
SoundPLANnoise

Contents of the individual modules

Document version June 2020



SoundPLAN GmbH | Etwiesenberg 15 | D-71522 Backnang
Phone +49 (0) 7191 9144-0 | Fax -24 | mail@soundplan.de

Base Modules

Data input via georeferenced bitmaps or import data from DXF, ASCII and QSI

Import elevation data with intelligent thinning of dense elevation information

Creation of digital ground models (DGM) for the elevation supply of the geometry and the calculation

Calculation of berms and sources in a DGM including calculation of embankments

Data adaptation to various data situations via automated geometry, building and elevation tools, e.g. create parallel objects, bridge recognition from the terrain, assign inhabitants to buildings, unite areas, ...

The Property Explorer lists all properties of an object type as a table. Object properties can be changed for several or all objects together - also via formulas.

Free properties that can be created as required, for example, to read in additional information during import or to consider preloads at receivers

Front view, side view and a 3D wire model data control during input

The geometry preflight jumps directly to conflicts in the input data, which could lead to problems in the calculation.

Various libraries filled with a lot of data for example for emission, sound transmission, directivity, train tables, assessment, day histogram

Powerful and fast calculation core, supports multi-core and multiprocessor PCs

Calculation of single receiver points – either assigned to buildings or free field receivers. One receiver may have any number of floors that are simultaneously calculated.

Batch calculation – Several calculation runs are processed one after the other.

Graphical representation of the results as level tables and as level charts

Result display of the contribution levels or the sum level as well as individual frequencies or groups

Documentation of results in different levels of detail (e.g. documentation of the sound propagation parameters)

Tabular documentation of noise protection measures

An integrated spreadsheet adapted to the special requirements of noise calculation

Flexible graphical plan output with title block, scale, north arrow and individual design of the displayed geometry data and geometry bitmaps together with the calculated results in 2D.

Display of the objects and scale colors according to DIN 45682

Cartography

Google Earth, Google Maps and OSM open with a mouse click in the area of the entered geometry data.

If the project does not yet contain any geodata, simply select the desired area via the address search and deposit a georeferenced bitmap as a basis with a single click.

Elevation import from Google Maps and OSM

Access to WMS servers for data input and plan output. The section automatically adapts to the selected geometry section. If desired, a bitmap can also be included in the project.

Export of geometry and contour bands of a grid noise map to kml

Import of photo points with GPS data. Representation of the photo points with view direction in a map and clear tabular photo documentation with number, picture and description.

Any columns from the integrated spreadsheet can be output in a map as small tables with reference to the receiver point.

Conflict maps and sum conflict maps for noise maps.

With the symbol editor you can create your own symbols, for example traffic signs, which make the thematic maps even more meaningful.

Extended object representation in 2D and 3D, for example individual line, chain and surface definitions, 3D wall with posts, different tree species for a more realistic 3D view.

Import of measured values (ASCII) into a table or as an aerial measurement map, for example to superimpose results from other programs with SoundPLAN results or to consider a preload.

Automated map description (e.g. reference kilometers of a wall, wall heights, source number, kilometer marking).

Map sections and overview map for the effective presentation of results of, for example, motorway and noise remediation projects, including automated generation of maps, graphics and export data for all map sections.

Road / Railway noise propagation

Standards road: ASJ-RTN Model 2003 · ASJ-RTN Model 2013 · BUB:2018 · CNOSSOS-EU Road:2015 · CoRTN:1988 · CoRTN [AU-NSW]:2013 · DIN 18005 Strasse:1987 · EMPA StL 86 · EMPA StL 86+ · EMPA StL 97 · FHWA:1978 · HJ2.Road:2009 · Hungarian Road · NMPB 96 · NMPB 2008 · Nord2000 Road · ODM 218.2.013:2011 · RLS-90 · RLS-19 · RTN: 1996 · Russian Road · RVS 3.02 · RVS 4.02 · RVS 4.02.11:2019 · sonRoad18 · Standaardrekenmethode2:2012 · Statens planverk Report no.48: 1980 · TNM 2.5 · TNM 3.0 · VBUS:2005 · VRSS:1975

Standards railway: BUB:2018 · CNOSSOS-EU Rail:2015 · CoRN:1995 · DIN 18005 Schiene:1987 · FTA / FRA-HSGT: 2005 · GOST R 54933:2912 · HS2 Phase 2b · Israeli Rail:2006 · Japan Narrow Gauge Railways:2008 · Kilde Report 67/130 · NFS 31-133 Rail:2007 · NMT:1996 · Nord2000 Rail · ONR 305011:2004 · ONR 305011:2009 · RMR:2002 (EU Interim) · Russian Rail · RVE 04.01.02:2019 · Schall 03:1990 · Schall 03:2012 · SEMIBEL · Transrapid · VBUSch:2006

All properties of roads and railways may change from coordinate to coordinate, for example bridge addition, curve radius or speed limit of 70 km/h. This means that no individual source segments need to be managed.

The coordinates with property changes are specially marked and are thus easy to find.

The distance between the emission bands and the road edges from defined cross sections can be conveniently graphically adjusted, for example, if a turning lane is added.

The base line of a noise barrier can be generated directly from the edge of the roadway.

The road day histogram library allows the direct allocation of hourly traffic volumes from road planning software.

Automated import of train assignments from the Excel data sheets of Deutsche Bahn for Schall 03:012

Project in neighboring country? All standards - one price.

New directives, such as CNOSSOS-EU, are incorporated into the current version and are free of charge with warranty and maintenance.

Roads and railways can be combined to different source groups, e.g. roads in the responsibility of different authorities and later optionally evaluated and displayed in groups.

Parking lots according to RLS-90, RLS-19 and Bavarian Parking Lot Study 2007

Tunnel opening and bridge as structures

Road edges, rail tracks, tunnels and bridges can be included in the DGM calculation so that the emission bands are not buried.

Calculation of single points, grid maps, cross-sectional noise maps, facade noise maps

Industry noise propagation

Standards industry noise: ASJ CN-Model:2007 · BS 5228-1:2009 · BUB: 2018 · CNOSSOS-EU Industry:2015 · Concawe (International standard of the petrol industry) · DIN 18005:1987 · DIN 45691 · General Prediction Method:2019 · General Prediction Method:1982 · HJ 2.4: 2009 · HMRI-II.8: 1999 · Industry Noise Model – based on TNM 1998 · ISO 9613-1:1996 · ISO 9613-2:1996 · Japan Industry Model:2003 · NF S 31-133: 2011 · Nord2000 · ÖAL 28: 2019 · ÖAL 28 · ÖNORM ISO 9613-2:2008 · Schall 03:2012 (RuLII3hf) · TA Lärm einfaches Verfahren · VBUI · VDI 2714/2720:1988

Standards wind turbines: IoA GPG Wind Turbine Noise · ISO 9613-2 interim:2015-05.1 (LAI Windkraftanlagen) · Danish Statutory Order No. 1284

Input and calculation of point, line and area sources (also vertical and on the facade), industrial buildings, parking lots, wind turbines and open-air concerts.

Noise at Workplace (powerful tool to calculate and document the noise exposure of workers at different workplaces (indoor or outdoor) over the working period.)

All standards - one price. Also holds for calculations according to the meteorologically and physically demanding Nord 2000

Open-air events with one or more stages are calculated according to ISO 9613-2 or Nord 2000, taking into account the relevant coherence effects.

Line sources, area sources and parking lots with relative elevation can be defined as "following the terrain".

The height of a source above ground can already be given in the emission spectrum in the library, for example for wind turbines where the hub height is type-dependent or the truck where the emission is always 1 meter above ground.

Exposure time as hourly day histogram in different units, e.g. minutes, percent, events or via direct input of a dB value

Calculation of low-frequency noise including G-weighting

Frequency bands in thirds and octaves from 1 - 20,000 Hz

Sound pressure levels can be converted into sound power levels at the push of a button

Rest period surcharges are automatically evaluated for the calculation on the basis of the selected assessment and the usages.

Sources can be combined into source groups, for example the sources of each company separately and later optionally evaluated and graphically documented in groups.

For grid maps, individual frequency bands can be graphically documented in addition to the sum level.

The industrial building is a special building in which all outer surfaces, including the shed roof and saddle roof, can radiate sound. In the industrial building editor, the components are conveniently entered, duplicated and provided with properties.

Unique: Outdoor noise can be calculated in one step using the sound pressure level inside, taking into account the sound transmission values of facades, gates and windows.

Frequency-dependent 2D and full 3D directivity library

Interface to freely available loudspeaker data imports spectrum and full 3D directivity

Detailed tabular documentation of results and input data

Calculation of single points, grid noise maps, cross-sectional noise maps, façade noise maps

Indoor Noise

Sound propagation in the interior according to VDI 3760 and an advanced sound particle model with diffraction for the calculation of noise in the workplace and room acoustics.

Calculation in halls, offices, auditoriums, etc., taking into account any room shapes and facilities

The equipment, for example interior sources, absorption surfaces, walls, intermediate ceilings, desks, cupboards, machines, baffles, etc. are intuitively entered in the industrial building editor and provided with source and material properties.

"Hallout" is a calculation that calculates the internal level at the enveloping surfaces from the properties of the indoor sources and stores the corresponding spectrum as a day histogram in the library.

Calculation of single points, grid maps, cross-sectional maps and "Hallout"; the results are assessment levels, sound propagation curves and horizontal and vertical noise maps.

Room Acoustics

Indoor noise module required

Calculation of reverberation times and various room acoustic parameters, such as speech intelligibility STI, distraction distance or privacy distance according to ISO 3382-3:2012 and E VDI 2569

Implemented room acoustics parameters: Reverberation time (T60, via T20 or T30 method) · Speech Transmission Index (STI) - male voice, female voice and averaged · Early Decay Time (EDT) · Clarity (C80, C50) · Clarity (D50) · Center Time (CT) · Strength (G) · Early Lateral Energy Ratio (LF and LFC)

Calculation of measurement paths, single receivers and grid maps

Automatic print-ready room classification according to E VDI 2569 or an assessment according to DIN 18041

Auralization

Graphical representation of all calculated room acoustic parameters via color-coded receivers, small tables or horizontal or vertical propagation maps.

Aircraft Noise

Calculation and data input according to DIN 45684-1: 2013-07, AzB 2008, AzB 1975, AzB 1975 DIN 45643, BUF:2018, CNOSSOS-AT: 2019, ECAC 2nd, 3rd und 4th Edition, CNOSSOS-EU, SANC, AzB 1975 Hungary, ÖAL 24:2004, AzB 1975 ÖAL 24

Complete integration of the current German Fluglärmschutzgesetz (Aircraft Noise Protection Act), checked for accuracy by the German Federal Environment Agency

Import of a complete model via QSI

Import of aircraft databases from Eurocontrol and INM data

Calculation of any descriptors, such as Leq, maximum level, NAT exceedance frequency, threshold value acc. to NAT, wake-up probability, ANEF (Australian Noise Exposure Forecast)

Detailed result documentation of the results including frequency and distribution function of the maximum level for a selected receiver.

Maximum level statistics for the individual aircraft classes or the sum of aircraft classes.

Automated graphical output of aircraft noise protection zones and passive noise protection measures.

Quick and easy combination with any other noise type on the basis of VDI 3722-2

Calculation of single points, grid noise maps, cross-sectional noise maps, façade noise maps

Graphical presentation of the protection zones according to AzB:2008

Radar Tracks

Aircraft noise module required

Import of radar tracks of the data formats Stanly, Fanomos and Topsonic

Aircraft database for automatic allocation of emission data

Convenient processing and data control of radar data during import

The stored ANP database of Eurocontrol allows the selection of procedural height profiles and fixed point profiles.

BA Facade

Calculation of the required evaluated sound insulation value $R'w$ of external components or the relevant outdoor noise level according to 24th BImSchV, VDI 2719, DIN 4109:1989/2016/2018, 2nd Aircraft Noise Protection Ordinance and in single values according to EN 12354-3.

Optimization of the acoustic properties of the room enveloping surfaces

Manual input or transfer of the SoundPLAN results and geometry

Flexible, structured representation of the buildings, depending on the building structure up to the subdivision into building - floor - apartment - room

Visualization of the individual object levels via photos and floor plans

A room can have one or more facades with different exterior levels.

Many relevant sound insulation dimensions of the components are already contained in the extensive sound insulation library, which can be supplemented at will.

Efficient handling of large and small projects, also ideal for noise remediation and acoustical building planning to protect against external noise

Flexible result documentation of the indoor level calculation and the measure list with sketches and pictures.

Window dimensioning

Simple solution for calculating the sound insulation window classes in the integrated spreadsheet for rooms with one external wall.

According to 24th BImSchV, VDI 2719, DIN 4109:1989

Calculation of costs for windows and fans

Wall Design

Dimensioning of noise barriers and noise berms on the basis of the location of a planned structure with different wall/berm heights

Calculation for individual receiver locations or with the module Façade Noise Map for entire areas

Various optimization strategies - compliance with limit values, minimization of facade lengths above limit values, finding the optimal cost-benefit ratio, costs per solved protection case (EBA), efficiency and effectiveness according to the Swiss economic viability index

The database, which contains the level reduction for each receiver and each wall element, is read by Wall Design and, depending on the optimization strategy selected, builds the wall elements in the order of use.

The results can be called interactively for each optimization step in the wall construction diagram.

Tools Industrial Noise

Consideration of special tasks in industrial noise

The analysis tool for noise protection concepts of complex industrial plants helps to identify reduction potentials and to select the most suitable reduction measure, also with regard to cost/benefit aspects.

The frequency-dependent sound power levels of individual noise sources can be calculated from the measured sound pressure levels, which is helpful, for example, if there are no manufacturer specifications for the sound sources.

Sound power can be calculated using formulas from any technical parameters, such as the internal level of a pipeline and its external noise emission.

Optimization concepts to ensure the greatest possible efficiency while complying with the limit values, for example for the optimum control of the individual wind turbines of a wind farm.

Noise Mapping Toolbox

Tools for the preparation of strategic noise maps - EU Environmental Noise Directive and action planning

Tile projects - loading of data only in the area of selected tiles / areas - minimizes first of all the calculation times, additionally, loading times, for example during data preparation or graphics creation are also minimized.

Annoyance analyses

Inhabitants and area statistics in intervals or above thresholds

Comparison of variants on the basis of affected inhabitants or areas via level statistics

Export of the building center of gravity with the highest level per building

Hotspot calculation using noise indicators

VDI 3722-2 - Overall noise assessment

Automated generation of map sections for large investigation areas

Distributed Computing

Calculate in the network with all free resources

With only one license you can equip an unlimited number of computers with the demo version and start calculating.

Automatically temporarily integrate computers, e.g. overnight

Completely automated sending of tasks and collection of results in the original project

So easy to set up that it's worth even for small projects

Work through calculations from different projects one after the other

Noise Allotment

DIN 45691, ÖAL 41

Optimization of noise quotas for different company sites within an area, so that the individual industrial sites are restricted as little as possible.

Consideration of noise pre-pollution manually entered or automated from pre-pollution calculation

Optimal utilization of immission values via additional allotments for individual directional sectors

Expression optimized for fixing in the zoning plan

Graphical representation of the sectors and as a noise map of the whole area

Façade Noise Map

Using the building facades selected at the push of a button, receivers are automatically set according to various criteria, e.g. a point in the middle of the facade, according to the specifications of BEB or CNOSSOS-EU or with an indentation from the facade corners.

Floor-by-floor calculation and calculation at a fixed height above terrain

The number of receiver points above each other (floors) and the height of the first calculation point are automatically taken from the building.

Representation of facade levels as color marks, colored facades or colored buildings in 2D and 3D. In 3D the color changes according to the level on the respective floor.

Display of results processed further via the integrated spreadsheet (e.g. decisive level from different variants)

Building reference points in accordance with RE-2012 with reference to the receiver table

Texts in the color marks in 2D and 3D, for example the number of the receiver point as reference to the table or the level value.

Output of difference maps and other arithmetic links such as the designation of noise level ranges

Calculations of the economic damage caused by noise according to the Swiss WTI ("Economic feasibility and proportionality of noise abatement measures", Series 301, Federal Agency for the Environment BAFU)

Evaluation according to parameters for wall optimization, e.g. cost ratio of active to passive noise protection measures, efficiency, effectiveness, WTI (BAFU) and costs per solved protection case (German Federal Railway Authority)

Freely definable color scale for graphic output

Color intervals - also non-linear, e.g. for highlighting limit values of different uses

Output of the sum level or individual groups

Grid Noise Map

Calculation of a receiver grid at a user-defined height above ground level. The grid size can be selected at will.

Display as isophone map with contour line labelling or grid map, also with color gradient

Output of difference maps and other arithmetic operations e.g. sum maps, maximum value maps or addition of constant values or levels

Freely definable color scale for graphic output, for intervals or discrete colors (for contour lines) by different scale types

Color intervals - also non-linear, e.g. for highlighting limit values of different uses

Output of the sum level or individual frequencies and groups

Grid Noise Map and Façade Noise Map

Calculation and presentation of a triangular noise map.

The density of the receiver grid varies according to the model data - closely meshed at sources, buildings and walls, larger mesh width in free field.

Output of the sum level or individual frequencies, frequency bands and groups

Cross-sectional Noise Map (vertical grid noise map)

In addition to the properties of the Grid Noise Map:

Shows the effect of noise barriers in a particularly meaningful way

Especially impressive as 3D cross-sectional noise map with semi-transparent areas and non-transparent contour lines

3D Graphics

3D Module accessible already during data entry to check the data with regards to the consistency of the 3-dimensional position in the terrain.

Individual design of the displayed geometry data and geometry bitmaps together with the calculated results of grid maps and façade noise maps in 3D.

Switch the graphic object type to the object types supplied as standard - tree for 3D, roof ridge

3D effects - perspective or orthogonal view, changing the light source, fog, etc.

3D Animation

Driving along any road or railway axis in the project, for example to check the position in the terrain.

Enter any animation path and fly over the 3D investigation area, for example.

Animated train pass-by via a Grid Noise Map, 2D and 3D display

Level-time curve at each point of the calculated noise map, also as a graphic box with reference of the location in the map

Arithmetic operations of animated noise maps with several trains, for example from different directions or trains running at a certain time interval.

GIS interface

Import and export of ESRI shapefiles with any geometry properties.

Open dbf files (property tables of Shapefiles), edit, supplement, modify using formulas, create and save columns with additional properties.

Shapefile export of the geometry with any property data

Shapefile export of the single point results with any desired columns (also the columns calculated in the SoundPLAN spreadsheet)

Shapefile export of the grid points, the contour lines (as line, surface or band) and the triangle points, for the DGM data also the triangles themselves

Import from CityGML

Import of OSM geometry via the geometry section [Prerequisite: Cartography]

Import of OSM XML

Import of grid maps of other software products

Interface from German road design software

Import from the road planning programs CARD/1, STRATIS and VERBUND. The original data is automatically converted into SoundPLAN objects and completely read into a SoundPLAN project.