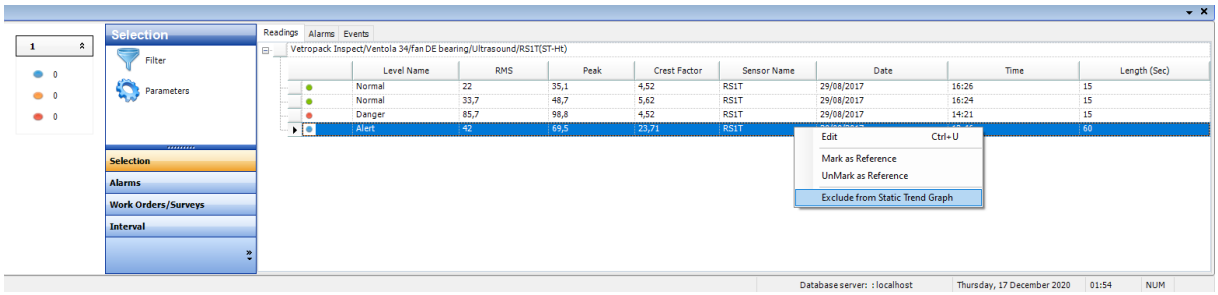


All measurements with **different acquisition time** than one set in current settings will be highlighted so you can easily spot them.

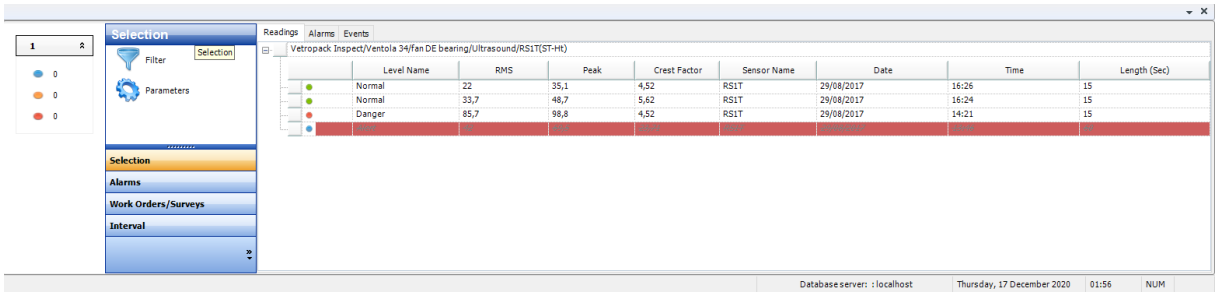


If necessary, measurements can be hidden in Static Trend Graph (not deleted). For consistency of the trend, excluding measurements with significantly different acquisition time is a good thing to do. Note that those measurements are not there as a mistake; In certain suspicious situations it is a good practice to collect longer acquisition time data.

To exclude measurement from Static Trend Graph, select the measurement, right click on it and select “Exclude from Static Trend Graph.”



Measurement will be hidden from Static Trend Graph and it will be displayed differently.



At any moment, you can include measurement back to Static Trend Graph following same process.

14. Graph Pane

Graph Pane contains Matrix with recent measurements, Static Trend Graph, Time Domain and Frequency Domain, all of them essential tools for signal understanding and signal development monitoring. All available tools are powerful help in delivering actionable conclusions and still easy and practical in daily use. Here are the details about them.

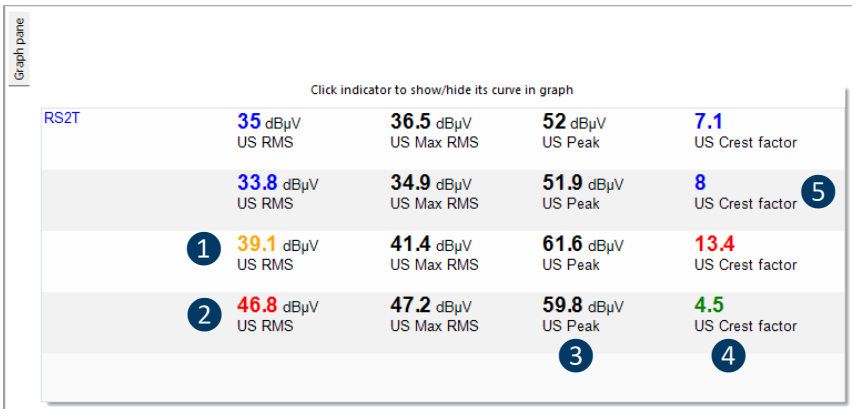
14.1. Matrix

Matrix shows four most recent readings, all four indicators (RMS, maxRMS, Peak and Crest Factor) for Ultrasound and Vibration and additionally, Added Grease quantity for LUBESense1 sensor (LUBExpert and SDT 270 with LUBExpert features).

Reading data is sorted from most recent to oldest, top to bottom.

Each Ultrasound and Vibration indicator is being displayed in color corresponding with alarm status, as in picture below:

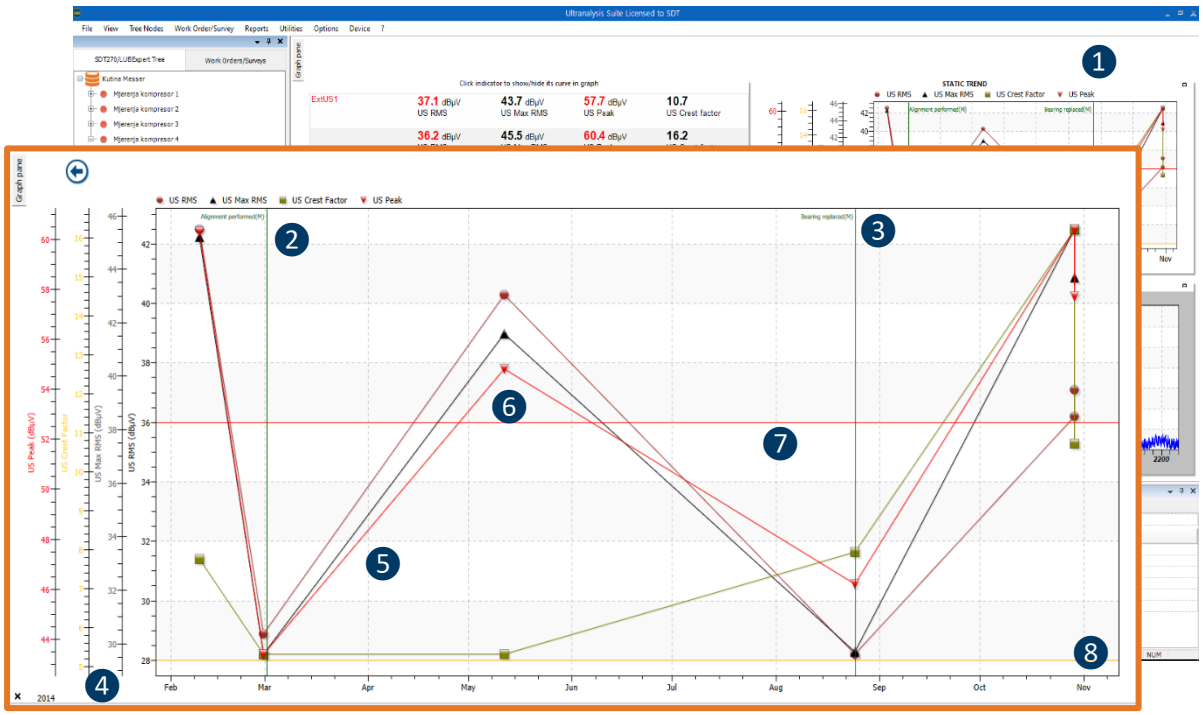
1. Alarm assigned and in **Warning** status
2. Alarm assigned and in **Danger** status
3. Alarm **NOT** assigned
4. Alarm assigned and **NOT** triggered
5. Alarm assigned and in **Alert** status



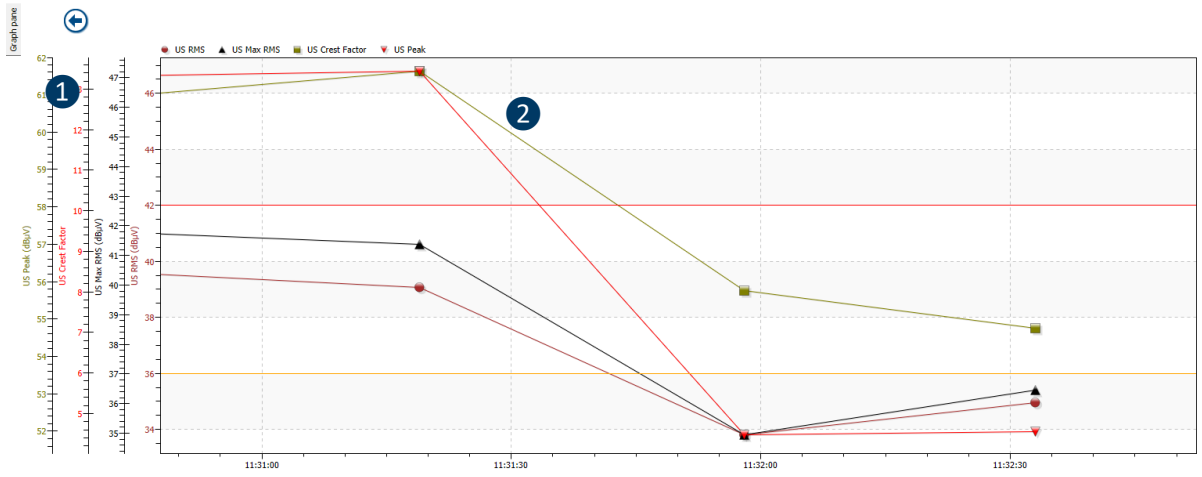
By right clicking on indicator, you hide or show it in Static Trend Graph, focusing on indicator most important for the purpose of analysis.

14.2. Static Trend Graph

Static trend graph plots reading values in respect to time they were collected. It can be understood as a plot describing behavior in time. Values being table, trending down or trending up, are essential information for understanding asset health. Static Trend Graph contains lots of information and can be easily customized. Here is an example of Static Trend Graph, so we can explain all details:



1. Click to enlarge
2. Events
3. Events
4. Y axis - amplitude for each displayed indicator, (auto scaled or Ymax defined)
5. Trend line for each indicator
6. Data points
7. Alarm level
8. X axis - time

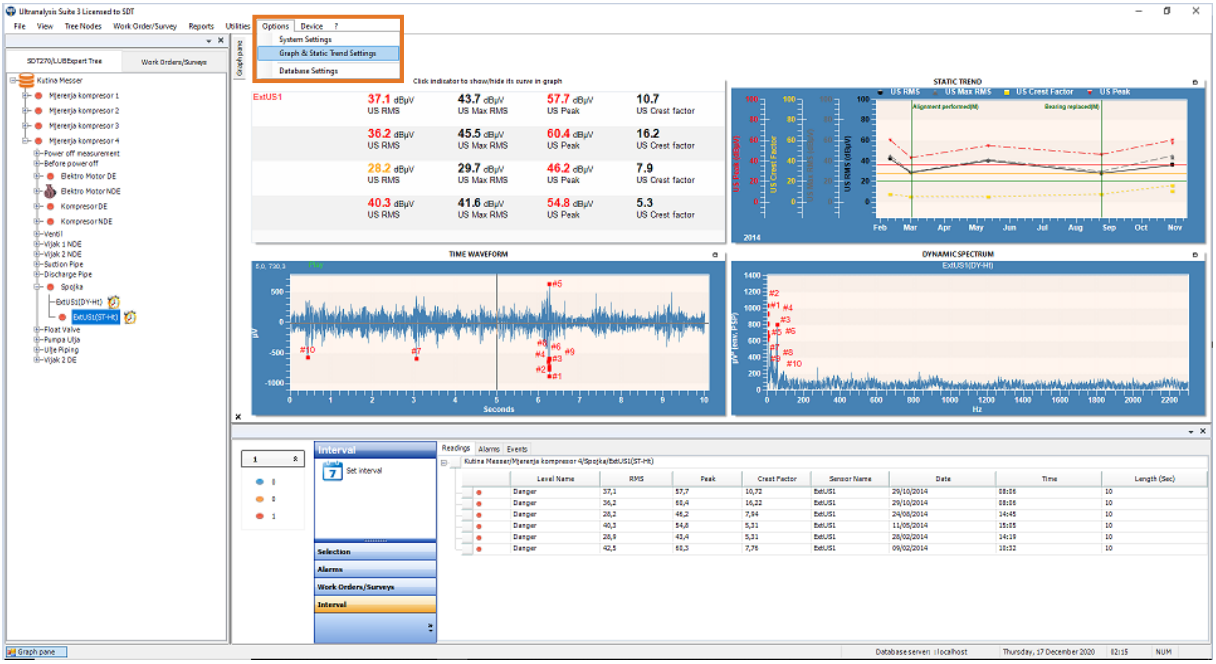


1. Font color of indicator on Y axis
2. Corresponds with trend line of that indicator

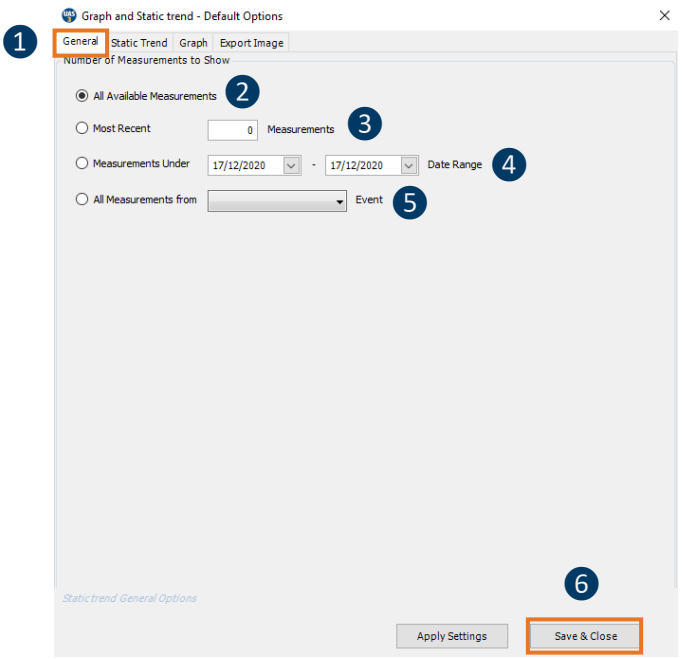
You can customize your Graphs.

14.2.1. Define reading data to display

Left click on Options and then Graph & Static Trend settings in top toolbar, as shown in picture below:



Graph & Static trend – Default Options window will pop up:



1. Select tab General
2. All available data will be displayed
3. Most recent X readings will be displayed
4. Only readings in defined date range will be displayed
5. Only readings since selected interval will be displayed
6. Confirm settings

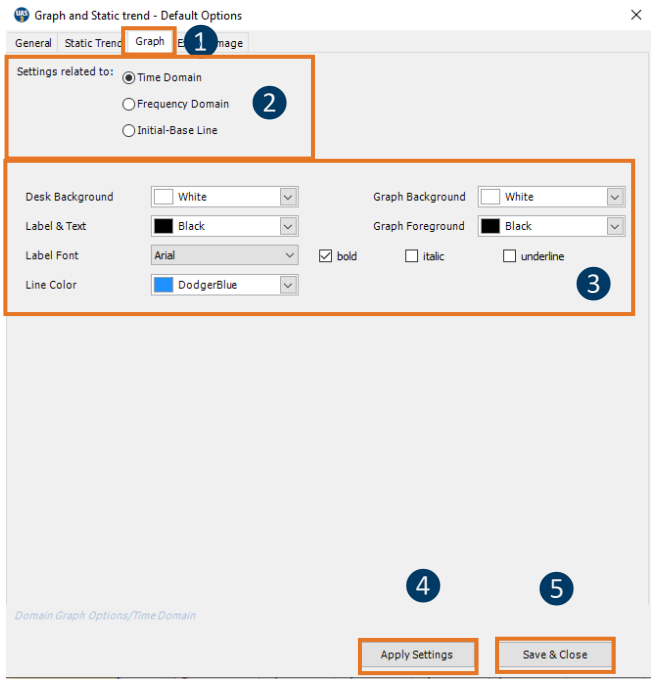
14.2.2. Define Static Trend visual & Y scale settings

Left click on Options and then Graph & Static Trend settings in top toolbar and Graph & Static trend – Default Options window will pop up.

1. Select Static Trend tab
2. Select readings type (Ut, Vib, TEMp …)
3. Select color scheme
4. Select color for each indicator
5. Define Y scale
   - If left unchecked, Y axis will auto scale
   - If checked, max Y value needs to be defined and scale will be displayed from -15 to "defined value" dBµV
6. Apply selected settings
7. Save settings and close the menu

14.2.3. Define basic visuals of Time Domain, Frequency Domain and Initial-Base Line graph

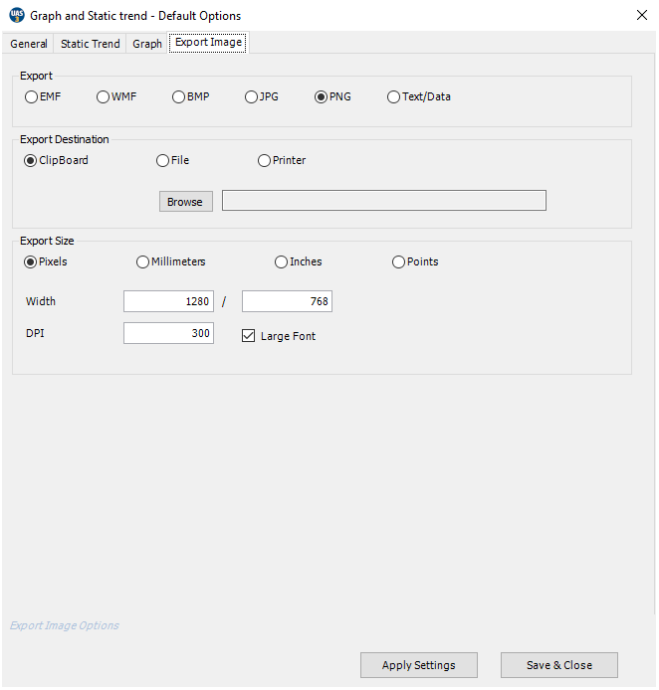
This menu allows you to set up a visual for each of mentioned graphs:



1. Select Graph tab
2. Select type of the graph you want to apply settings to
3. Select color scheme
4. Apply selected settings
5. Save settings and close the menu

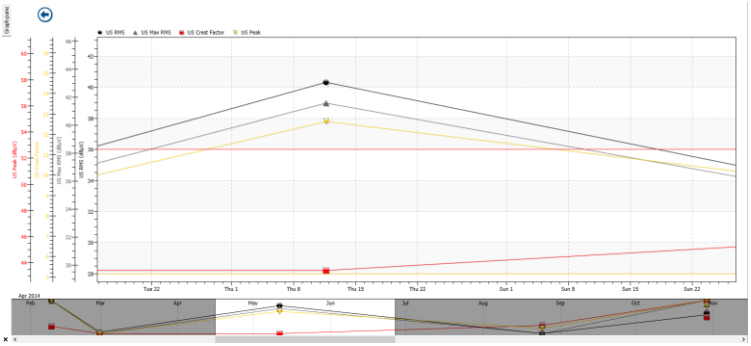
14.2.4. Define preferred settings for image export (Graph export)

This menu allows you to save your preferred setting for image export. Once you select exporting image, those settings will be offered as default, but you can still change them in export menu

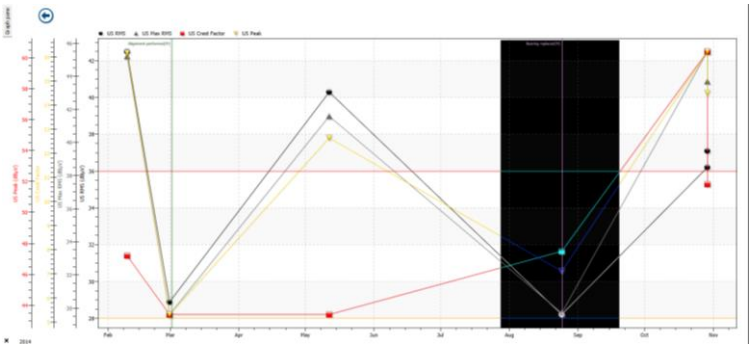


14.2.5. Zoom

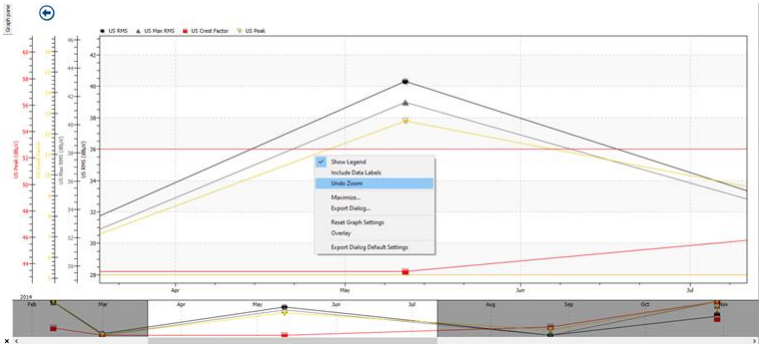
Place mouse pointer in graph and scroll mouse wheel to zoom in and zoom out. Zoom bar at the bottom of the graph shows you where the part of the graph you are looking at is positioned in entire graph. Hold the non shaded part and move it left and right to dee other parts of the graph.



Another way to zoom in is to hold a left click on your mouse and drag to form a rectangle. Selected areas will be displayed. To zoom out, use the mouse wheel.

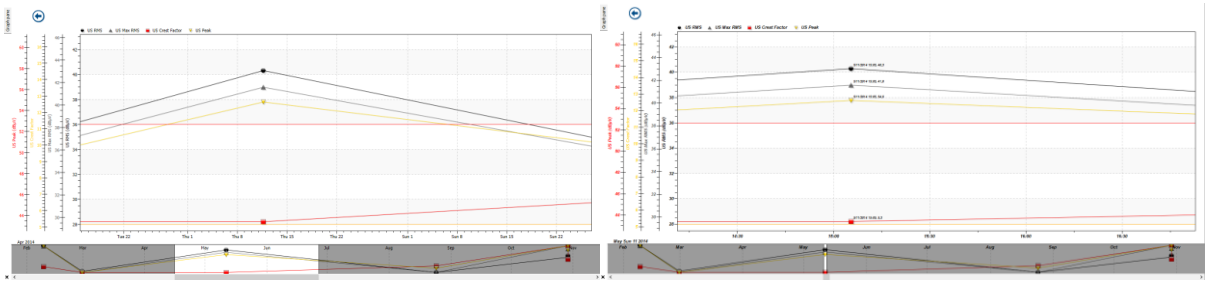


To undo zoom and go back to original full view, right click within the graph area, and choose **Undo Zoom** function, as below:



14.2.6. Show/Hide Labels

Labels containing date, time, and value for each datapoint can be shown or hidden. Right click anywhere within the graph area and select **Include Data Labels**.

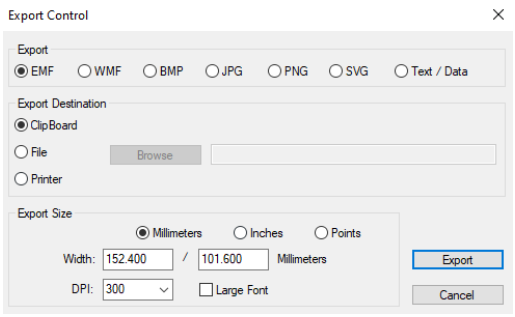


14.2.7. Maximize

Right click anywhere in the graph area and select **Maximize**; graph will be displayed full screen. To exit full screen, press ***esc*** or click in top left corner of the graph.

14.2.8. Export graph

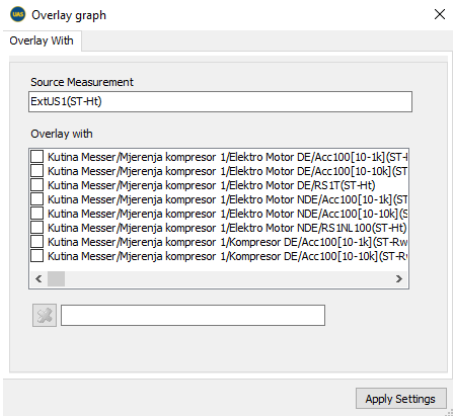
Right click anywhere in the graph area and select **Export Dialog; Export Control** window will pop up. Choose your settings and export graph.



14.2.9. Overlay Graph

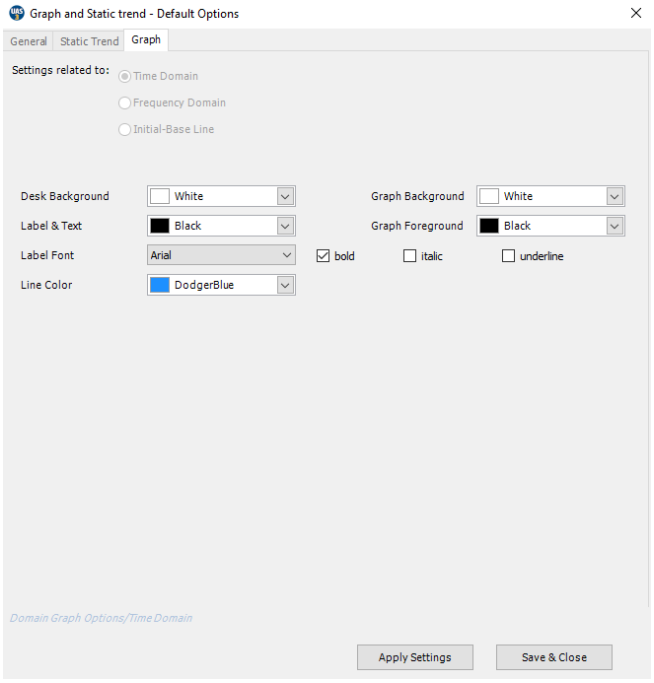
Right click anywhere in the graph area and select **Overlay**; Overlay Graph window will pop up.

Choose the measurement point you want to overlay with current graph, choose indicators to show and confirm settings. To cancel overlay, follow the same path and uncheck selected overlay measurement points.



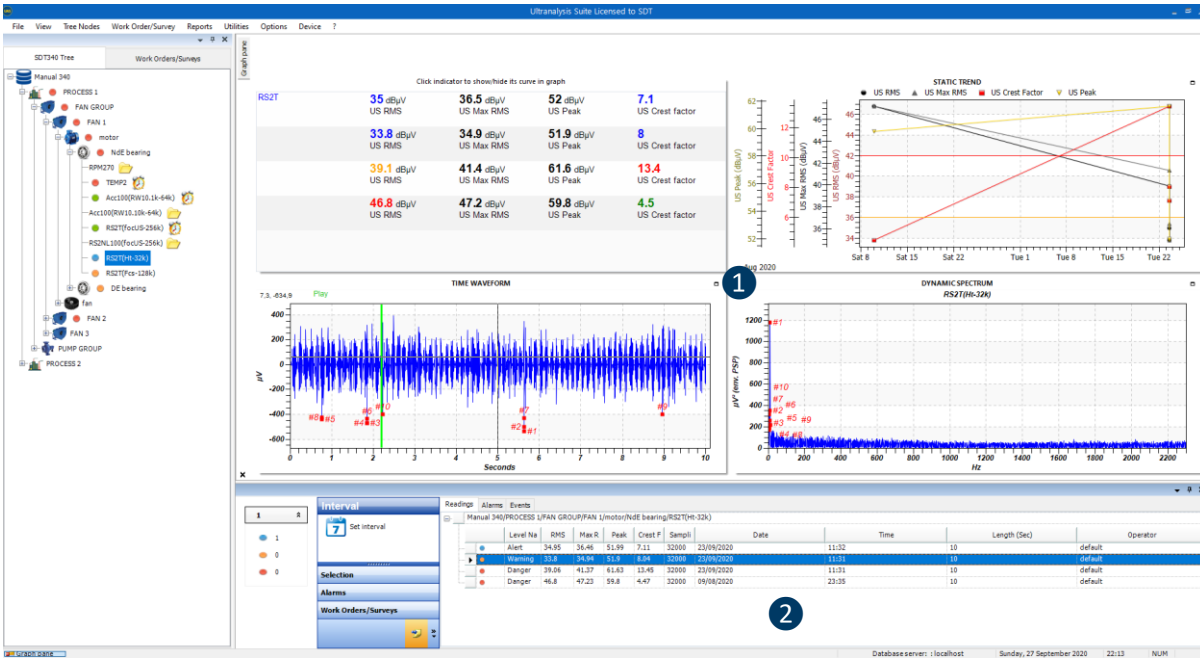
14.2.10. Accessing settings menu directly from graph

Left double click within the graph, and you will access settings menu directly. When settings assessed directly from the graph, it is locked to that graph type. That means that change is possible for that type only. Same shortcut is available for following graph types: Time Domain, Frequency Domain, Static Trend and Initial-Base line in case of Lubrication.



14.3. Time Domain Graph

Time Wave Form is fundamental way of representing an event collected through Dynamic measurement. It plots amplitude in time, thus giving us a clear view on what happened and when. Select the measurement you want to see and click on enlarge.



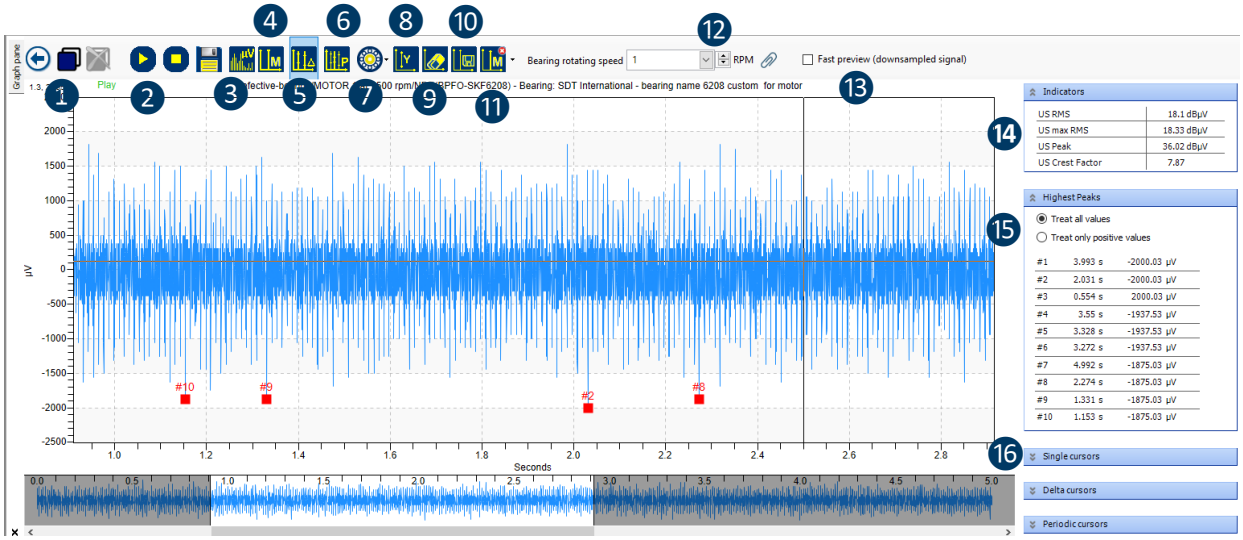
1 Click to enlarge

2 Select measurement

Time Domain window will be enlarged, and all-Time Domain tools will be displayed and active. Users can zoom in and out by using the scroll wheel of the mouse.

Some of the buttons available in the tool bar are not necessarily common to all sensors.

SDT strongly encourages user to maintain the software up to date to get the most advanced features.



1 Add/remove the current chart (including comments and cursors) for reports

2 Play back/stop audio signal (heterodyned or vibration). Export signal in standard format .wav (16 bits). Note that signals acquired in focus mode are not audible/heterodyned.

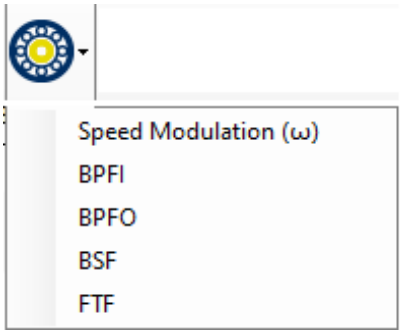
3 Switch to frequency domain

4 Add single cursor with comment

5 Add delta cursor

6 Add periodic cursor (slide by clicking P1, rescale by clicking any other cursors)

7 Add predefined time cursors depending on the selected bearing given in measurement settings



8 Set Y scale

9 Hide portion of the signal

10 Save cursors/current analysis/rotating speed

11 Remove cursors

12 Adjust the bearing rotating speed (reference rotating speed defined in measurement settings by default. User can also link this field with an existing measurement node in RPM that can be manually edited. UAS3 will retrieve the 3 nearest acquired values around the current measurement).

13 Fast preview (reduce the number of samples displayed in the graph)

14 Indicators

15 List of the 10 highest peaks in signal

16 Cursors details

14.3.1. Play Audio

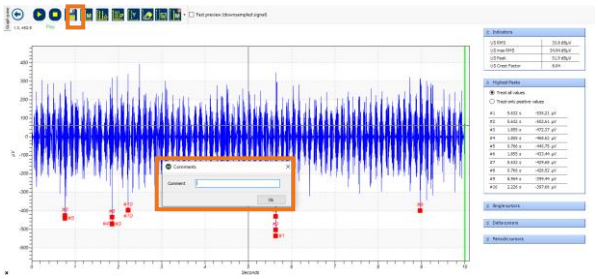
Left click on **Play/ Stop** to play-back audio signals. The green line will visually indicate progress, so you can connect what you hear and what you see in the signal.

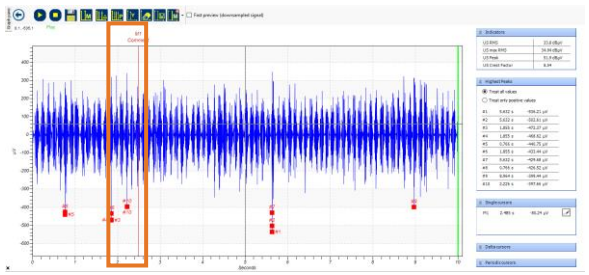
14.3.2. Export Wav File

Left click on save icon and export wav file/audio of selected reading.

14.3.3. Add Single Cursor/Comment

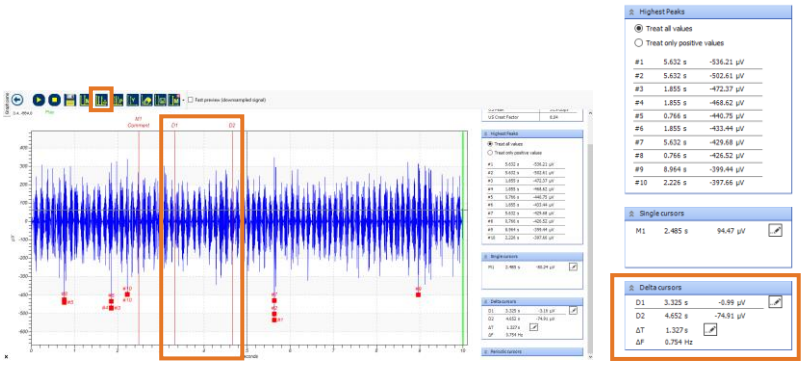
Left click on indicated tool, and Comment window will pop up, add comment, and left click in signal area to add comment. Move comment to other position, if necessary, by holding left click, moving it to new position and release.





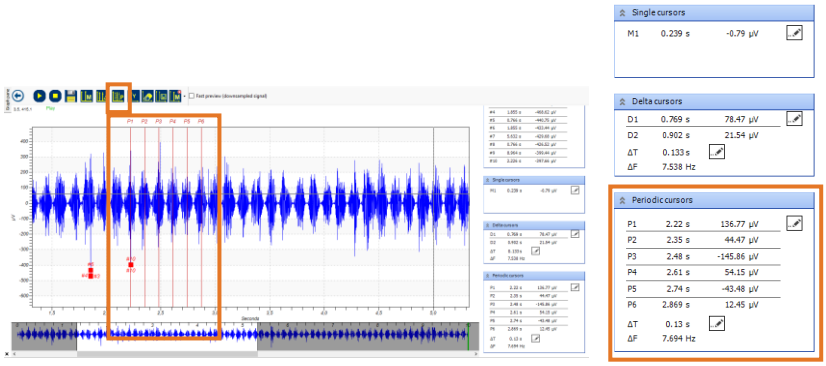
14.3.4. Add Delta Cursor

Left click on indicated tool, then left click in signal area to place the cursor. Move **D1** (lead cursor) to needed position and move **D2** to define Δ. In a signal descriptor on the right side, cursor details will be displayed; position in time, amplitude, Δt (time) and corresponding Δf (frequency)



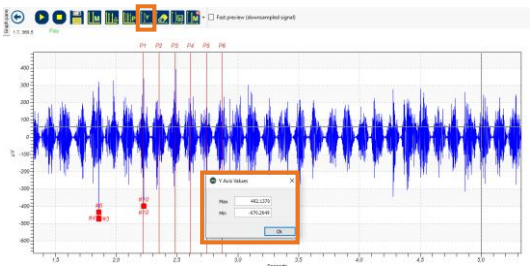
14.3.5. Add Periodic Cursor

Left click on indicated tool, then left click in signal area to place the cursor. Left click and hold on **P1** to move it to needed position, then left click and hold any of other cursors **(P2-P6)** to adjust the Δt. Alternatively, set both **P1** position and Δt in cursor details on the right side. Cursor details display; position in time, amplitude, Δt (time) and corresponding Δf (frequency).



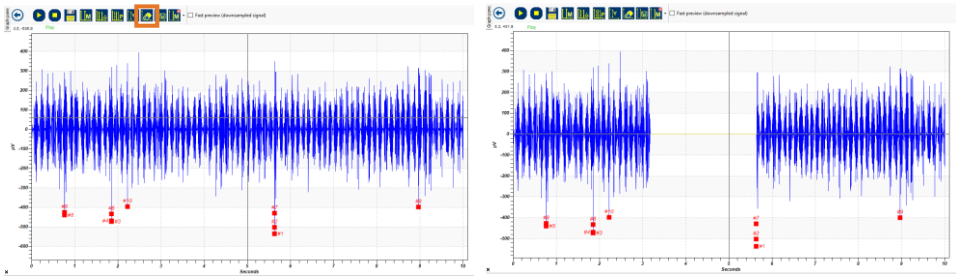
14.3.6. Set Y Scale

This tool allows you to set **Y scale**, for purpose of comparison or overlaying graphs. Left click on indicated tool, and **Y Axis Values** window will pop up. Set Y scale and confirm by pressing **Ok**.



14.3.7. Delete Portion of the Signal

This function enables you to temporarily delete the portion of the signal (by delete, meaning is that selected portion is set to amplitude zero), for the purpose of analysis. Indicators will automatically be recalculated based on new TWF values. Zoom on portion of the signal you want to delete and press on indicated tool. Note, deleted portion of the signal will be exactly that on the screen. By selecting any other measurement and coming back to the processed signal, delete action will be reverted.



14.3.8. Save Cursors

This function allows you to save cursors you have set in TWF.

14.3.9. Remove Cursors

This function allows you to remove individual cursor (click on small arrow on right side of the tool), or all cursors.

14.3.10. Indicators for Selected Signal (TWF)

This window displays indicators (RMS, max RMS, Peak and Crest Factor) for selected TWF.

14.3.11. List of highest Peaks in Signal

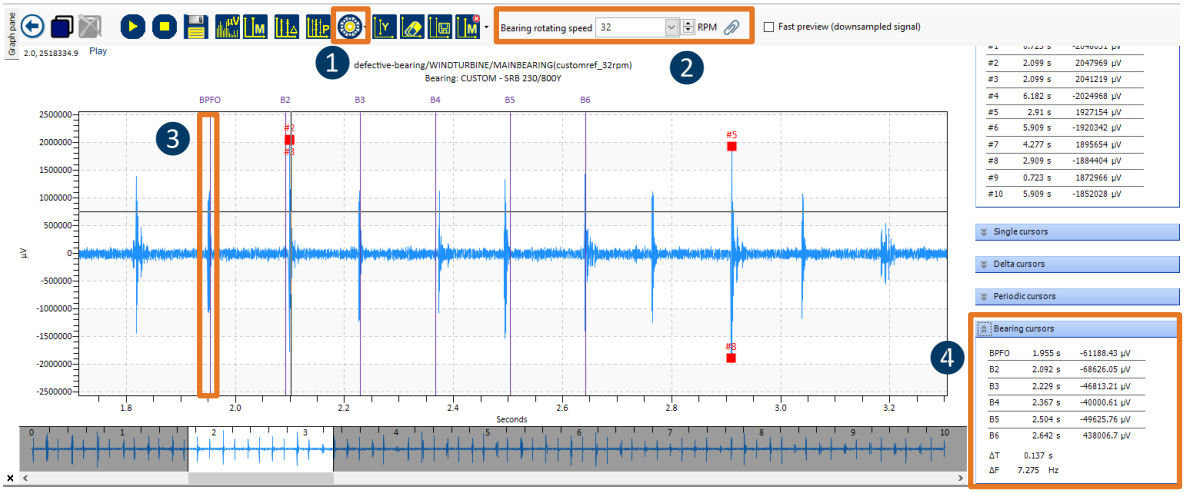
This window displays 10 highest Peaks in selected TWF, in descending order. You can choose to display all values or only positive values.

14.3.12. Cursors for bearing analysis

This button displays the periodicity associated with the bearing defects (BPFO, BPFI, BSF, FTF or in speed), at a given rotating speed, in selected TWF.

The example below summarizes step-by-step, the manipulations confirming a BPFO at 32 rpm, on a custom bearing reference.

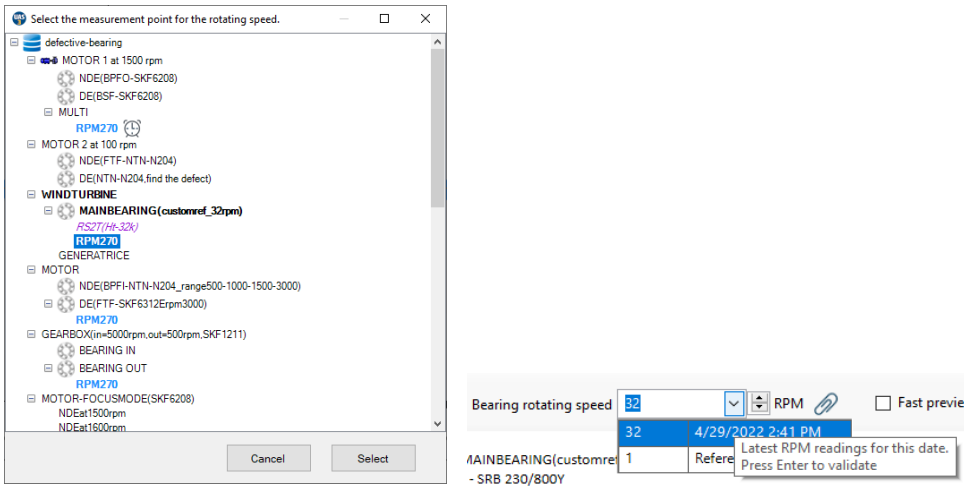
The custom bearing reference as well as the reference rotating speed have been defined first in the measurement node to historicize the acquired data.



1 Select one possible defect based on the bearing reference defined in measurement settings

2 Define or adjust the rotating speed. If defined with available readings taken on dates corresponding to the current measurements, user can retrieve the rotating speed from an existing measurement node, by clicking on .

A new window showing the tree structure will pop-up, in which **the current measurement node**, the **current measurement setting,** and the existing measurement settings dedicated to rotating speed acquisitions **RPM270** are displayed in color.



Once the appropriate RPM270 is selected, apply the change by clicking on the drop menu of Bearing rotating speed, select the new entry, that is identified with the time format. Click the save button on the chart to maintain these settings.

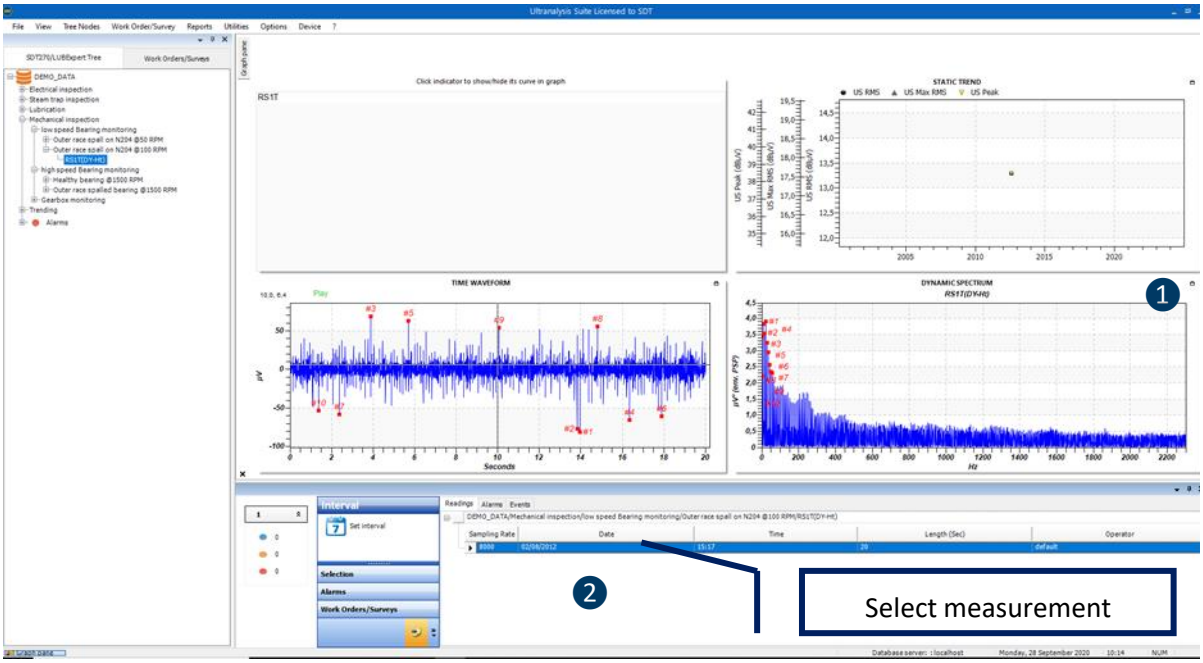
3 Click on one impact in the TWF to display the bearing periodic cursor associated with the theoretical defect

4 Check if the selected defect is periodically confirmed (in this case BPFO). The coordinates of each periodic cursors are summarized in table “Bearing cursors”.

Note Prefer this approach for slow speed applications from which the periodic impacts can be more easily identified in the TWF.

14.4. Frequency Domain Graph

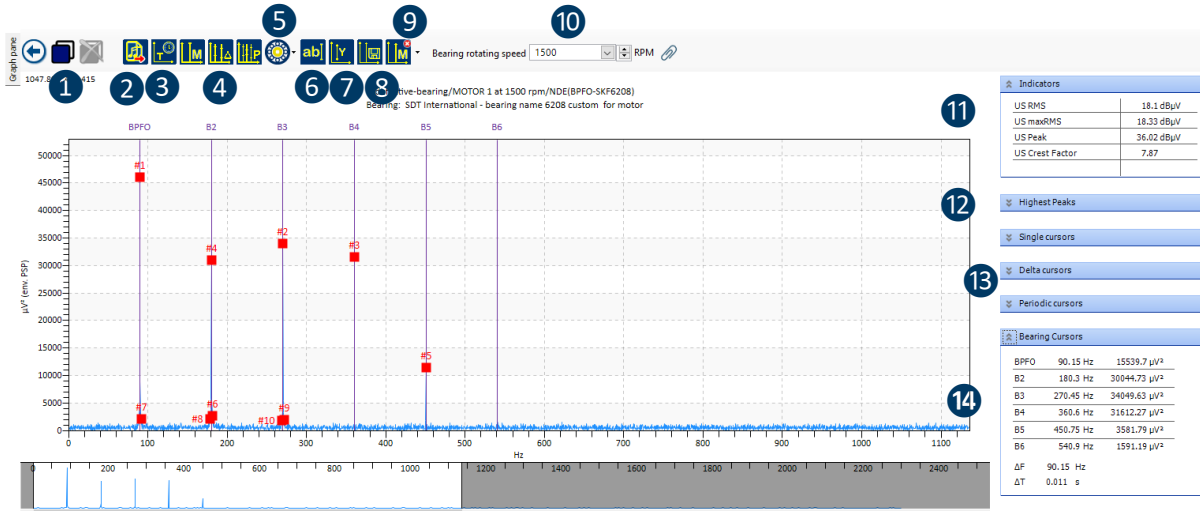
The Frequency Domain Graph of Dynamic Measurement displays how much of the Dynamic Measurement lies within each given frequency band over a range of frequencies. Select the measurement you want to see and click on enlarge or switch from TWF to the frequency domain by clicking on .



1 Click to enlarge

2 Select measurement

Frequency domain window will be enlarged, and the compatible tools will be displayed in the top bar menu:



1 Add/remove the current chart (including comments and cursors) for reports

2 Export TWF signal in standard format .wav (16 bits). Note that signals acquired in focus mode are not audible/heterodyned.

3 Switch to time domain

4 Add custom single/delta/harmonic cursors

5 Add a predefined defect cursor (if compatible settings) linked to the bearing reference defined in measurement settings

6 Add a comment at specific coordinate

7 Set Y axis

8. Save cursors and comments
9. Remove cursors
10. Adjust the rotating speed by clicking on

Users can also correlate this field with an existing measurement node in RPM. By clicking on , as described above, UAS3 will retrieve the 3 nearest acquired speed values from the selected measurement setting of type RPM270.

11. Indicators
12. List of the 10 highest spectral amplitudes
13. Details for the custom spectral cursors
14. Details for the specific bearing cursors

Some spectral patterns, such as those related to Imbalance or misalignment can be identified by using cursor “speed modulation”. Some other common spectral patterns associated with modulated signals can be identified by using the double sideband option.

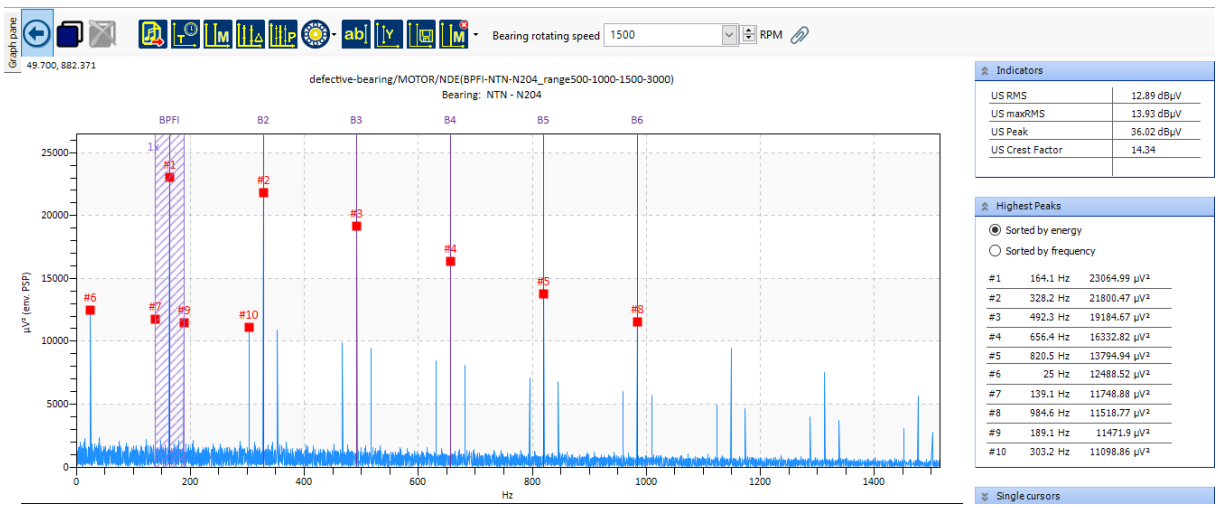
To use it, proceed as follows:

1) Place or identify the main pattern associated with the bearing defect
2) Control + left click (1x, 2x or 3x) on the fundamental frequency or its harmonics (ex: B1, B2, B3, B4, B5 or B6) to display in a hatched area, the sidebands relating to the modulation at the rotating speed (1x). The second (2x) and the third (3x) sideband are based on the harmonics of the rotating speed.

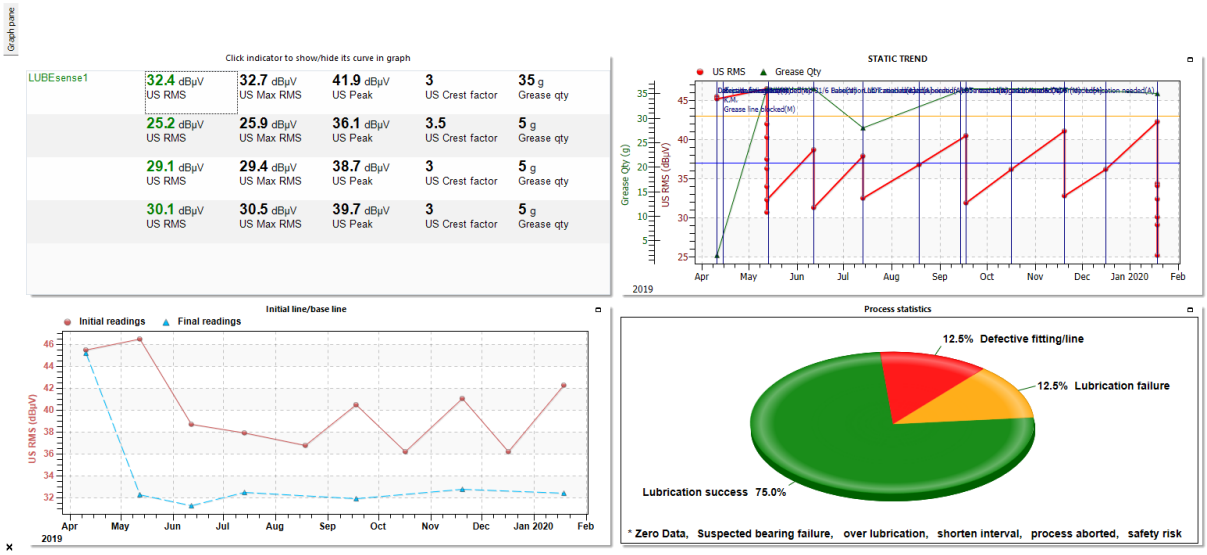
In the example below, BPFI (#1=164 Hz + harmonics) is confirmed at 1500 rpm (or #6 = 25Hz = 1x) on a bearing of type N204. The sideband cursor (1x), displayed around the fundamental frequency of BPFI confirms a modulation at the rotating speed since, in this concrete case:

- #7 = 139 Hz = #1 - #6 = 164 Hz – 25 Hz
- #9 = 189 Hz = #1 + #6 = 164 Hz + 25 Hz

This pattern (BPFI +/- 1 x) can also be observed on harmonics B2, B3, ...



14.5. Specific LUBExpert Graphs



For detailed manual about specific functions of LUBExpert feature in UAS3, please refer to LUBExpert Manual.

15. Reports

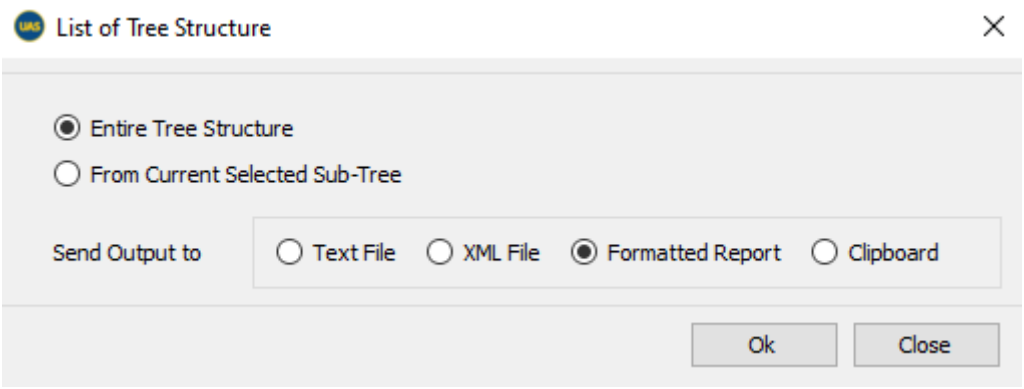
Reports are very important tools when findings, conclusions and situations need to be communicated. There are several report topics on the menu, for different purposes.

15.1. Tree Structure Report

Only the Report of the Tree Structure pertaining to the Database currently open is accessible. If you want to generate the Report of another Tree structure, please first open the regarding Database.

Select the menu **Reports / Tree Structure.**

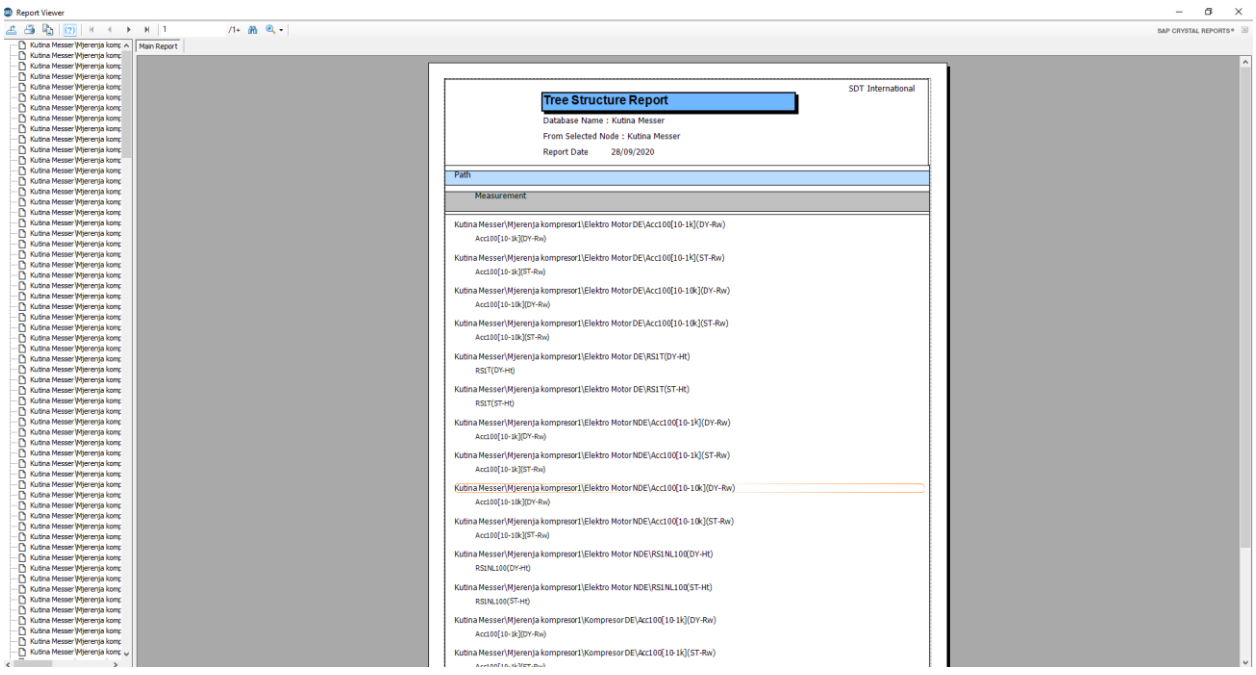
Following window is displayed:



You may prefer to generate a Report of the **Entire Tree structure** or a Report starting from the **Current Selected Sub-Tree**, by ticking the appropriate button.

For the format of the Report, you can choose between Text File, XML File and Formatted Report. You can also insert the content of the Report inside the Clipboard.

Click **Ok** to generate the report.

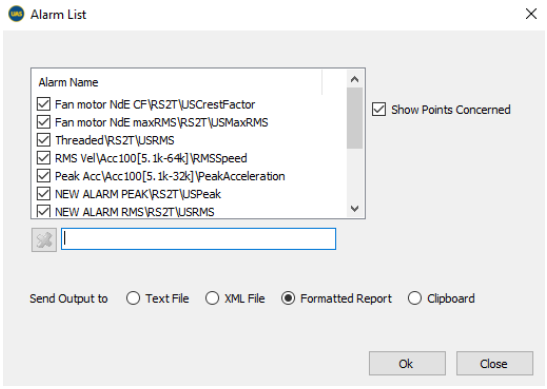


15.2. Alarms Report

Alarms are common to all Databases. Therefore, you can include any chosen Alarm in the Reports, whatever the currently open Database.

Select the Menu **Reports / Alarms**.

The following windows is displayed:



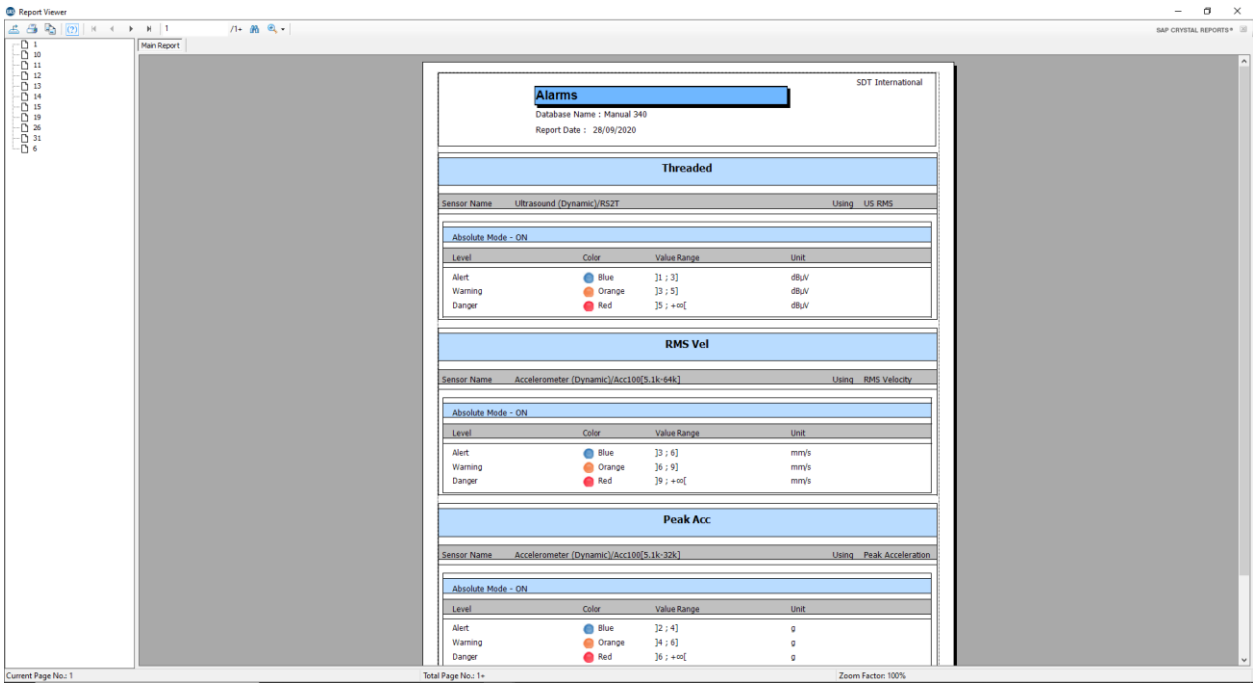
To activate the filter, use **CRTL+F**.

The Report will show or hide the measurements' locations concerned, by ticking or not the regarding check box.

For the format of the report, you can choose between Text File, XML File and Formatted Report.

You can also insert the content of the Report inside the Clipboard.

Click **Ok** to generate the report.



15.3. Work Orders/Surveys Report

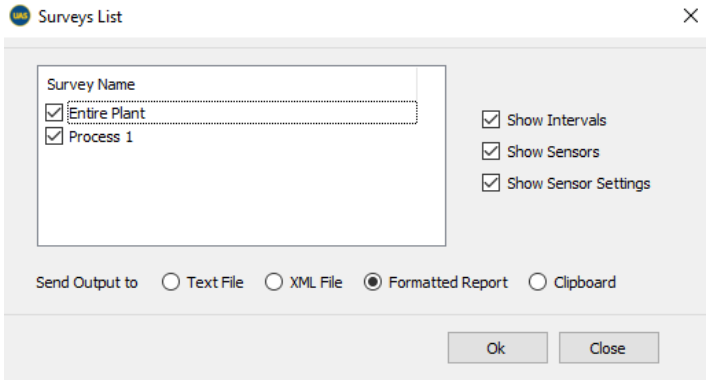
The software offers the possibility to generate a report of: The last survey uploaded in a specific SDT170.

Only the Surveys Reports pertaining to the Database currently open are accessible.

If you want to generate a Report created in another Database, please open first.

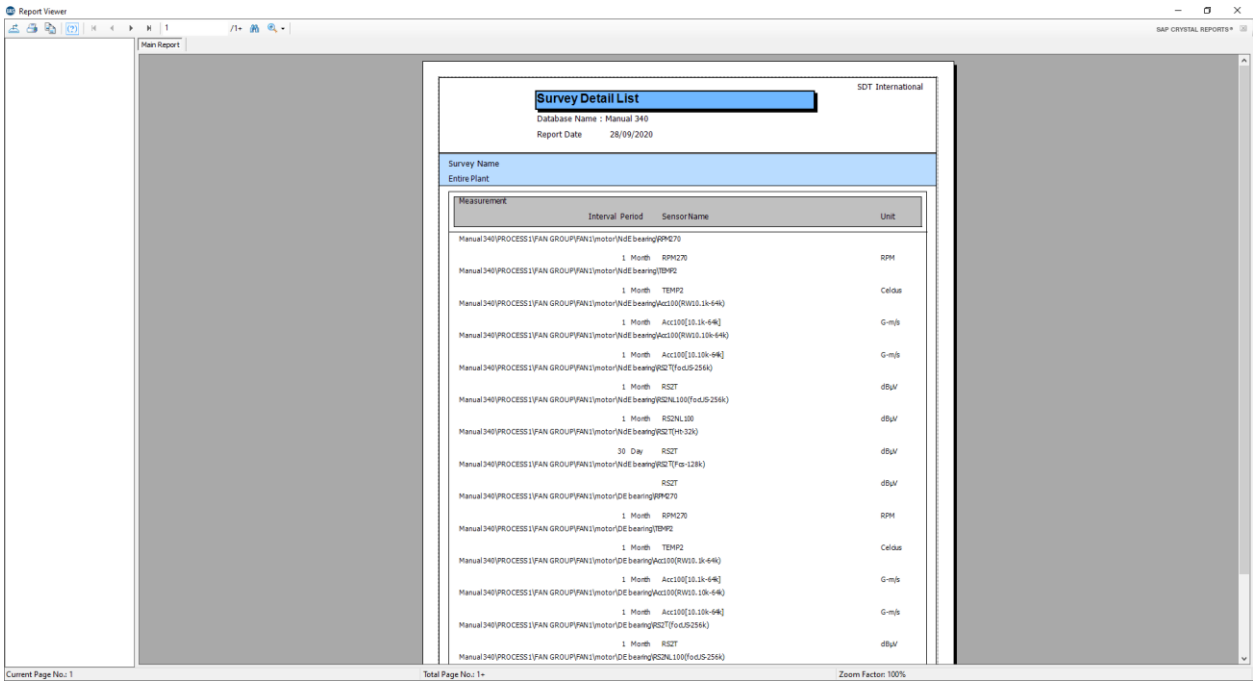
Select the Menu **Reports / Work Orders/Surveys / SDT270/LUBExpert (or SDT340) Work Orders/Surveys.**

The following window is displayed:



You can decide to show, or hide, in the Report, the used **Intervals,** the **Sensors,** and the **Sensor Settings,** by ticking, or not, the regarding check boxes.

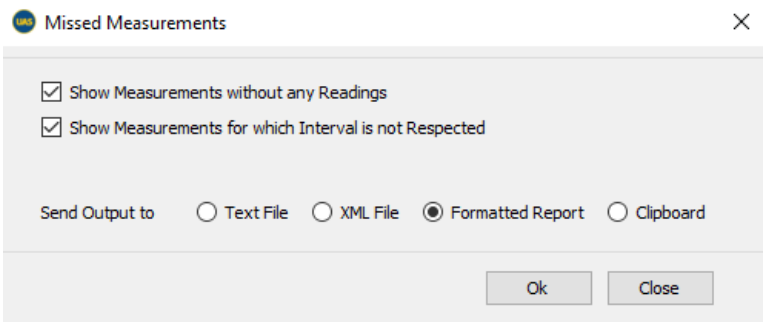
Click **Ok** to generate the Report.



15.4. Missed Measurements Report

Select the menu **Reports / Missed Measurement Report**.

The following window is displayed:

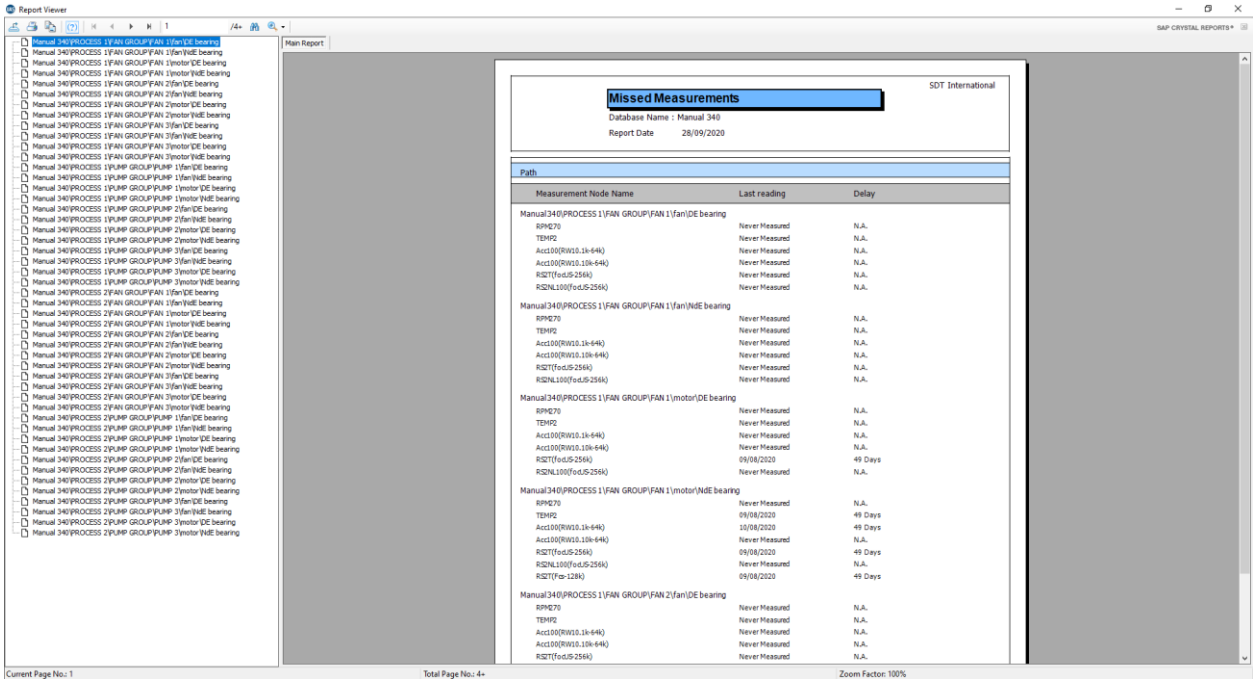


The Report will show, or hide, the **Measurements without any Data** and the **Measurements for which the data collection interval is exceeded,** by ticking or not the regarding check boxes.

For the format of the report, you can choose between Text File, XML File and Formatted Report.

You can also insert the content of the Report inside the Clipboard.

Click **Ok** to generate the Report.

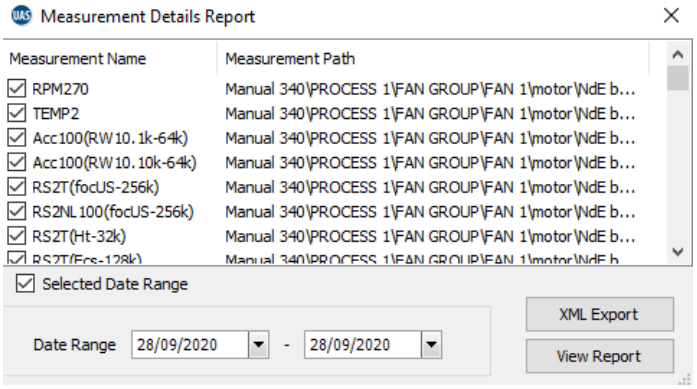


15.5. Measurement Details Report

This Report provides a list of the data recorded for selected measurements, from a range of dates**.**

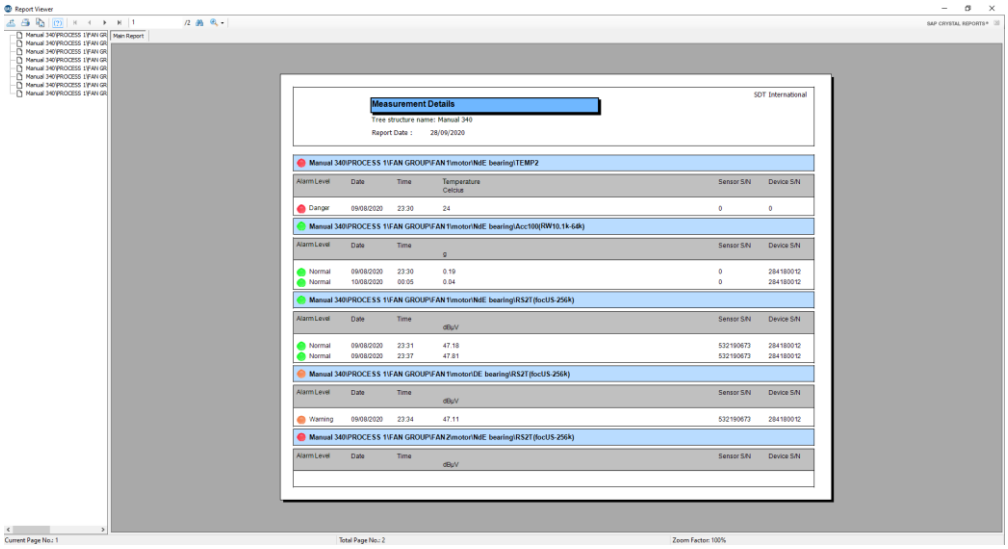
Select the menu **Reports / Measurement Details.**

The following window is displayed:



You can refine your search by selecting a **Data Range.**

Then click the button **XML Export** or the button **View Report.**

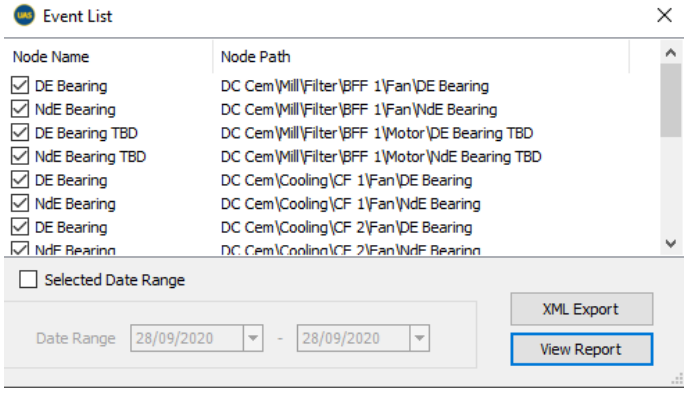


15.6. Events Report

This Report provides a list of the events recorded for parent nodes of Measurements, called Measurement Points, from a range of dates.

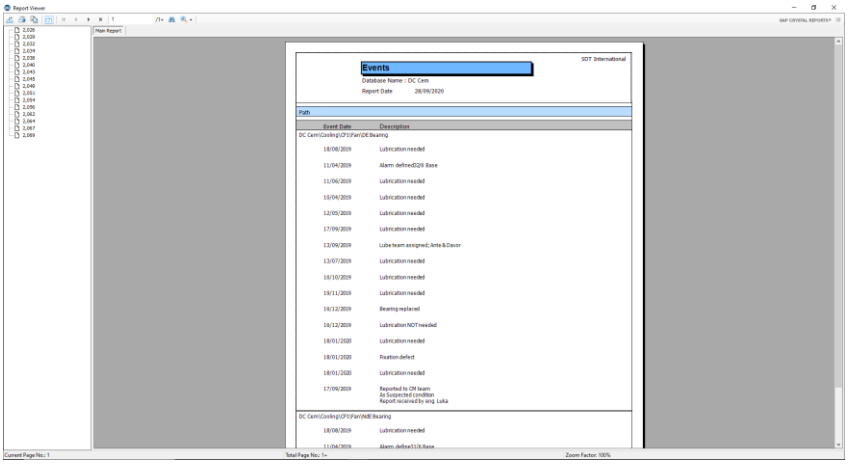
Select **Reports / Event.**

The following window is displayed:



You can refine your search by selecting a **Data Range**.

Then click the button **XML Export** or the button **View Report**.



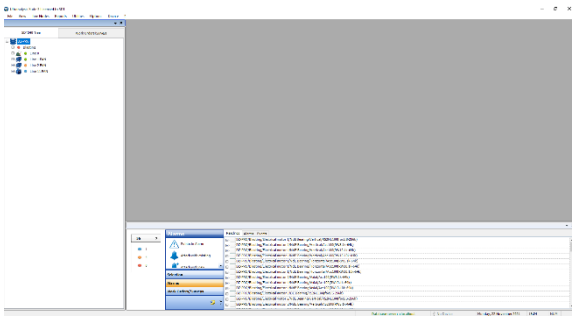
15.7. Lube Report

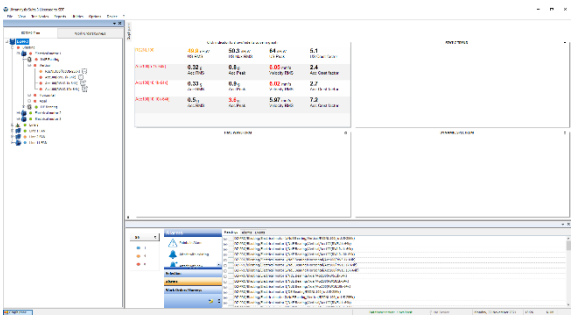
Specific report for LUBExpert functionalities is explained in detail in the LUBExpert Manual.

15.8. Asset Condition Report

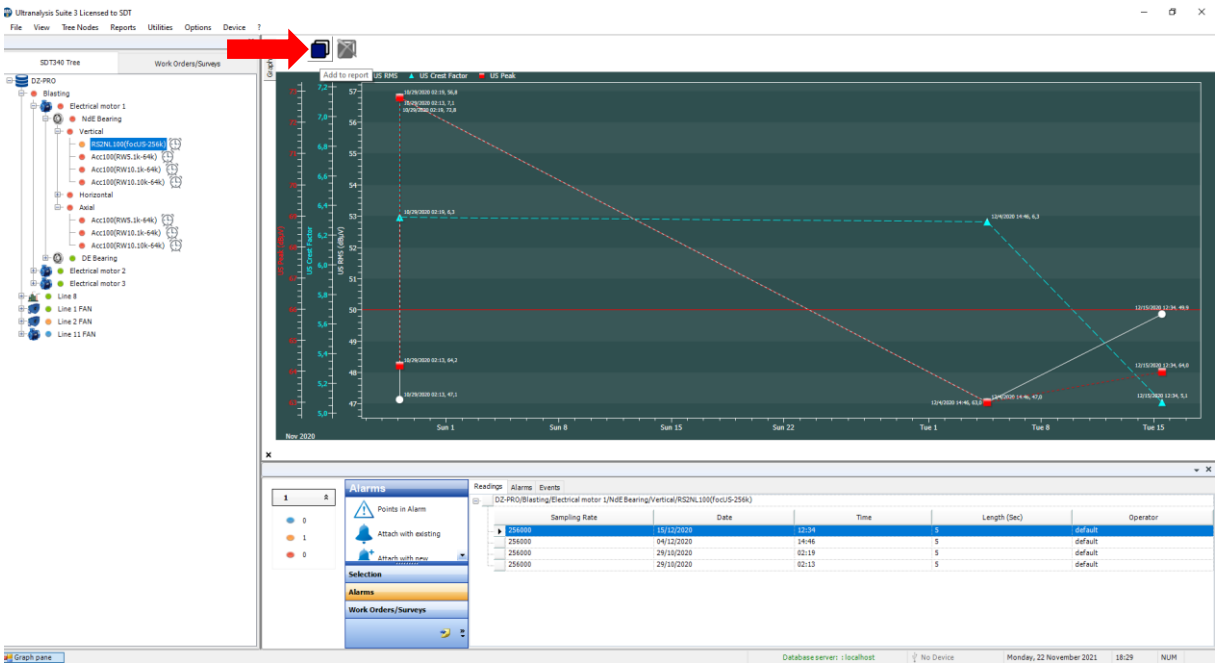
The Asset Condition report is a fully customizable report that includes all necessary information. It is ideal tool for all involved: end user, service provider, CM technician or engineer, Reliability team, management. The report contains all information already available in UAS3, as well as pre-defined fields to enter conclusions such as condition, recommendations, situation, description, criticality and other.

Creating a report is fast, easy, and very intuitive. Once you decide what you want to report (what asset, group of assets, or only measurement point), select the graphs you want to include in your report (if any):



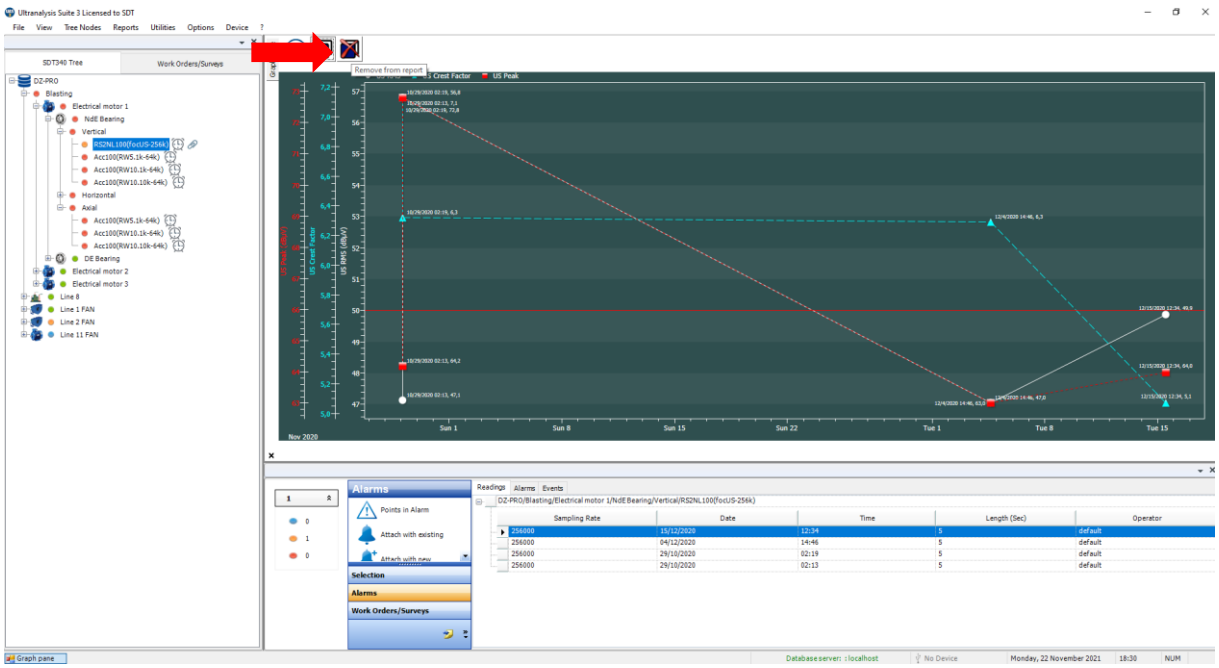


Select the measurement point, the graph, and enlarge it:

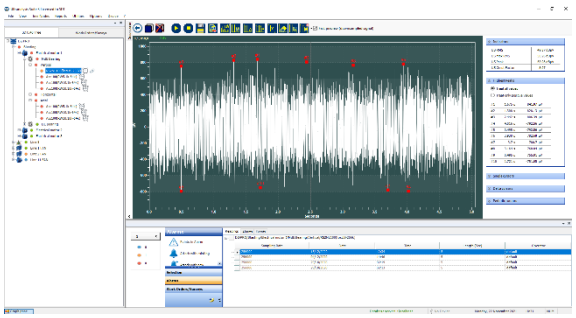


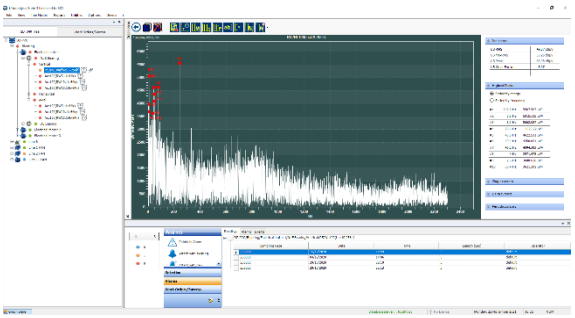
To add a specific graph to the report, simply select the button “Add to report”. The selected graph will be included in your report once you enter all the other information.

To remove the graph from the report, in case you changed your mind, or it was added by mistake, use the button “Remove from report”.

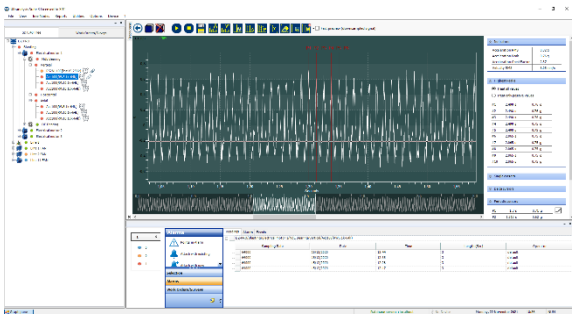


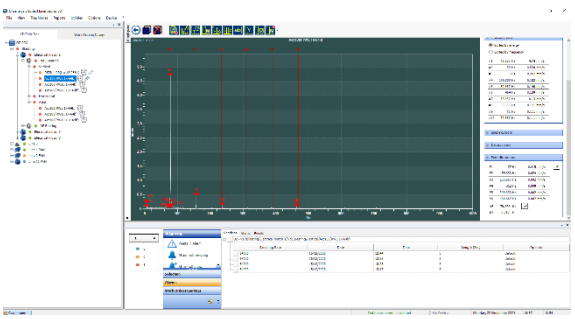
You can do the same with all graphs in your UAS3: TWF & Spectrum for both Ultrasound and Vibration, Temperature, RPM, as well as with all graphs specific to LUBExpert.



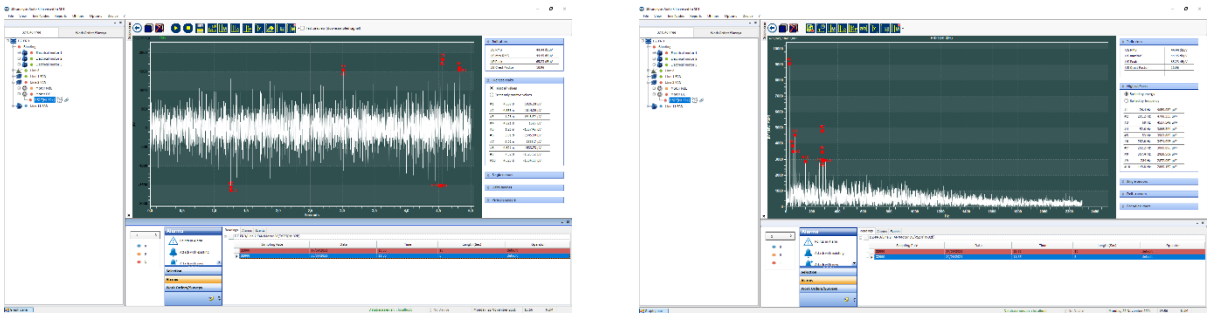


Once you set cursors in your graph and add it to report, the graph will be added with cursors and numeric descriptors, for all cursors and markers, disregarding if cursors are saved or not.

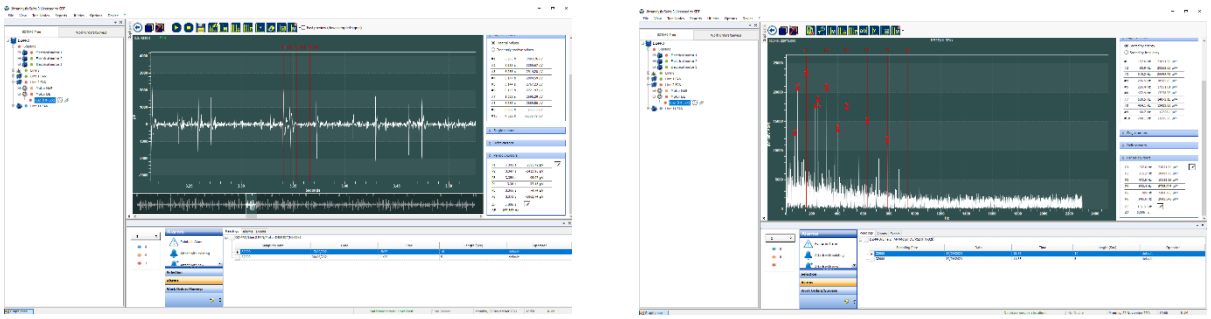




There is no limitation on the number of graphs to be added to the report for each specific measurement point, or altogether. If you add several TWF and Spectra (as an example) from one measurement point, they will be displayed chronologically, newest first, TWF and corresponding Spectrum one after another.



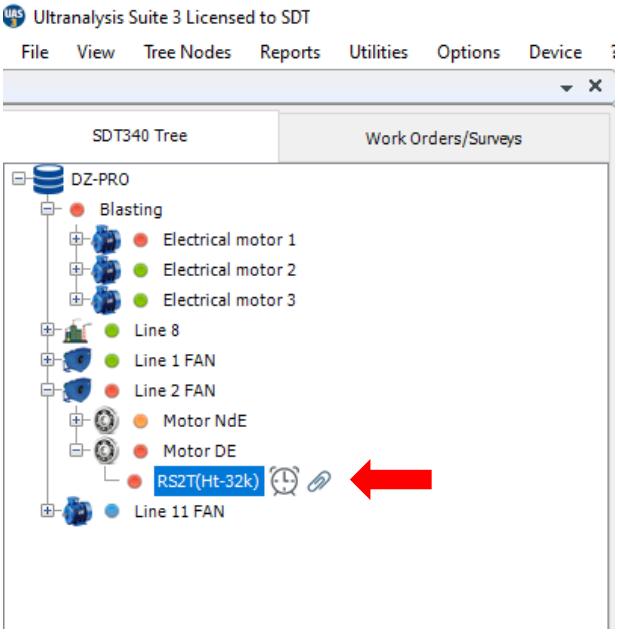
TWF and Spectra of June 30, 2021, Line 2 FAN/Motor DE



TWF and Spectra of September 17, 2021, Line 2 FAN/Motor DE: same measurement point

All graphs will be displayed exactly as you set them (color, options, zoom …).

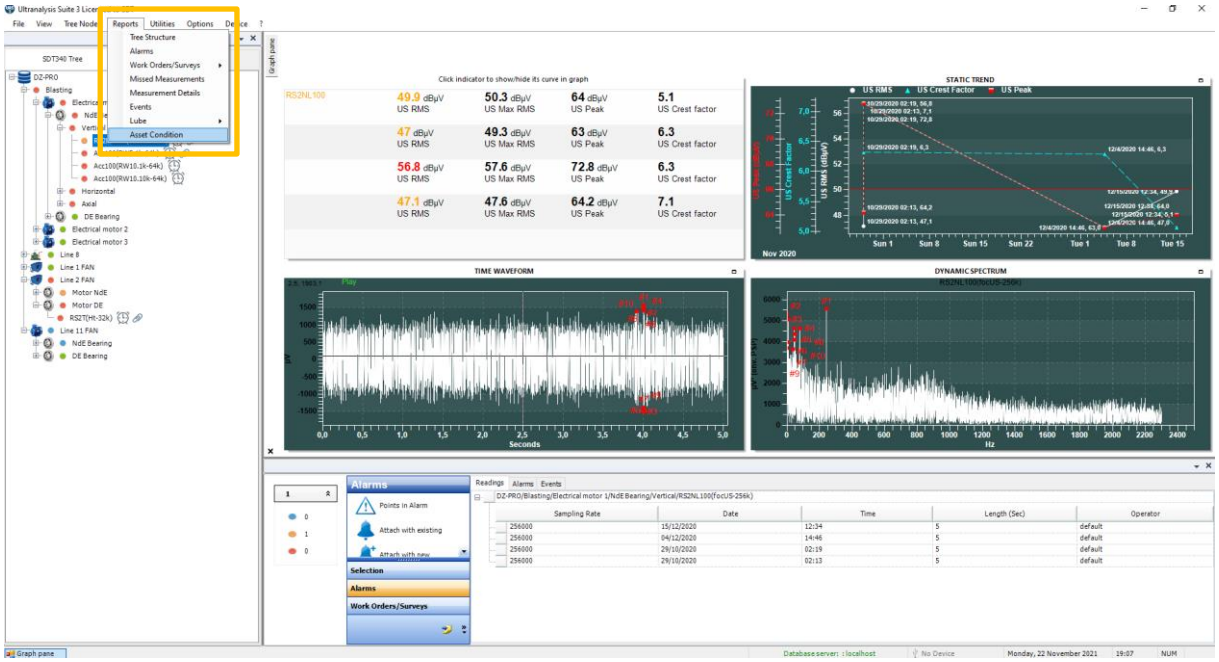
Note: The small paperclip icon next to the measurement settings (sensor level) indicates that this node contains graph(s) selected for reporting.



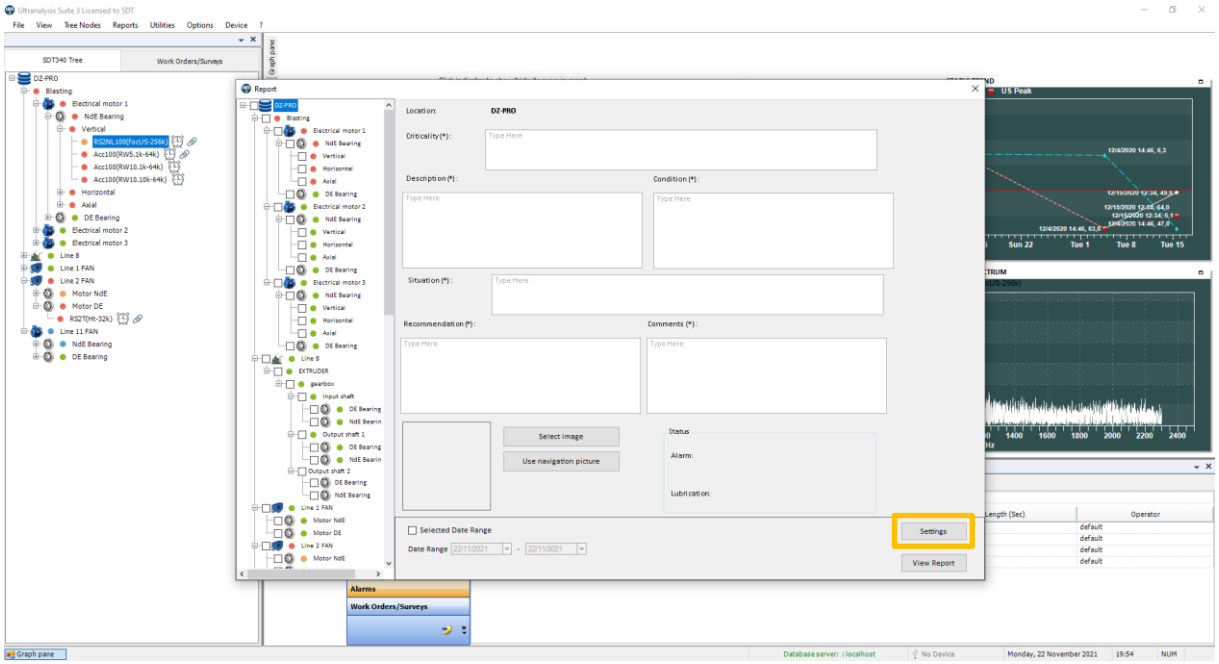
Important: Once you switch to another tree structure, another folder or restart your UAS3, graphs you selected for reporting will be de-selected.

Apart from the selected graphs, the report will display all measurement data, alarms settings, alarm status, measurement settings like interval, acquisition time, sampling rate, software license number, sensor serial number, instrument serial number, operator name. All historical data will be displayed unless otherwise set in report settings (selected date range).

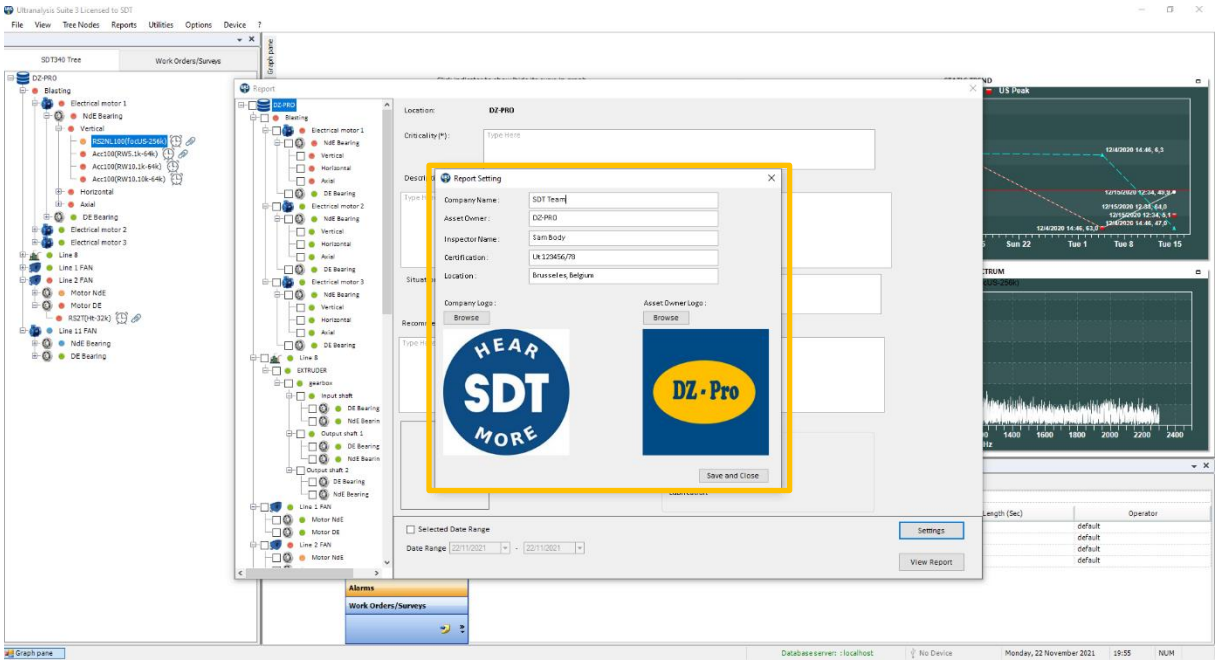
Once you have selected all the graphs you want to display, select “Reports” in the top toolbar, and select “Asset Condition”:



The report settings menu will open with various options:

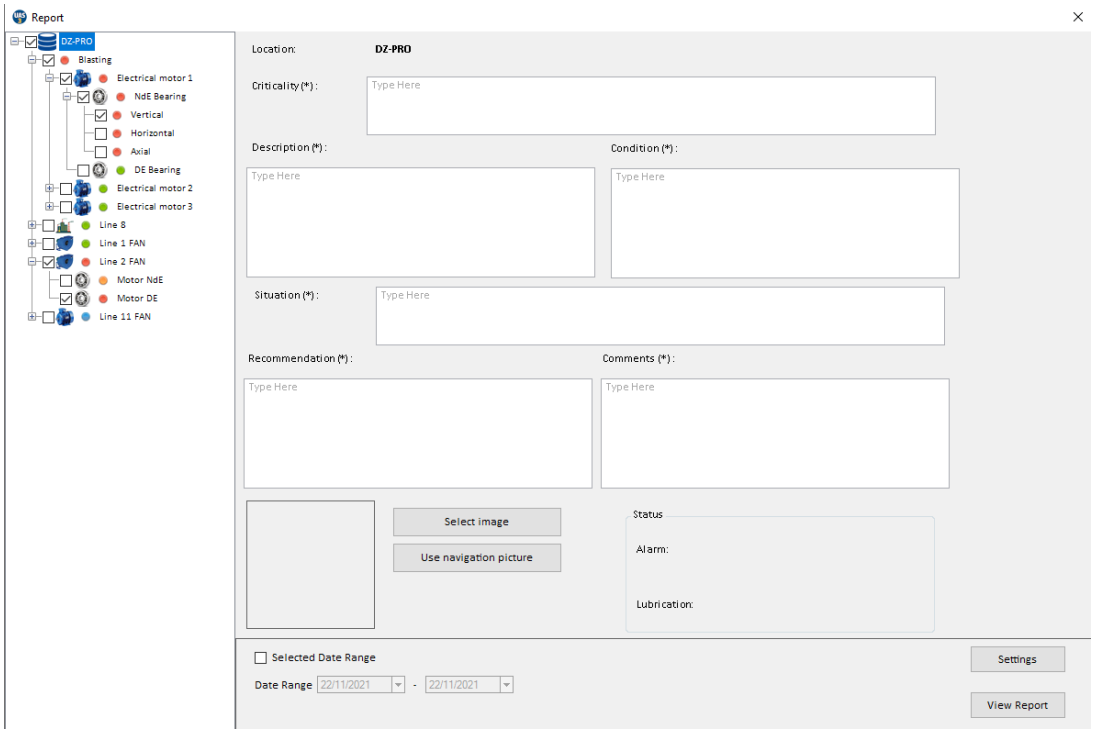


Now, select “Settings” in the bottom right corner of the report menu to enter basic information:



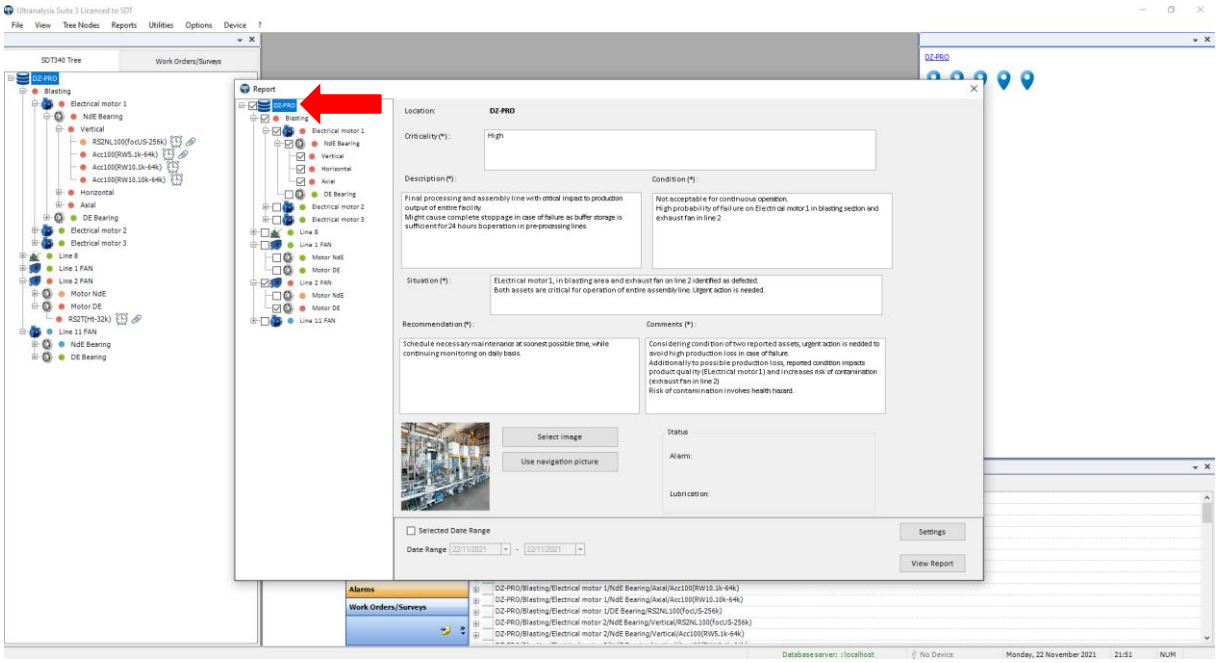
Enter all the necessary data and select “Save and Close” in the bottom right corner. The information you have entered in the basic settings will be displayed in the report.

Next, select the assets and measurement points you want to report. Simply check the box and the selected node will be included in the report. Selecting a node will include all child nodes automatically, but you can de-select some of them individually. Another way to go is to select the exact point, and all parent nodes will be selected automatically. You cannot de-select the parent node, as the report must show the path of the system/assets/component/part…measurement point.

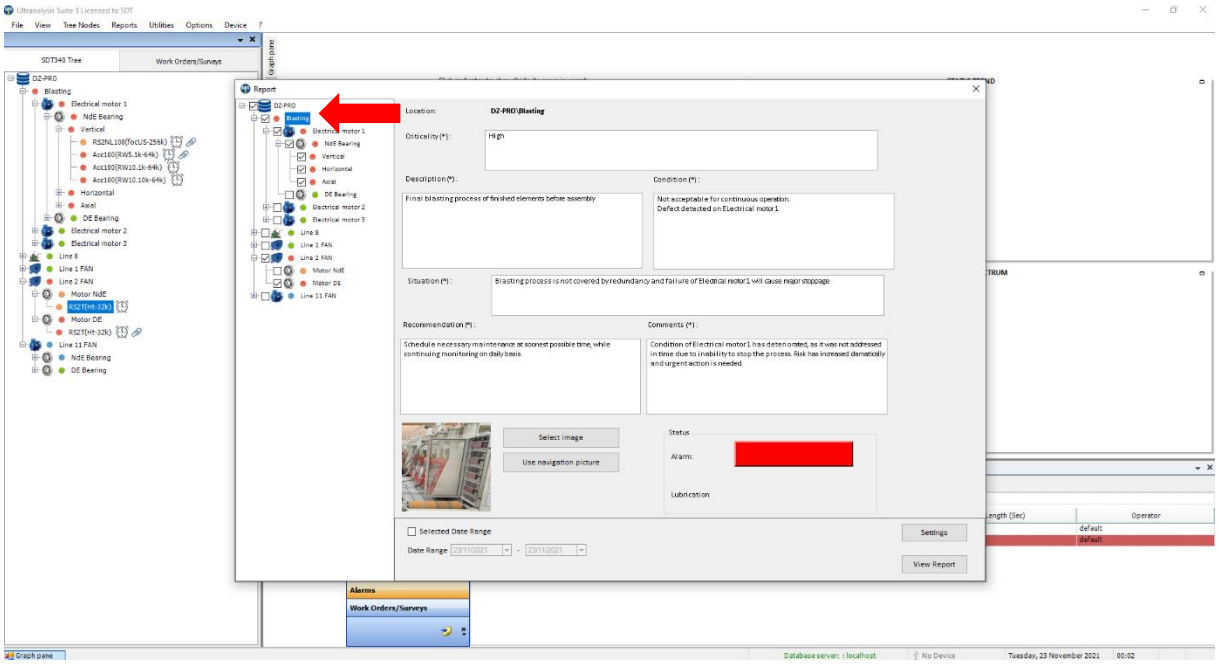


Note that the graphs you have selected for reporting will only be displayed if the node they belong to is selected for reporting.

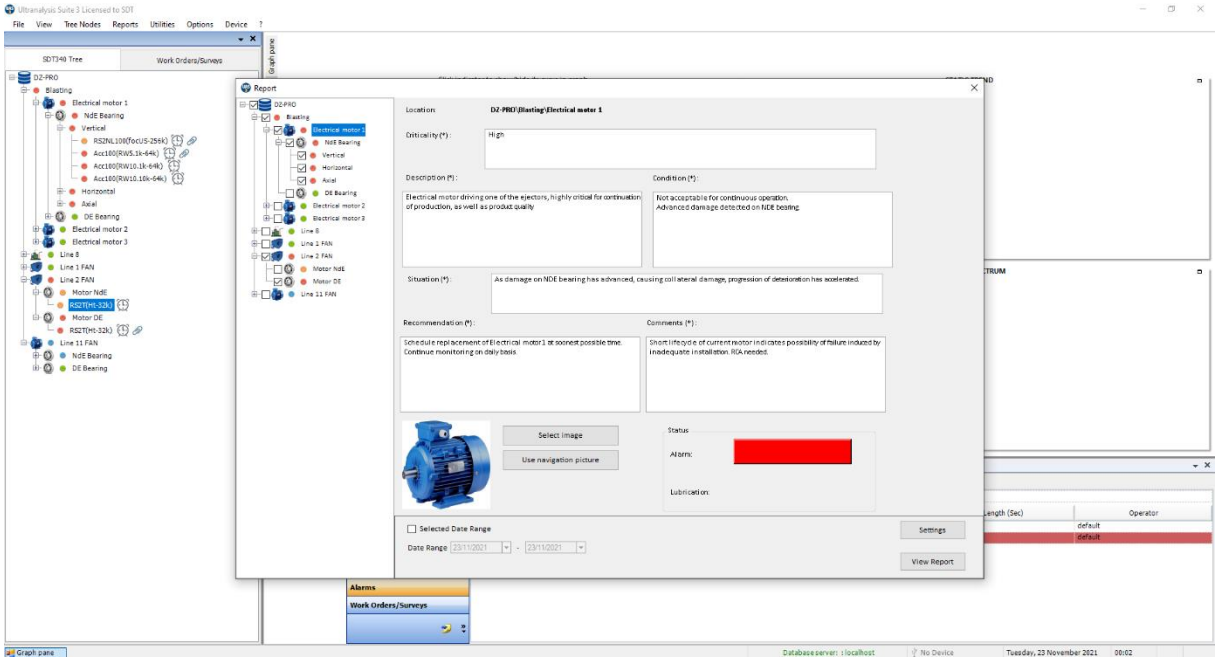
Next, select each node and enter your report content (your conclusions, diagnosis, recommendations, asset condition, descriptions). Here is the example:



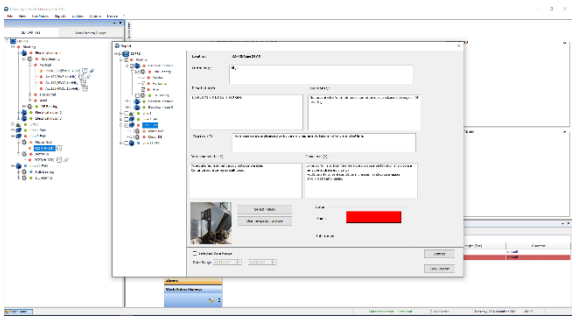
For database root DZ-PRO, in this example: finishing and assembly line; you can enter all necessary data, your findings and conclusions, to move on to the specific process and assets it contains:

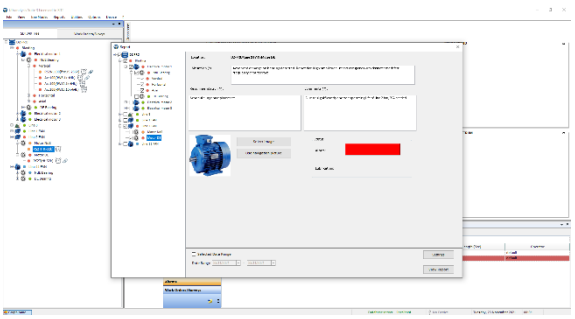


In this case, blasting process, followed by the assets:



Electrical motors, measurement points and measurement settings.



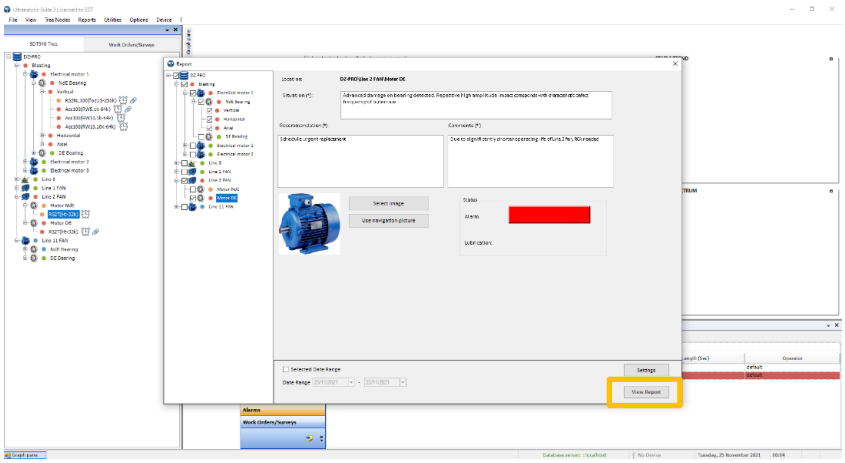


Or in continuation, Line 2 Fan

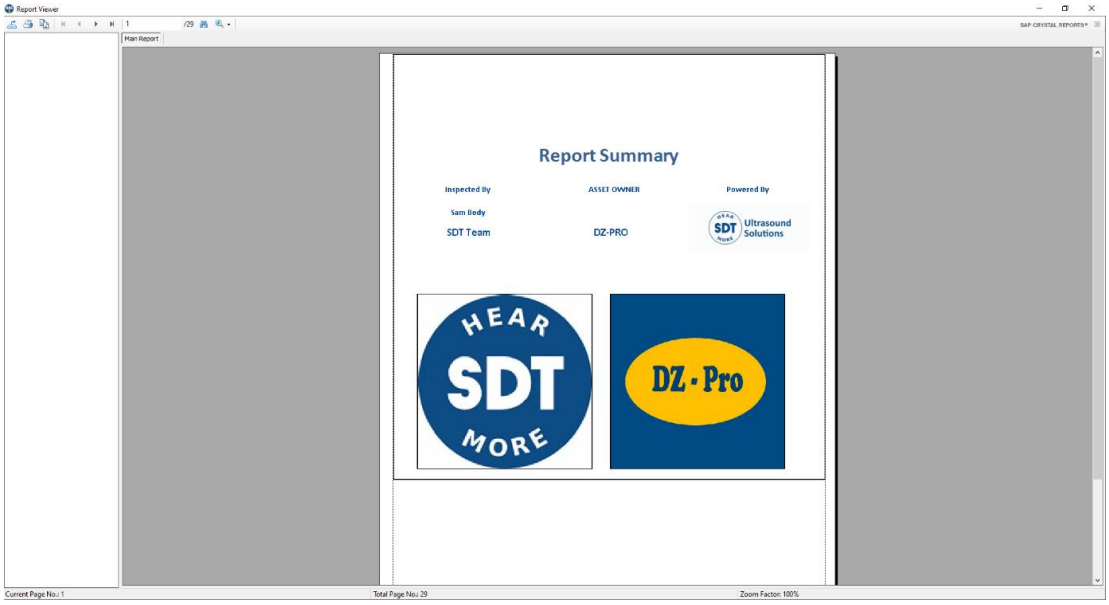
Note: If you close the report menu at this stage, all data you entered will be saved even if you change the tree structure, folder, or restart UAS3. Once you open that particular tree structure and Asset Condition report, the data will be there.

If you close the report menu, you can go through your tree structure and add more graphs or remove graphs you do not want, and your report preparation will be updated.

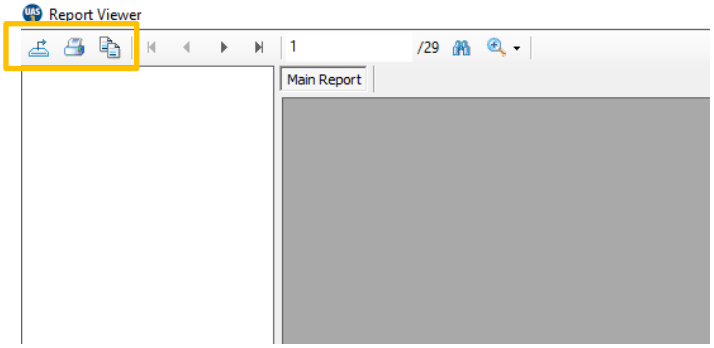
Once you are done with your report, select “View report” in the bottom right corner:



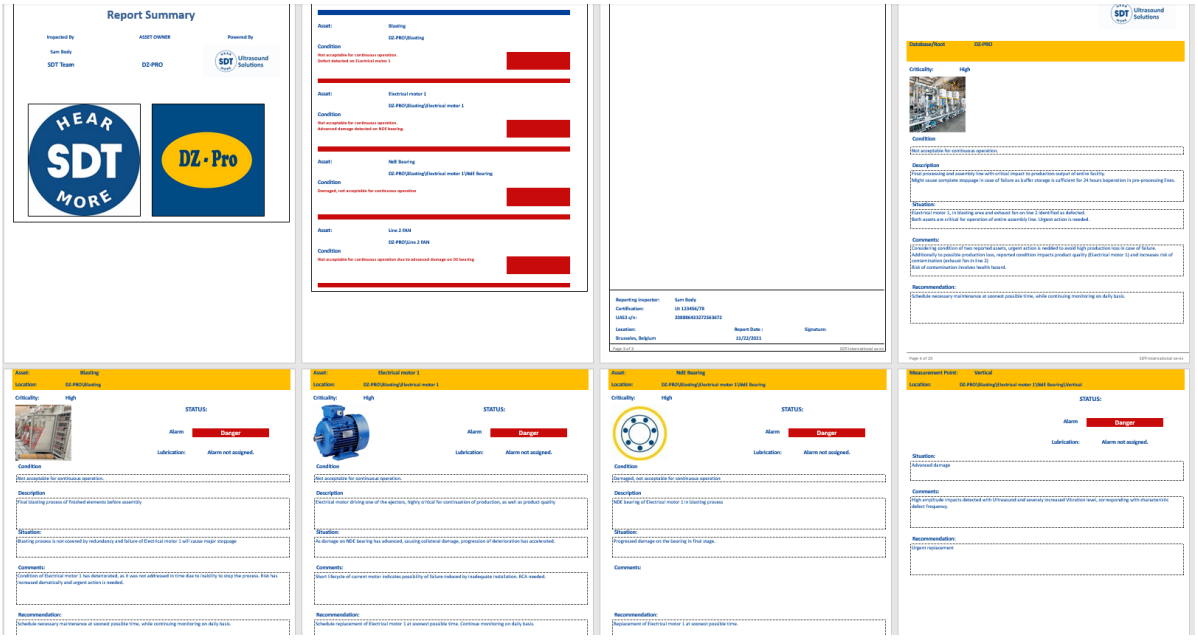
Your report will be displayed in the Report Viewer, and you can make a final check before exporting or printing it.

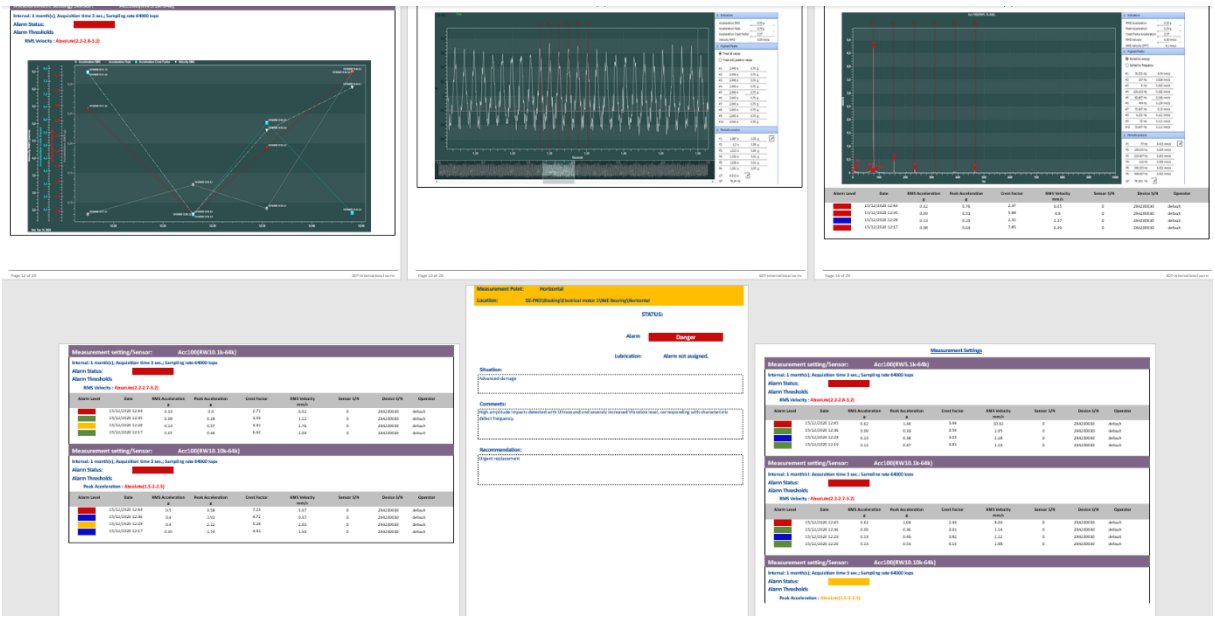


In the top left corner, you can choose to copy the currently displayed page, print the entire report, or export it in different formats:

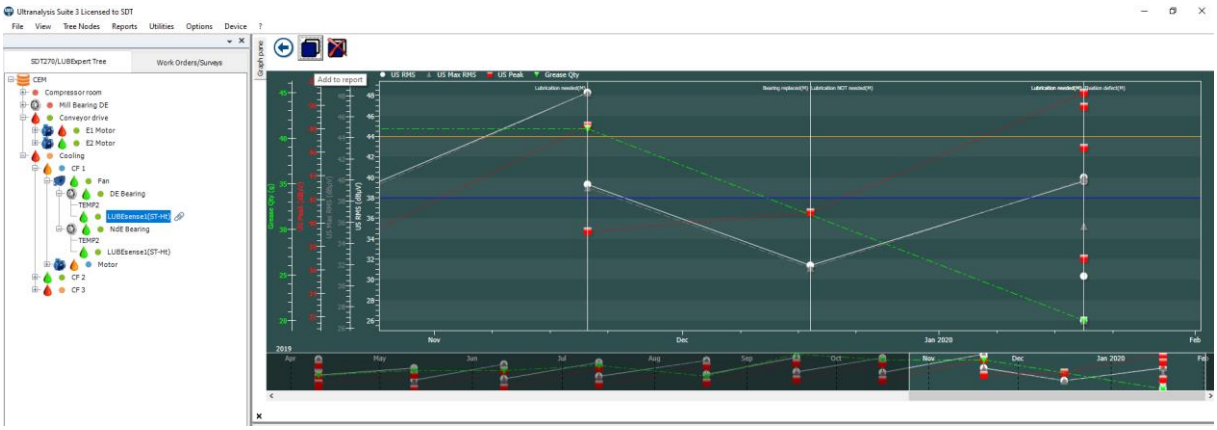


Your report is completed!

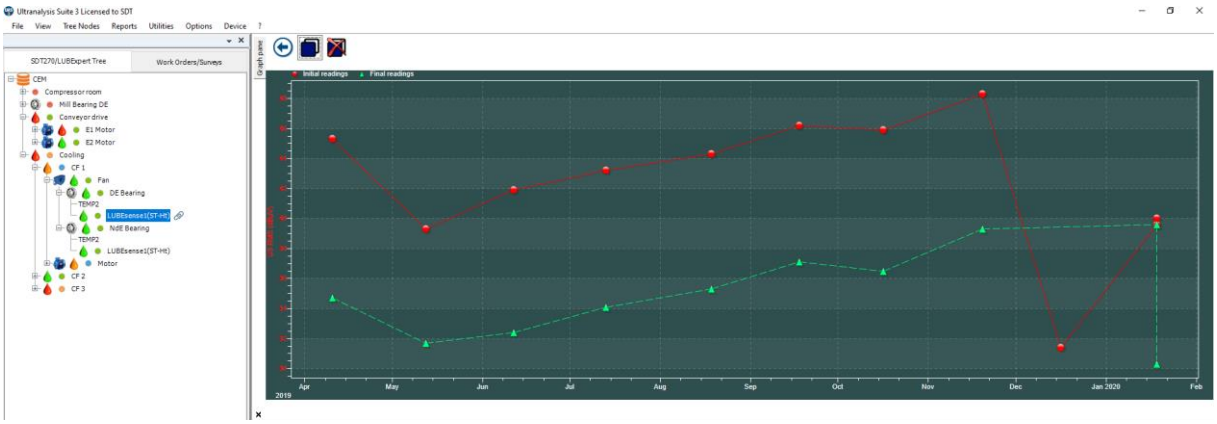




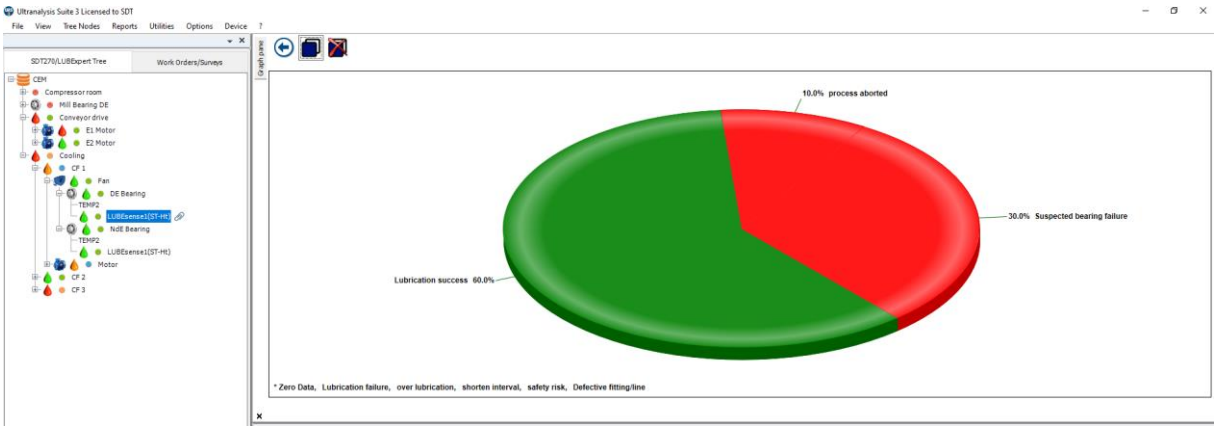
When reporting LUBExpert data, there is no difference in the settings. You will select all graphs you need, all measurement points you need, enter your conclusions and recommendations and generate the report:



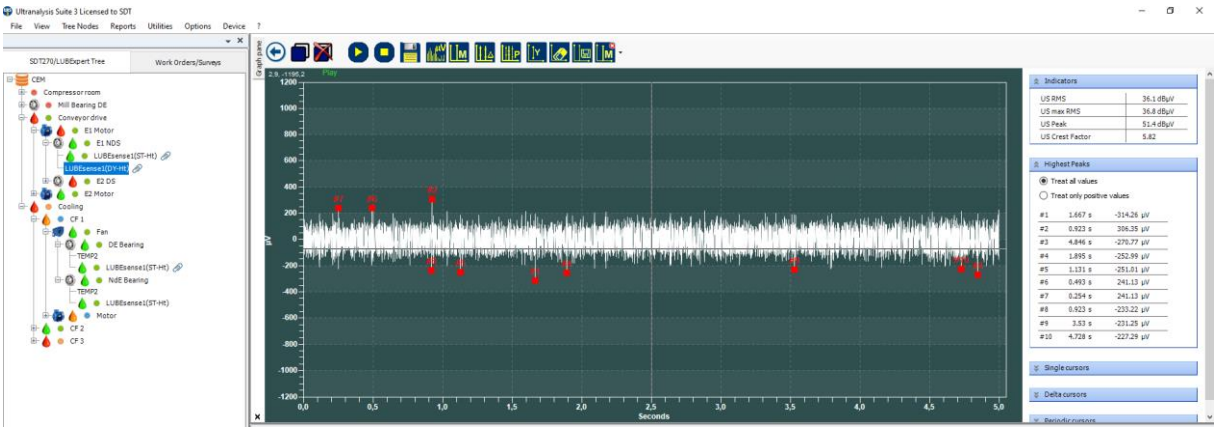
Static trend with all data,

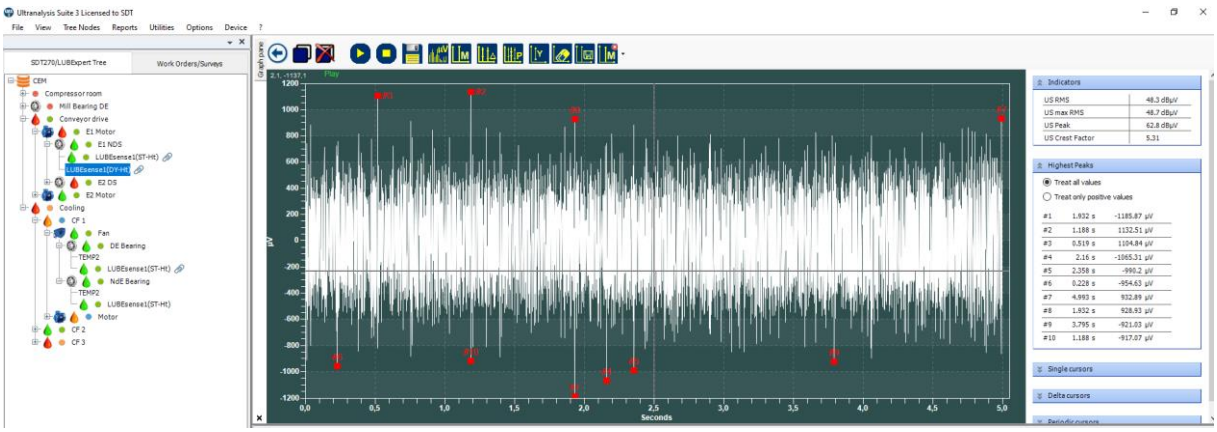


Initial/Base line graph,



Process statistics





TWF and/or Spectra before and after lubrication (in case you are using LUBExpert Dynamic).

All data relevant to the lubrication process will be displayed.

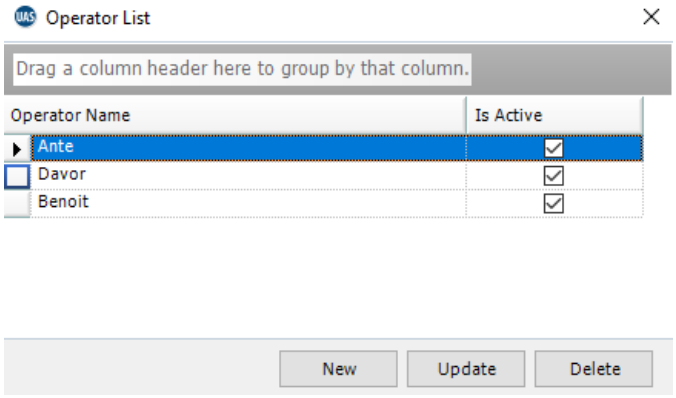
Examples are showing rotating equipment, but your Asset Condition report is equally useful for electrical equipment, valves, hydraulics, or any other application.

16. Assigning operators and users

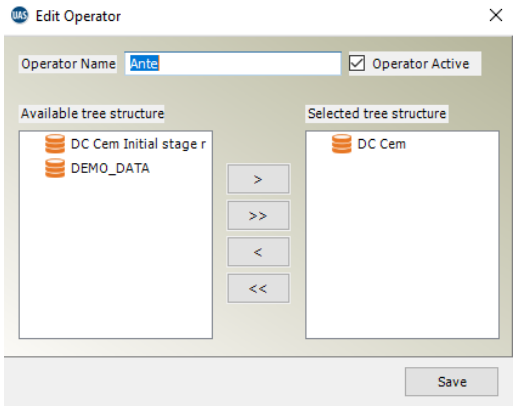
UAS3 allows you to assign instrument operators and UAS3 users. It is often useful to do so, if there are several users and operators, when traceability and control is necessary.

16.1. Assigning Instrument Operator

Click on **Utilities/Operators** and following window will pop up:



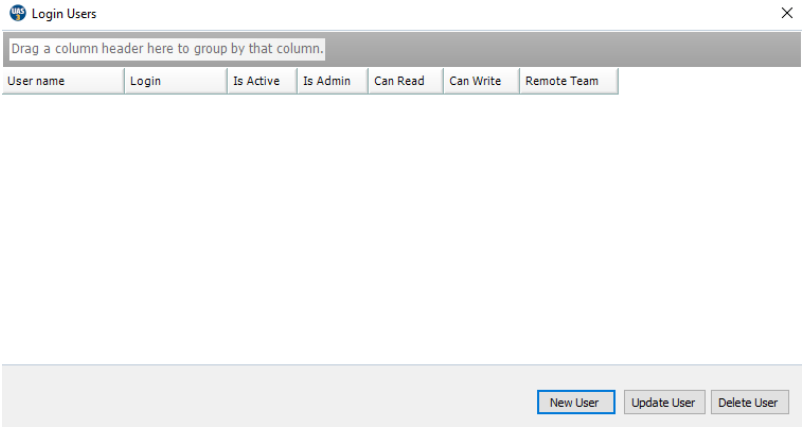
You can add **New** operator, **Delete** operator, or **Update** selected operator details, as follows:



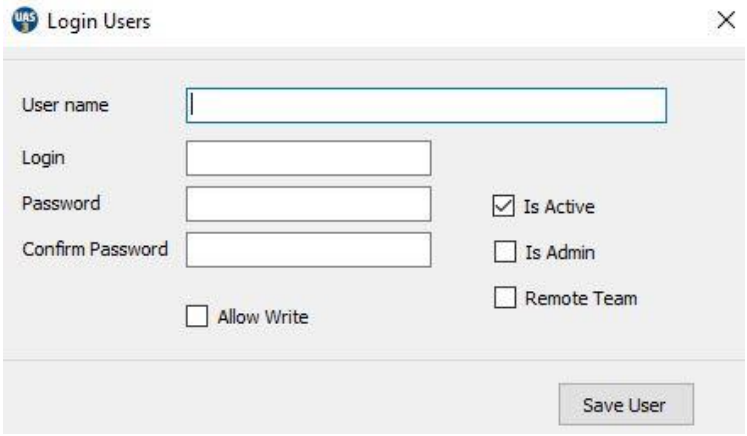
Here, you can assign specific Tree Structures to selected operator.

16.2. Assigning UAS3 User

Click on **Utilities/Login Users** and following window will pop up:



Click on **New User** and following window will pop up:



If none of the boxes defining user's rights (*Is Admin, Allow Write, Remote Team*) are checked, the user will have *read-only* access.

Is Admin – The user has full access, including the right to administrate other users.

Allow Write – The user has full access to read and modify the database but cannot administrate other users.

Remote team – The user has access to read data, upload, download and create backup, but cannot modify the database or administrate other users.

Add user, define status and click on **Save User**.

You can also **Update** users' details and **Delete User.**

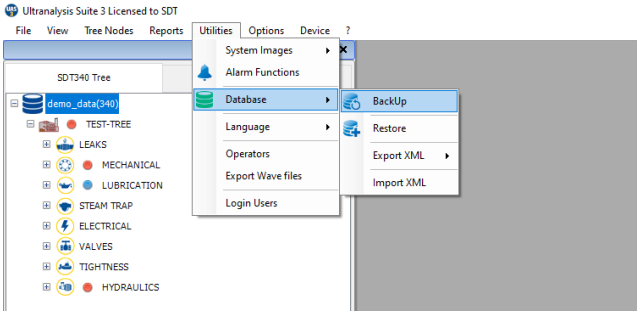
17. Backing up and Restoring Database

Data contained in UAS3 can be backed up and restored, for two main purposes. First is to save a backup of your data in case of mishap. The second reason is to share data with another user, whether a colleague in your team or a consultant for support.

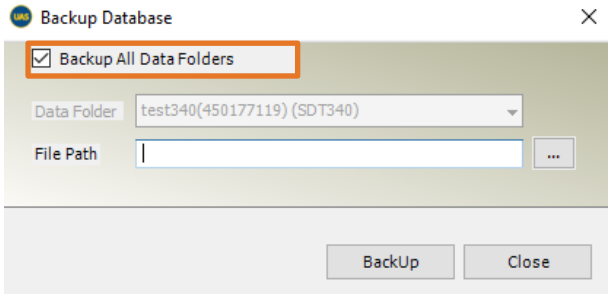
17.1. Backing up Full UAS Database

UAS3 is creating a backup of a database with all its details. Entire Tree Structure, all Settings, all Alarms, all Measurements.
UAS3 is backing up a Data Folder as a minimum unit of backup, with its entire content.

Click on **Utilities/Database/Backup/Full UAS Database** in top toolbar, as shown below:

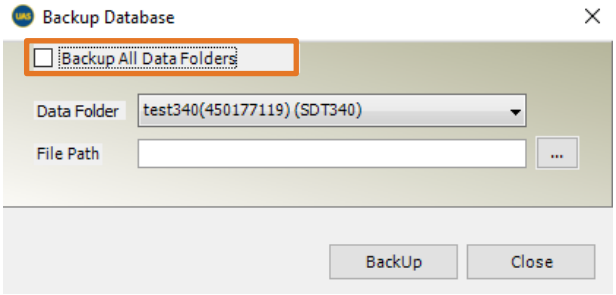


Following window will pop up:



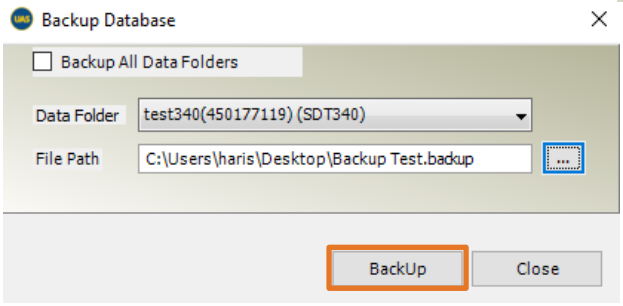
NOTE! In case that **Backup All Data Folders** is checked, all data folders (entire content of your UAS3) will be backed up. This is very useful to do on a regular basis and preserve your data in case of mishap.

If you want to backup only one Data Folder, for purpose of sharing with you colleagues or with consultant/support, uncheck this field, as below:



Now, only displayed Data Folder will be backed up [test 340 (450177119) (SDT340)]. By clicking on arrow next to the Data Folder name, drop down menu will enable you to choose any other folder.

In next step, choose destination and name for your backup file, by pressing ... , and press **Backup**



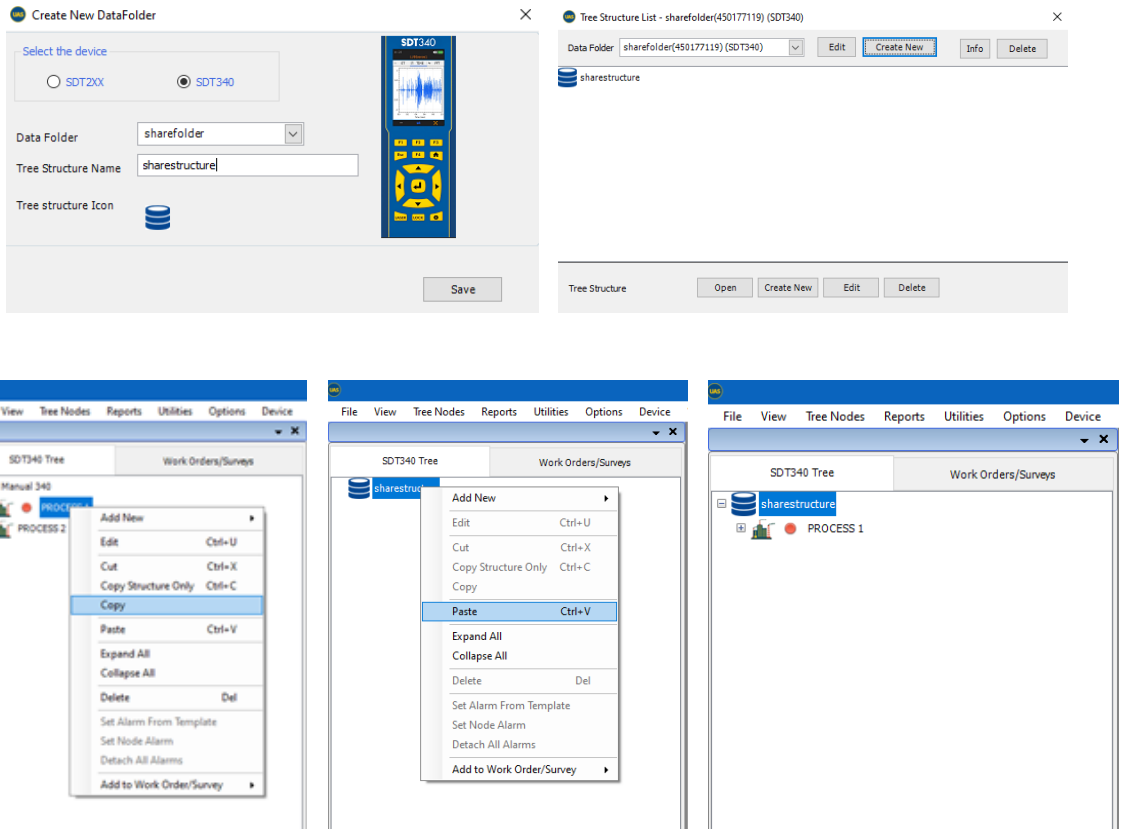
Your backup has been created.

NOTE!

If you want to create a backup of a Tree Structure that is within Data Folder containing more different Tree Structures, or you want to backup only a part of the Tree Structure, you can do following:

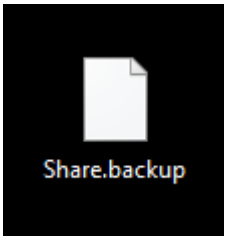
- Create a new Tree Structure in new Data Folder;
- Copy nodes from Tree Structure you want to backup (Structure only, or with Data, depending on what you want to backup and share);
- Paste Nodes in newly created Tree Structure in new Data Folder;
- Backup new Data Folder.

As shown below:



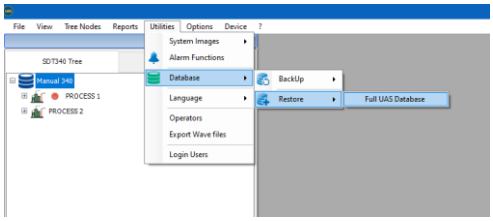
Copied Node is now in a new Tree Structure within the new Data Folder. Now you can backup the new Data Folder and it contains only what you intended to share.

Your backup file is ready to be sent:

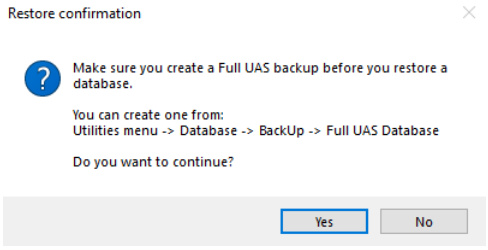


17.2. Restoring Full UAS Database

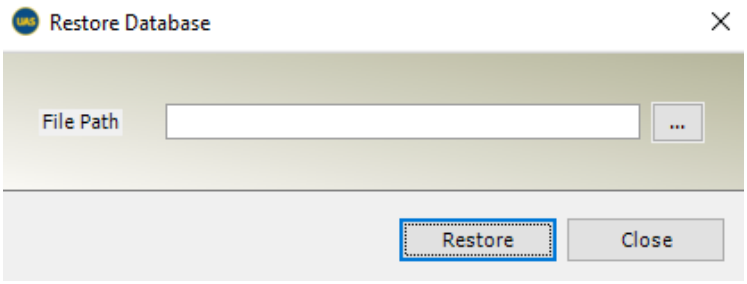
When you need to restore backup in your UAS3, click on **Utilities/Database/Backup/Full UAS Database in top toolbar**, as shown below:



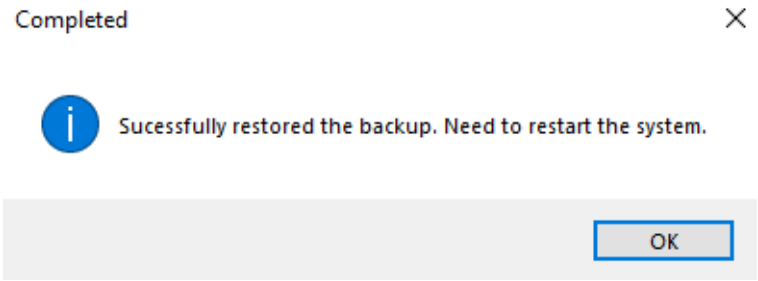
Warning window will pop up, and it I always good to make a backup of your data first, of course.



Once you confirm, Restore Database window will pop up:



By pressing ..., locate the backup file and select it. Then press **Restore**.

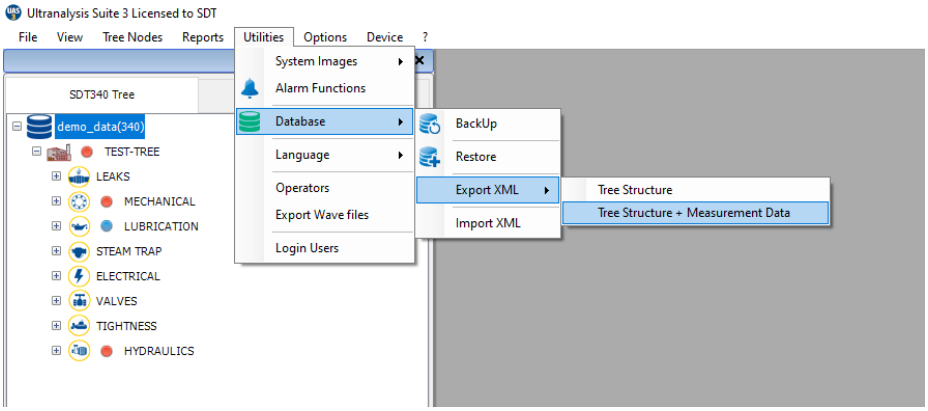


Open your Data Folders and look for restored folder.

17.3. Export XML, Tree Structure or Tree Structure & Measurements

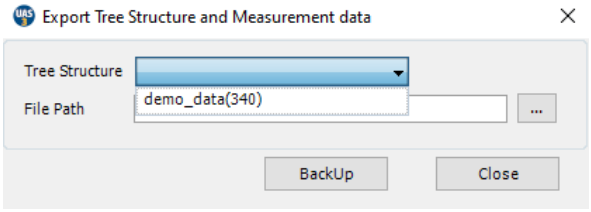
This function enables you to export tree structure only or export it with selected measurement data. This becomes very useful when operation is running on several different locations and regular refreshment of data in supervisor's or analysts' database is needed, as well as in all cases when data needs to be shared on regular basis without need to send large files.

Click on **Utilities/Database/Backup/Export XML** in top toolbar, as shown below:



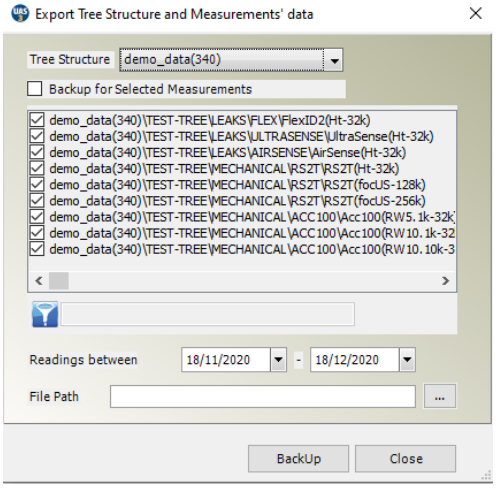
And choose if you want to export Tree Structure only, or Tree Structure + Measurement data.

Exporting Tree Structure will do exactly that, export only tree structure, without any measurement data, and it can be restored in any UAS3 software:



Select a File path and backup your data.

Exporting Tree Structure + Measurement data will export Tree Structure, but it will also include measurement data that you select to export.



Various tools are available to help you select data you need to export and backup.

You can select the option to backup selected measurements and select them individually or using filter.

You can also select to export, and backup measurements filtered by date.

Once you export and backup your data, it is ready to be sent and restored in another UAS3 software.

NOTE:

In case that exported tree structure and import target tree structure are not identical (target tree structure was altered), difference will be overwritten by import or additional nodes will be added, and measurement data will be inserted. To make sure that everything runs smoothly, and any possible confusion is avoided, use "login users" function and assign rights to each user in regard to administrate, write or read only. That way, you can be sure that tree structures in multiple locations will be the same, and data will be easily updated with simple export/import.

18. Responsibility limits

Neither the company SDT International, nor any related company, will in any circumstances be liable for any damages, including, without limitation, damages for loss of business, business interruption, loss of information, defect of the UAS3 loss of time, financial or material loss or any other indirect or consequential loss arising out of the use, or inability to use this product, even when it has been warned of possible damages.

19. Copyright

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The information herein is believed to be accurate to the best of our knowledge.

Due to continued research and development, specifications of this product can change without prior notice.

10	CGI 31/10/2023	To-do list + import bearing parameters chapters added	MUN
09	MUN 24/05/2023	Updated screens	GGH
08	CMA 30/08/2022	Update “Bearing toolbox” (activation and functioning)	CGI
07	HTR 24/11/2021	UAS3 Report	CGI
06	CMA 28/08/2021	Major updates (network settings)	HTR
05	CMA 04/05/2021	Additional info on network/pgsql	HTR
04	CGI 18/12/2020	UAS3 improvements	HTR
03	CGI 27/10/2020	Compatible with Windows 8, 8.1, 10 - 64 Bits	HTR
02	CGI 21/10/2020	Changed blurry screenshots	HTR
01	CGI 13/10/2020	Original version	HTR
Revision	**Writer**	**Nature of modification**	**Approved**