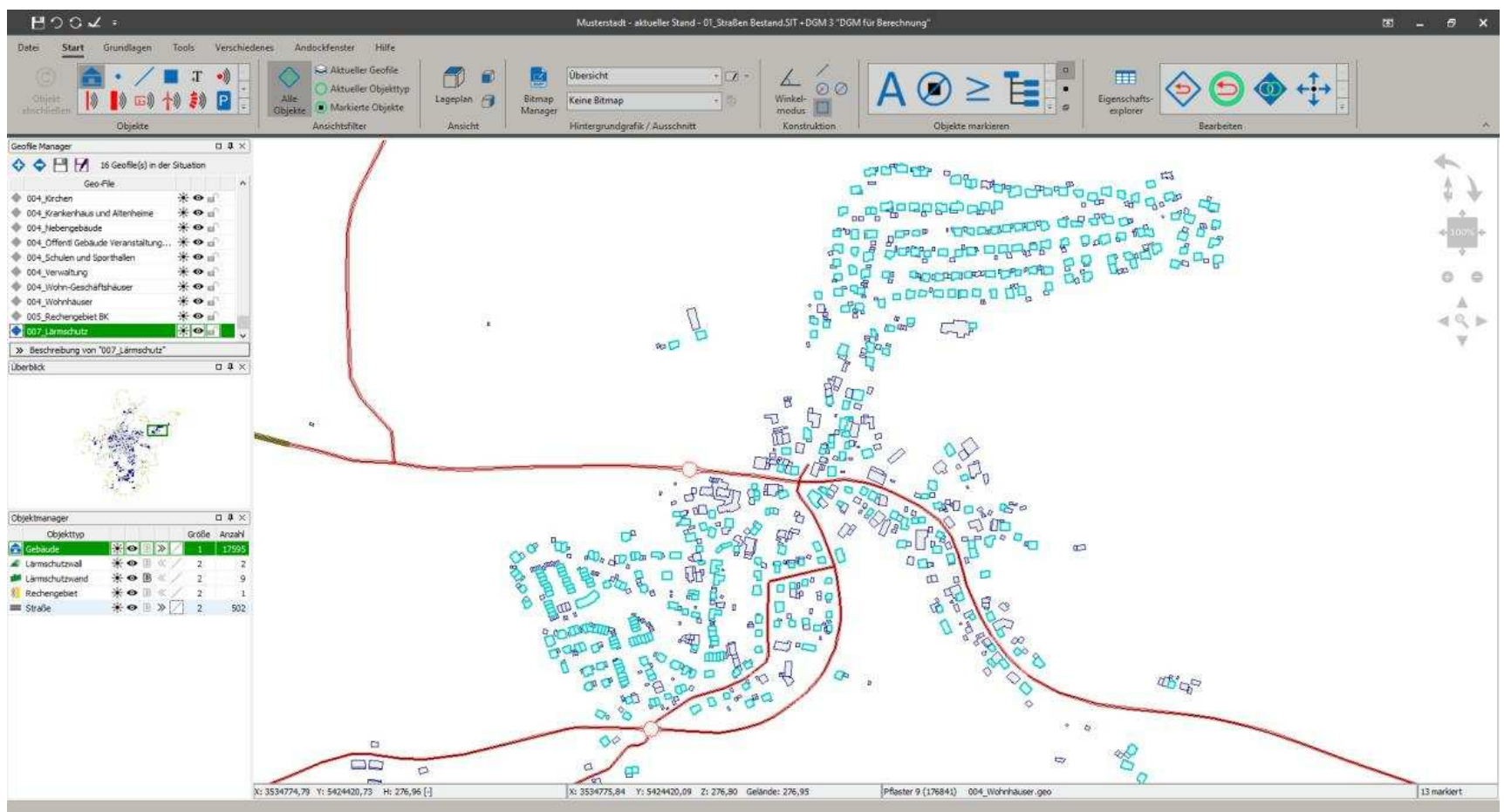


Update letter 9.0



SoundPLAN GmbH
December 2022

New in SoundPLANnoise 9.0

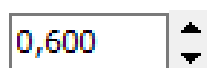
Highlights

- 🌀 Complete revision of the Geo-Database
- 🌀 No repetitive screen loading for large amounts of data
- 🌀 Flexible working with background bitmaps and bitmap groups
- 🌀 Shape/CityGML/ASCII/DBF import: preview of the properties contained in the import file in the assignment table
- 🌀 Exclude emitters of individual noise types from the calculation
- 🌀 Acceleration of grid noise map calculations with multi-core computers / distributed computing
- 🌀 Tile size for the calculation freely selectable
- 🌀 Object “measuring tape” as measurement chain in the Graphics
- 🌀 Improved auralization

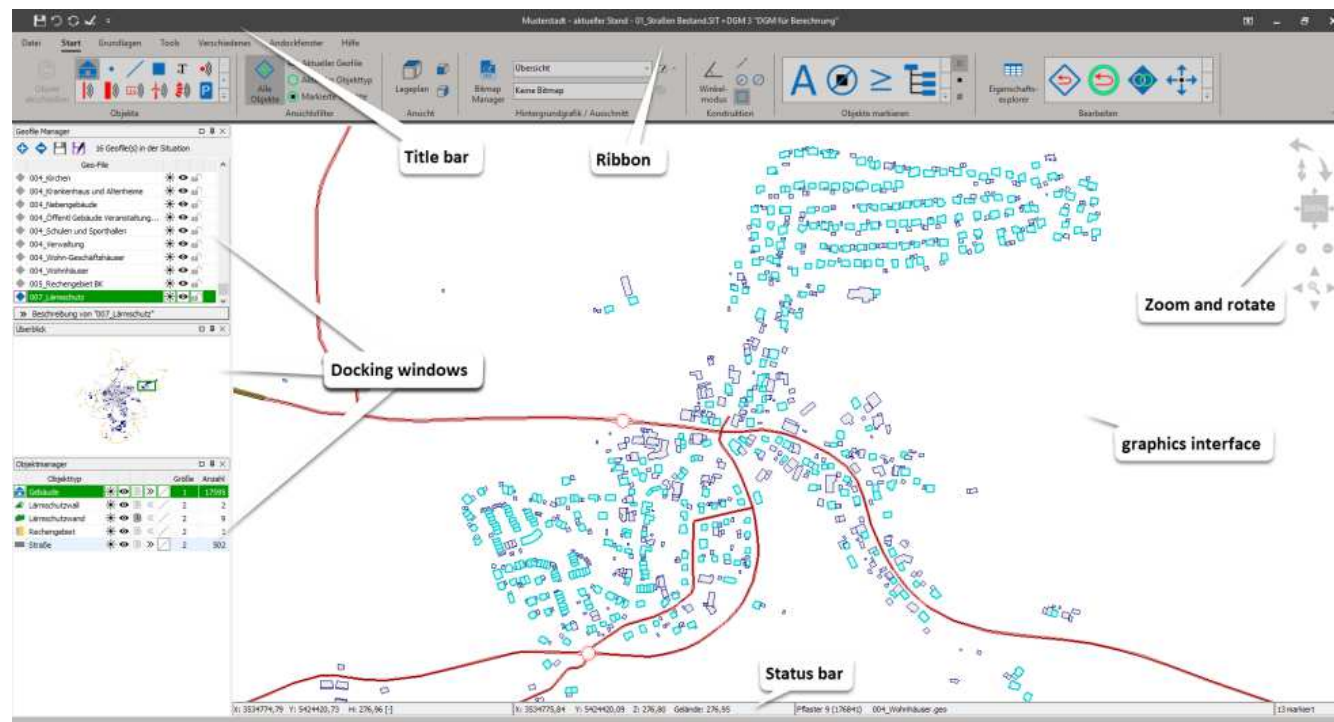
Overview of all modifications

- **General**

- The options dialog has been reorganized and now opens much faster. Standards and standard selection have been combined. If a new standard is added to the standard selection, it can be selected directly without leaving the options dialog. In addition, the settings for online map services and the definition of a tiling system have been added.
- If standards are changed in the options in the Geo-Database file menu, the selected standard becomes active without restarting the Geo-Database.
- The declarations of conformity are accessible via the Help menu of the SoundPLAN Manager.
- The connection to Google Earth is no longer available, because it fails with current versions of Google Earth.
- In all fields where values can be changed by clicking the arrow keys, you can now also do this by turning the mouse wheel.



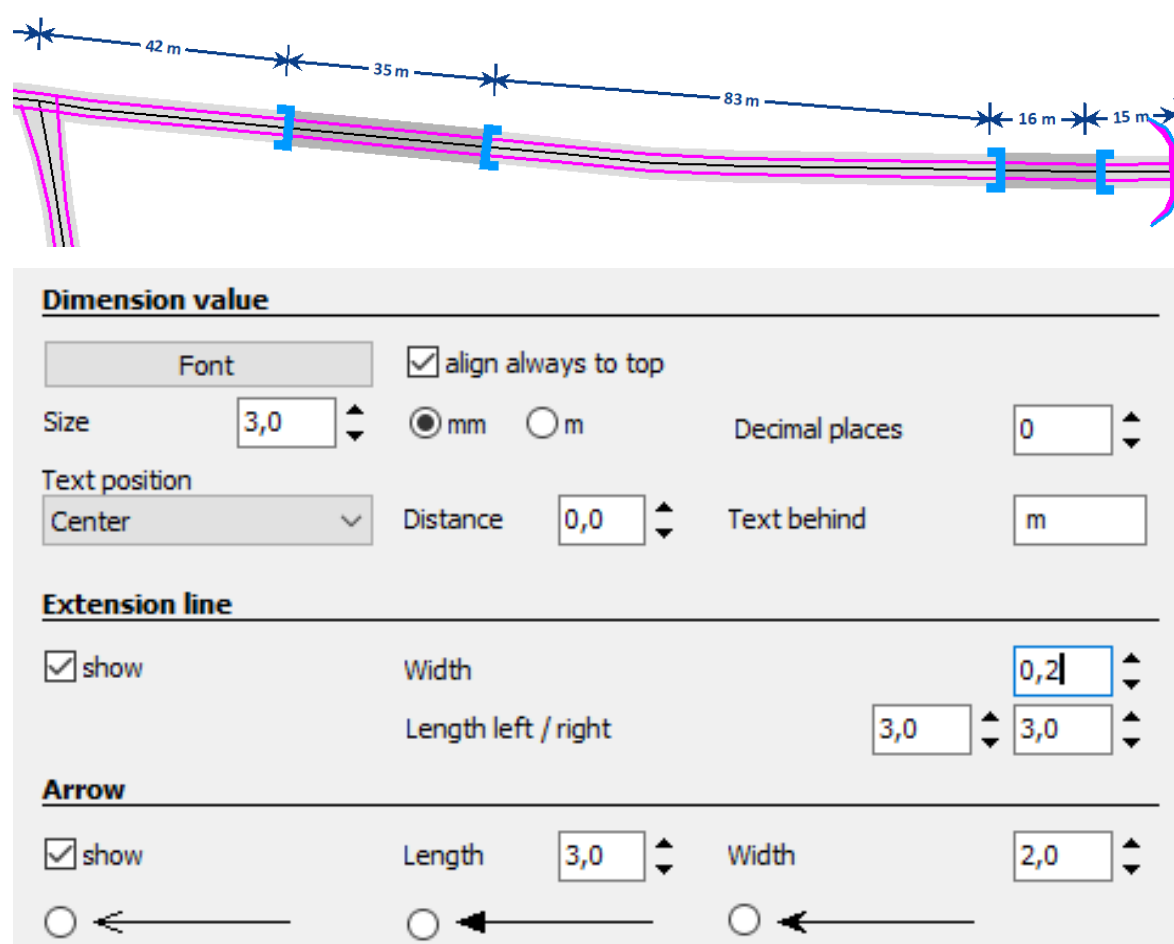
- **Geo-Database:** The design of the Geo-Database has been completely revised. In addition, new functions have been added and working with background graphics has been greatly improved. Please read the chapter in the manual (SoundPLAN Manager **HELP | MANUAL**), see "[Selected innovations in the Geo-Database](#)" (page 8).



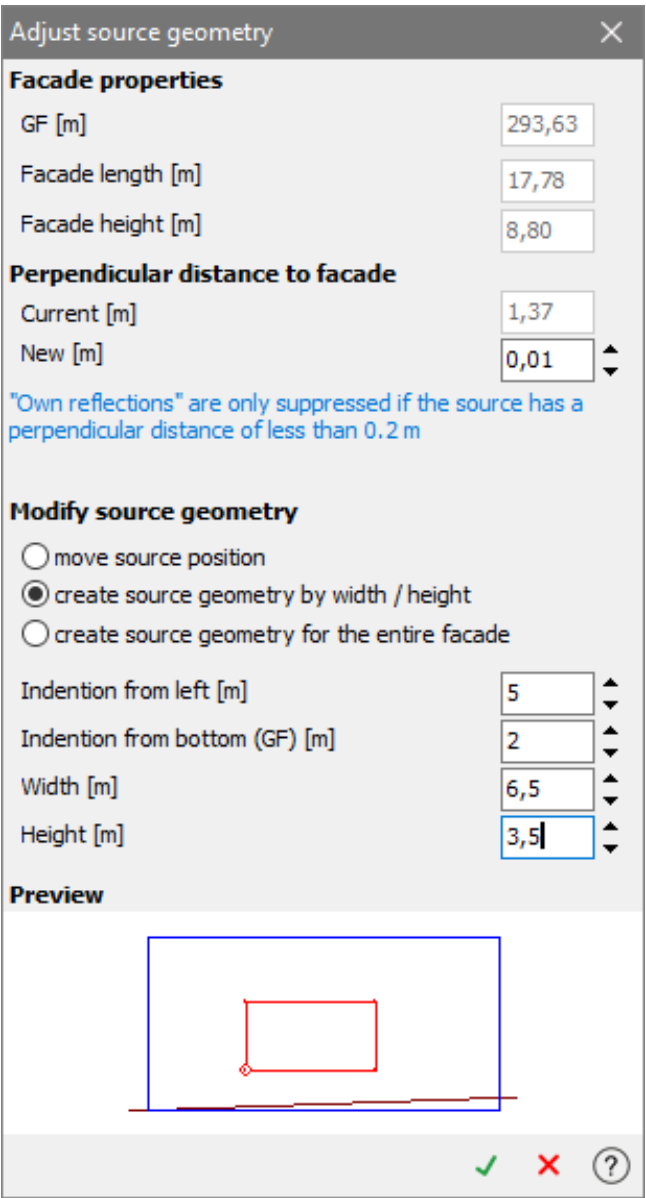
- **Geo-Tools**

- Geo-Tools **Create parallel object:** A preview of the newly created object is displayed during entry.
- In the Geo-Tool **Distribute inhabitants and dwellings** you can now process inhabitants and dwellings available in area usages or a value grid in one step. In addition to the calculation mode "base height * number of floors", the calculation mode "building volume" according to CNOSSOS-EU has been added. The "extended assignment" has been dropped.
- Geo-Tool **Connect objects:** You can ignore height differences between objects, i.e. use the 2-dimensional instead of the 3-dimensional distance between objects. In this case, the upper height of the two objects is used.

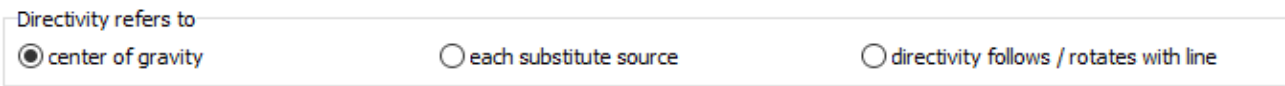
- In the Geo-Tool **Evaluate elevation points for building height**, you can now select whether the height from which the difference to the terrain is derived should be determined by the arithmetic mean or the median.
- New Geo-Tools: **Create multiple copies of objects, mirror objects, merge properties from partial buildings, combine building areas**, see "[New edit functions and Geo-Tools](#)" (page 11).
- **Import**
 - When **importing Shapefiles, CityGML, ASCII and DBF**, you can open a preview of the import file properties in the mapping table and thus view the contents of the columns contained in the import data directly during import.
 - When importing **CityGML**, you can optionally import roof areas, wall areas and floor areas into separate Geo-Files to validate the imported buildings.
- **Export**
 - When exporting shapefiles from the Geo-Database and Graphics, the projection file (*.prj) is now also generated.
- **Objects**
 - **The Measuring tape** object is no longer a temporary object and can be displayed as a measurement chain in the Graphics [Cartography].



- For the **Stage** object, the object number and free properties have been added.
- The **assignment of sources to buildings** has been improved once again and a preview window has been added.



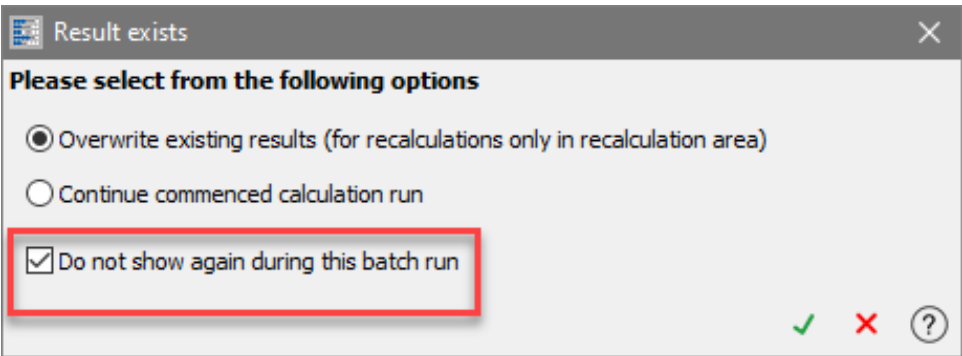
- For **noise sources** and **wind turbines**, the tab *Additional* removed. The information correction factors, rotor diameter, ... is entered in the tab *General*, the definition of the directivity in the tab *Directivity*.



- In the properties of **ground effect areas** the checkmark **WATER AREA** was added, this evaluates the parameters of the ground effect according to Schall-03:2012, IoA Windturbines or BEK no. 135 (wind turbines). For all other standards, a water area is evaluated as hard ground (G=0).
- Parking lot: Swiss standard VSS-40578:2019 implemented.

● **Calculation core**

- **Overwrite / continue** is no longer linked to a progress bar. Select the desired option and start the calculation with the green check mark. For batch calculation runs, the checkmark **DO NOT SHOW AGAIN IN THIS BATCH RUN** will use the selected option for all calculation runs.



- If there are different emitters in the situation, but not all of them shall be calculated together, you control the emitters to be calculated with the check mark in front of the standard. In this way, you can, for example, consider bridge structures of a rail-

way track in a road noise calculation, industrial buildings as pure obstacles or hard road surfaces as ground effect without calculating the noise type.

GeneralSettingsStandardsAssessmentGrid MapStatisticsDescription

Road noise

☒

CNOSSOS-EU: 2021/2015

Emission

CNOSSOS-EU: 2021/2015

Railway noise

☒

CNOSSOS-EU: 2021

Emission

CNOSSOS-EU: 2021

Industry noise

☒

CNOSSOS-EU: 2021/2015

Parking lot noise

☒

CNOSSOS-EU: 2021/2015

Emission

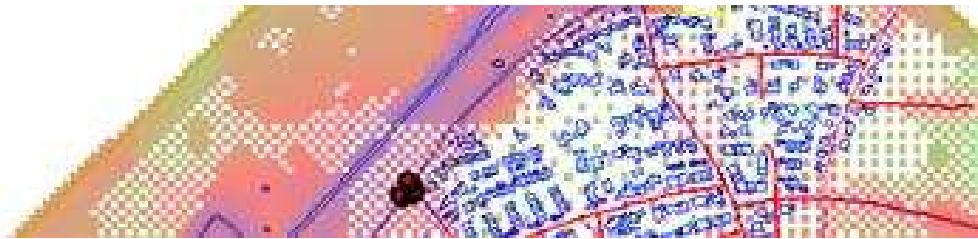
Parkplatzlärmstudie 2007

Wind turbine noise

☒

BEK nr 135 af 07/02/2019, Wind Turbines

- If Cmet is defined by a wind statistics, C0 is displayed informatively as a table in the standard settings.
- The calculation of Grid Noise Maps has been sped up, especially for computers with many cores. The 9 x 9 blocks are now resolved into individual points during the calculation, so that the calculation is no longer slows down towards the end.
- The calculation run graphic for displaying grid calculations has been optimized so that switching to the tab *graphics* no longer increases the calculation time.



- The limitation of the tile size for tiling calculations to 2 x 2 km tiles was no longer up-to-date. Per project, you can now create one tiling system for the calculations in any size. Depending on the computer performance and the available memory, larger tiles can significantly speed up the calculation. Try out what is the best configuration for your computer environment, your projects and the standards you use. We recommend sufficient RAM and the 64-bit version.
- For Facade Noise Map calculations, it is now possible to take over not relevant levels from a beforehand calculated Grid Noise Map if the values from the Grid Noise Map result are below a user defined threshold value at all receivers of a building. This may speed up the calculation time of the FNM considerably.

AllgemeinEinstellungenRichtlinienBewertungGebäudelärmkartePegel aus RLKStatistik

Beschreibung

Ergebnispegel von der angegebenen RLK übernehmen, bei denen die RLK Pegel aller Fassaden unterhalb des eingegebenen Schwellenwerts liegen. Bei der RLK muss die gleiche Bewertung eingestellt sein. Die Schwellenwerte können nur für Leq Zeitbereiche angegeben werden.

RLK Rechenlauf Nr.

2

Schwellenwerte

Zeitbereich	Schwellenwert [dB]
LrT	40
LrN	40

- **Calculate objects in DGM:** It is now possible to consider the DGM height at the road edges for the resulting DGM instead of the z coordinate of the road axis. In this case, the DGM should represent the road edges very accurate. This is especially interesting

for highway projects where a highway has a cross slope in curves. It is also interesting for all standards where the height of the emission line above the gradient is small.

- If the DGM elevation from the road edge has been included in the DGM, the checkbox **TREAT ROADS AS TERRAIN FOLLOWING** in the tab *Settings* is set and displayed informatively grayed out. This has the effect that the height of the emission lines for roads with cross slopes are adjusted so that both emission lines are at the height above the DGM defined in the standards.

- **Indoor calculations**

- More options have been added to the **calculation run settings** for indoor calculations with SPD:

- The **NON-CONVEX CALCULATION METHOD** can be used for complicated Situations that contain a large number of areas. It is a normal SPD simulation that uses a different form of geometric preprocessing. In general, this preprocessing runs faster and has lower memory requirements. The main simulation often runs faster with this method (but not always).

Unlike the standard method, this pre-processing does not implicitly include comprehensive spatial analysis, which is used to identify acoustically closed spaces, allowing better documentation of acoustic materials and allowing inaccessible receivers to be disabled. Surface documentation is also available in non-convex mode, but it includes surfaces within enclosed spaces (e.g., cabinets) that do not contribute acoustically.

- It is possible to ask for an additional full **ROOM ANALYSIS** in non-convex mode by checking the box in the run settings. This, of course, will re-introduce the run times and memory requirements of the standard pre-processing, on top of the non-convex pre-processing. However, if the main particle simulation runs faster in non-convex mode, this may be worth considering.
- The threshold **FAST APPROXIMATION FOR TRANSMISSION LOSSES HIGHER THAN** is used to speed up calculations where the room-to-room transmission is important. This sets the minimum probability with which particles can transmit to ensure a sensible particle flow.
- The **indoor Meshed map** creates a triangulated horizontal mesh of receiver points which can be used to create a continuous sound map. Two categories of receiver points are employed: those placed close to vertical walls and those placed in object-free areas. The resolution of both categories can be adjusted. As such, the Indoor MNM is a more flexible and (potentially) more efficient version of the grid noise map because it is designed to place more receivers where sound levels vary rapidly (close to walls, for example) and fewer where the sound field remains flat. This can allow accurate mapping with fewer receivers.

Note that for the grid to work properly, it is necessary to place receivers at both ends of each wall segment placed in the situation. If structures with very small segments have been modelled, this will result in a high density of receivers, and this cannot be controlled with the resolution settings. Therefore, keep geometries as simple as possible.

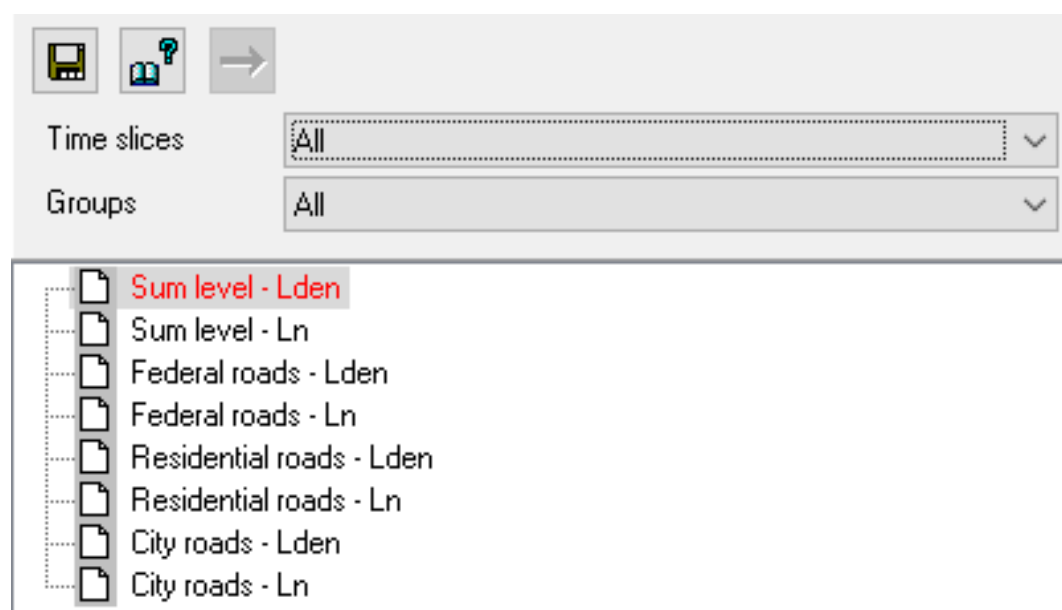
- **Auralization** has been improved, now more than one source can be auralized at the same time, which is important when the signal comes from a loudspeaker system. In addition, SoundPLAN distinguishes between "useful signal" sources and "background noise" sources. For auralization, both source types can be auralized together, giving a realistic impression of the speech intelligibility of a speaker, see "[Auralization](#)" (page 13).

- **Spreadsheet**

- When selecting the column types (e.g. limit value, time slice, groups), the same setting is preset for further results. The limit value is switched off by default from the second result.
- The list of calculated group results can be inverted with **Ctrl+G**.

- **Graphics**

- A simple tool for measuring distances has been implemented in "Edit map".
- In the sheet tree, you can now also load sheets with a double click.
- The used **assessment** can be selected as a text variable.
- New: **Results manager (F8)**. All partial results stored in a result (time slices, floors, groups, frequencies) are listed in a tree structure. You can use the selection lists to control which partial results should be displayed. All selected partial results can be printed and exported together. You can also create own sheets for partial results.



- **Wall design**

- In the receiver list, the exceedance to the target level is displayed as an additional column.

- **BA-Outside**

- In the print settings, the facade list can optionally be documented with the outer wall.
- In the list of measures of the 24th BImSchV, an overview of all components can now optionally be printed.

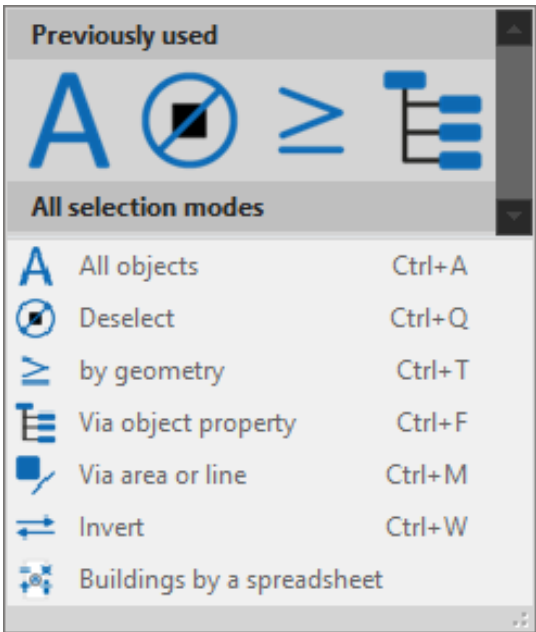
- **New standards**

- BEK nr. 135 07/02/2019 Wind Turbines, Swiss parking lot VSS-40578:2019, sonRoad18:2021, TNM 3.0

Modifications in detail

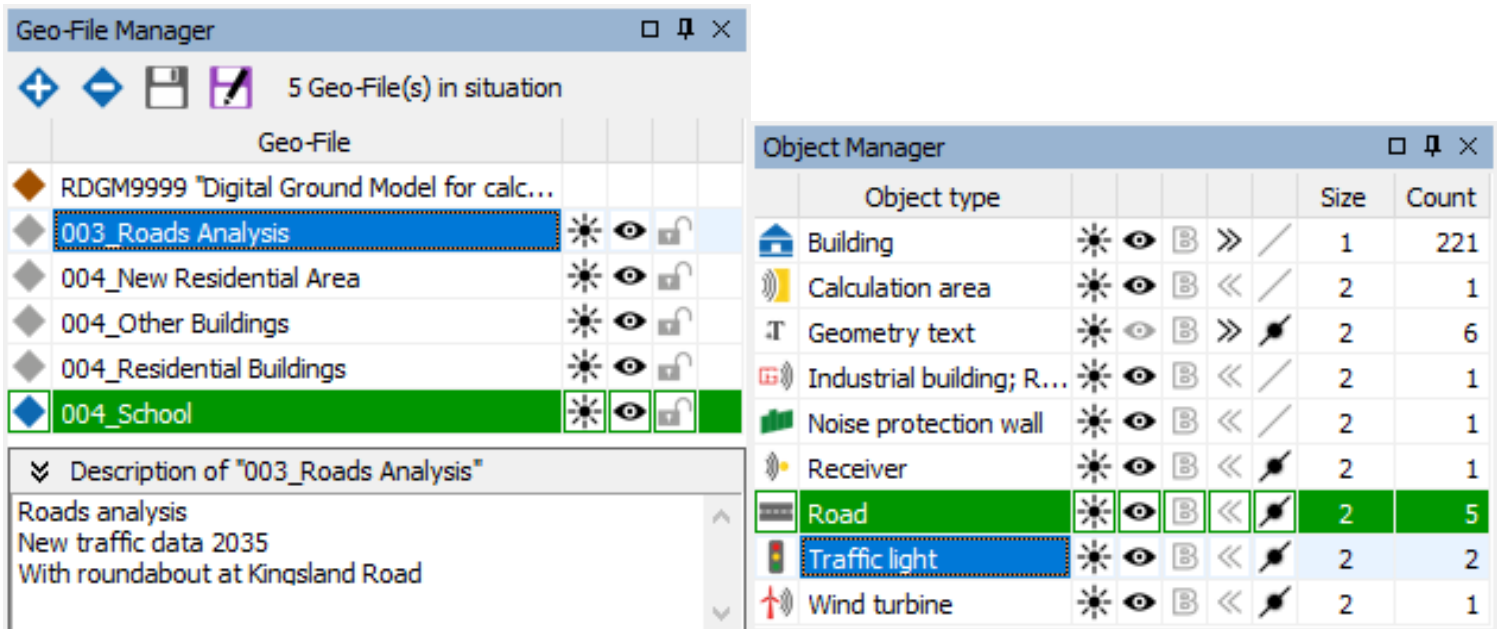
Selected innovations in the Geo-Database

Instead of long and nested menus, the functions are now arranged in ribbons. List views of the individual functions allow quick access to the last used functions on the one hand, on the other hand all functions of a group can be opened quickly with one click.



The docking windows allow to customize the elements displayed on the screen permanently or when hovering over them with the mouse. 3D Graphics, Logbook, Object Manager, Geo-File Manager and a graphical overview are available as docking windows.

Object Manager and Geo-File Manager clearly list all object types or Geo-Files present in the situation together with the display settings (hidden, with properties, ...) and the number of objects.



In the Geo-File Manager, you can expand and change the **description** of the selected Geo-File.

Working with background bitmaps - selected functions

- Bitmaps are georeferenced and edited in the Bitmap Manager.
- The bitmaps are stored in different resolutions so that the resolution is always high enough regardless of the zoom level.
- The current geometry section is no longer reset when the bitmap is deactivated.
- There are no more restrictions on the number of bitmaps displayed - they are managed in bitmap groups. In addition, you can rotate the geometry even with the bitmap switched on and open front view and side view.
- Bitmaps can be combined into bitmap groups so that, for example, tiled aerial images are combined into one bitmap group for projects with a larger extent. Bitmaps with different levels of detail within a section can also be displayed together. For example, the detailed bitmap of a construction project and the bitmap of the surrounding area.
- Bitmaps and bitmap groups can be saved as geometry sections at the click of a button, allowing you to select a specific section.




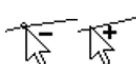
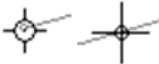



Use the **File menu** to access the Situation Manager, recently used Situations, and the option dialog. You can pin recently used situations so that they are always displayed on top.

In the **Situation Manager** a new Geo-File filter was added that only lists Geo-Files containing a certain object type.

The Geo-Database no longer needs to be closed to activate the associated emission when the road or railway standard changes.

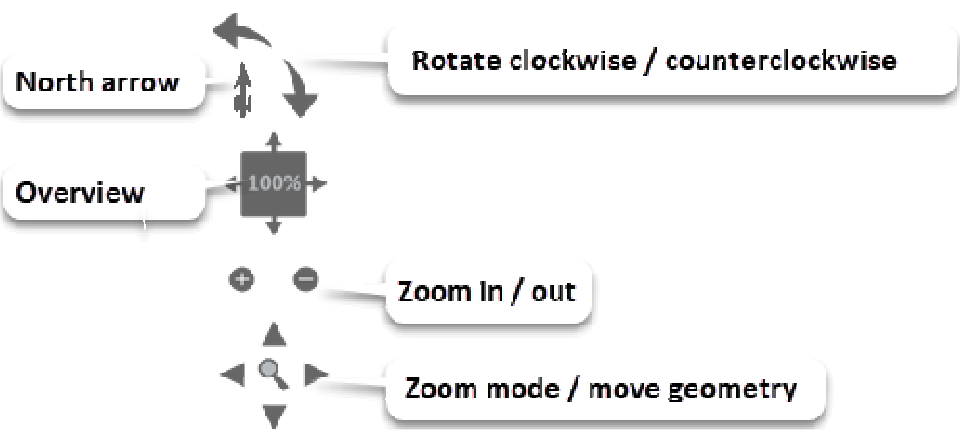
With **rotated geometry**, objects entered by dragging a rectangle will also be rotated accordingly.

The **different functions** performed by the left and right mouse buttons with the **Alt, Ctrl or Shift key** additionally pressed have been extended. The cursor visualizes the selected function:

	Left mouse button: Enter coordinates Right mouse button: Selected actions for selected objects Rotate mouse wheel: Zoom geometry Drag frame left mouse button: drag line, rectangle or circle Drag frame right mouse button: select objects over section
	Left mouse button: Call up properties dialog Right mouse button at object coordinate: actions for the selected object By additionally pressing the < key , the arrow cursor is temporarily switched off.
	For selected objects Left mouse button: Move single object points or whole objects (pink diamond) Alt+ Left mouse button: Duplicate selected objects (pink diamond) Ctrl+ Left mouse button: Rotate whole objects (pink diamond)
	Shift+ Left mouse button on object coordinate: Delete point Shift+ Left mouse button on object line: Insert point
	Ctrl+ Left mouse button on object coordinate: capture point Ctrl+ Left mouse button on object line: capture position on line
	Alt+ Left mouse button on object: Select object Ctrl+ Alt+ Left mouse button on object: Selects more objects Ctrl+ Alt+ Left mouse button on selected object: deselect it
	Turn the mouse wheel: Reduce / enlarge section (zoom). The zoom mode at the top right of the screen drags a zoom frame. Shift + pressed mouse wheel activates the zoom mode temporarily.
	Mouse wheel pressed: Move geometry

For area-type objects, the last object line automatically generated when the object is closed is processed as a "normal" object line, so that for example, points can also be inserted in this line.

Rotation, zoom overview: In the right section of the graphics interface, semi-transparent functions for rotation and zoom are placed. They become active when you move the mouse over the section.



The two arrows at the top can be used to rotate the geometry clockwise or counterclockwise in 5° steps. You can rotate continuously by holding down the **Ctrl key** and using the

mouse wheel. The north arrow rotates accordingly. By clicking on the north arrow, the geometry will be displayed in the north direction again.


Via the small + and - symbol, with the mouse wheel or via the "Page up" or "Page down" buttons you zoom the geometry. Below this is the zoom mode, where the cursor changes to a magnifying glass. In the zoom mode, you can either zoom in by dragging a frame around an area or zoom out by clicking the left mouse button or zoom in by clicking the right mouse button. To use the zoom mode temporarily without the cursor changing permanently, drag an area with **Shift + mouse wheel**. The four arrows at the bottom move the geometry section by half the width of the screen.

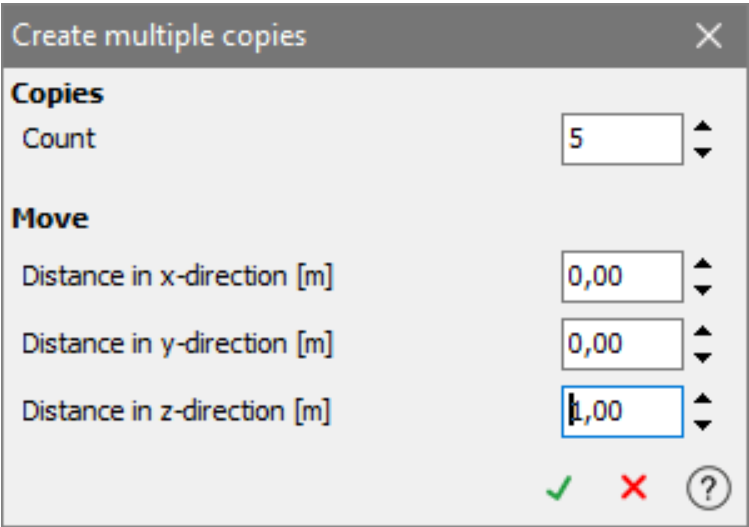
Using the context menu of the right mouse button you can **transfer properties from one object to another**. For example, the traffic data of a second rail line or spectrum, day histogram and directivity of a source. Right-click the object from which you want to transfer properties and select **COPY PROPERTIES**. All properties of the selected object will be copied. Now click on the object to which the properties are to be transferred. Select from the list which properties are to be transferred. If different object types are selected, only compatible properties are listed.

The **construction modes** have been improved. The "Right angle mode" is now an angle mode, preset is an increment of 15°. Object points can also be entered with the **SPACE BAR**. **PRESSING** the **C KEY** opens the dialog for numerical entry of distance and angle for line and area objects.

New edit functions and Geo-Tools


Create multiple copies

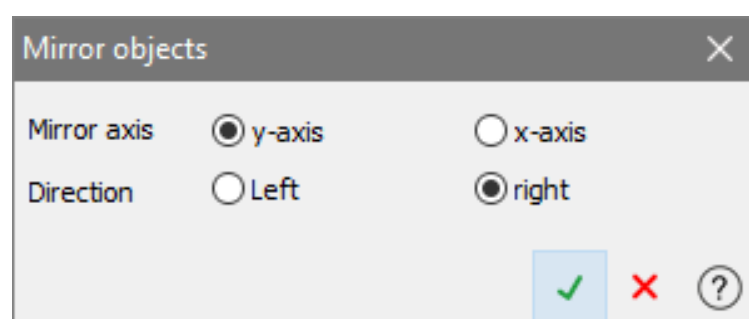
 You can create multiple copies from one or more objects and move them in x, y and / or z direction. In this way, for example, several surface noise sources stacked on top of each other or construction windows with the same floor plans can be created at once.



Select the objects you want to process, and call **CREATE MULTIPLE COPIES** from the **Edit list view**. Specify the number of copies and the distance in the different directions. The result in x- and y-direction is already visualized in the Geo-Database interface during the input, so that you can check the position. The properties are taken from the original object(s).

Copy and mirror objects

 Select the objects you want to mirror and call **COPY AND MIRROR OBJECTS** from the **Edit list view**.



Set the mirror axis and select the direction left / right or above / below. The result is already displayed in the Geo-Database interface during the input.

Merge properties from partial buildings

When importing building data (e.g. CityGML) it can happen that buildings are subdivided into several partial buildings, but properties like road name or function ID are not contained in all partial buildings. The GML ID from CityGML is contained in each partial building and is automatically imported into the building name.



To merge the properties, the Geo-Tool **MERGE PROPERTIES FORM PARTIAL BUILDINGS** needs a unique characteristic to identify the related sub-buildings. For CityGML data, it makes sense to use the GML ID in the building name. However, you can also select a unique key from another building property.

If a property is not unique, e.g. because two partial buildings have different values in one property, the replacement for this (!) property is skipped and a warning is written in the logbook.

Completing lost properties should be done before combining building parts, otherwise properties may be lost completely.

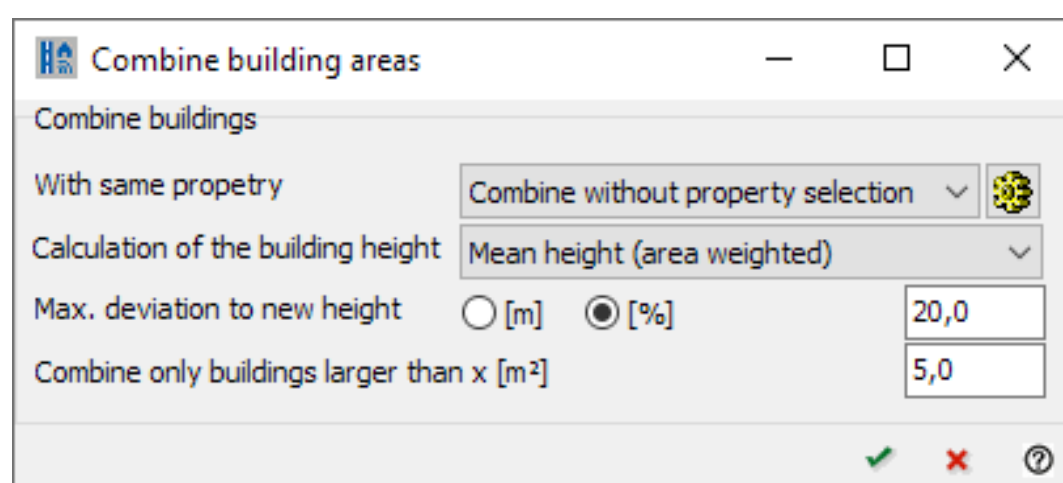
Combine building areas



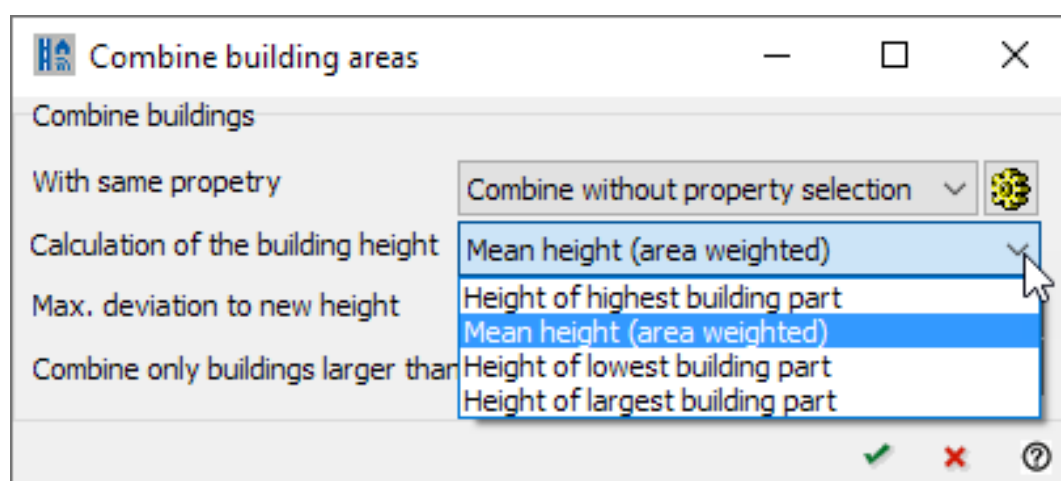
Use **BUILDING TOOLS | COMBINE BUILDING AREAS** (Shift + W) to combine for example annexes to main buildings or partial buildings from a CityGML import.

Sometimes the partial buildings form a CityGML import strongly differ in height (e.g. church tower and church nave) and should be kept as separate buildings. Sometimes they differ little (by number of dormers, by coincidence (laser points), by multiple floor plans under one roof, etc.) and can be combined. Still others are very specifically nested and may only be partially combined.

For this purpose, building parts that can be combined must first be grouped. You can use a key property for this, according to which the first grouping is done, and a minimum size, by which the group is reduced again and also divided.



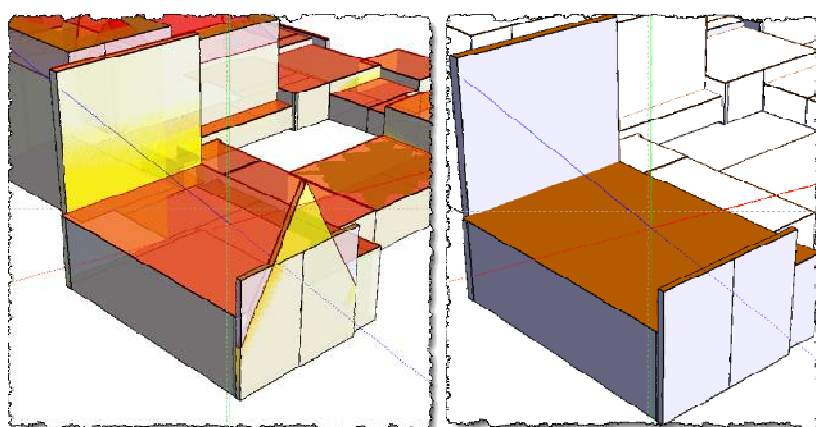
Next define how you want to determine the height of the new, combined buildings.



In order not to always automatically combine all building parts, additionally enter a height tolerance to the new height in [%] or in [m]. Buildings that are sorted out according to these criteria are not combined. For the combined buildings of a group, the properties (except building height) are determined from the largest partial building of the group.

Starting the procedure, first the buildings will be grouped, if they match to the settings, and combined.

It is not always sensible to blindly use a mean height, because in almost every inspected CityGML file we found walls and other building types which were set in front of the façade with a fantasy height and fantasy roof type, e.g. inspired by a nearby tree. Such errors point on photogrammetric work without any quality control.



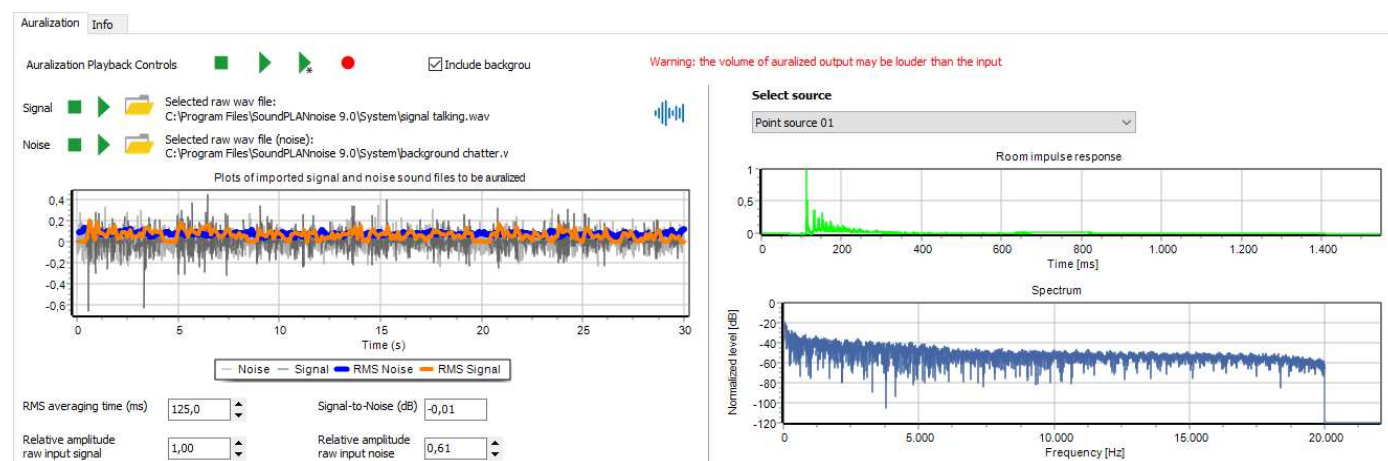
In reality the shown building is one simple, rectangular flat roof building. To correct the result, you can e.g. combine the 4 partial buildings using the setting “Height of lowest building part” and a max. deviation of 100 m. So you will get all parts together with a sensible height. To combine saddle roof parts, instead you should prefer “Mean height (area weighted)” and a sensible deviation.

The areas must not overlap. Therefore, if necessary, first run the Geo-Tool "Clean up overlapping areas".

Auralization

Switch on the **AURALIZATION** in the *Single Points checkmark* and perform the calculation. Since auralization is very memory-intensive, only situations with a few receivers should be auralized, ideally only with one receiver. Check the result against the echogram and the decay curve to ensure that it is smoothed and that a sufficient signal arrives.

In the results tables, switch to the *Auralization* box.



Select the wav files for useful signal / background noise. An example is supplied in each case. You can call these up via the **USE SUPPLIED DEMO FILES** icon. You can select your own useful signal and background noise files using the **OPEN** buttons. The **START** and **STOP** icons are used to play the files or to stop playback.

If you select useful signal and background noise, these files are mixed with the relative volumes corresponding to the signal and background noise levels from the calculation. If only one file is selected, only that file is auralized. You can disable background noise for two selected files using the **USE BACKGROUND NOISE CHECKMARK**.

The useful signal and background noise should have the same volume so that an output has the same balance as in the calculation. Therefore, both signals are normalized via an RMS average (Root-Mean-Squared), where the averaging is done via time blocks whose length you can set.

If the automatic procedure does not give a satisfactory result (for example, because an input signal has gaps), you can adjust the **RELATIVE AMPLITUDE** for signal and background noise until the volume has converged.

Select the source(s) for auralization. This way you can simulate a loudspeaker system where several sources provide identical signals. You will notice the delayed arrival of the signals with speakers located at different distances from the receiver. "All sources" is not useful for a mixture of loudspeaker sources and noise sources, because the noise sources are also considered like loudspeaker sources. The diagrams show the room impulse response and the spectrum of the sources.

In the auralization playback you play the auralized original signal (green arrow), or the overall signal (green arrow with star). The red recording symbol saves the auralization as a wav file.

Note: The auralized signals are normally listened to via headphones so that acoustic effects of the room can be excluded. The listening impression can vary greatly depending on the devices used.

The output of the signals is normalized and may be louder than the input signals. Please test the volume with a low volume setting to avoid hearing damage.