New features of CadnaA 2022 MR2

New features of CadnaA 2022 and 2022 MR1 can be found [here](#).

Configuration Methods

- New Calculation method "HJ 2.4 (2021)" (China) for noise types
  - Industry noise
  - Road noise
  - Railway noise
- HJ 2.4 (2009), Road noise: Speed range of JTG B03 is now also applied for the calculation of L_{eq} (formula A.12 of HJ 2.4 (2009)).
- SonRoad18: Consideration of foliage according to ISO 9613-2, annex A implemented.
- CNOSSOS-EU (Directives 2015/996 and 2021/1226) or country-specific implementations: Reduced initialization times for projects without industry sources.

Features

- Object tables, Change Column: New option "Starting Number" for definition of the number, at which the numbering with # should start.
- New function "Zoom to Object" in the context menu for each object. The 2D view is adjusted so that the object is displayed completely.
- Consistency check warnings are now saved as local text block CALC_WARN
- Object-Scan Preset "EU 2021/1226 | People in level classes (Median)" modified to also consider buildings with multiple storeys. If a building has only one storey, there is no change in the calculation results (typical case with receivers in 4m height).
- PlotDesigner: "Display units" (defined in the Options menu) are now also used for labelling of the plan cell
- Symbol, Scale bar: Display units (defined in Options Menu) are now considered
- Aircraft Noise: Traffic-Count Calculator | Normalize Aircraft Classes: If the ID of an aircraft group ends with "-S" or "-L", it will be truncated. (Feature already included since 2022 MR1)
- CadnaA Silent Setup: Added command line option /skipwebview=true to skip WebView2 installation.
- Configuration of Calculations | Tab Standards | Template: For all CNOSSOS-EU related templates (starting with 2015/996 or 2021/1226), parameter *Modify NPD Curves* for calculation of aircraft noise is now checked to be activated.

Bug Fixes

- Object-Scan Preset "EU 2021/1226 | Noisiest grid point in/near building | Step 2" corrected. Formula for evaluation parameter 2/3/4 always used the maximum value of LP1 (instead of LP2/3/4) as input.
- Calculation method CNOSSOS-EU (Directives 2015/996 and 2021/1226) or country-specific implementations, railway object: For the calculation of the vertical directivity, the angle of direct line of sight from source to receiver is now used. Before, in case of

an obstacle in the propagation path, the angle was calculated from the source to the upper edge of the obstacle.

- Railway object: Sum level was not shown for calculation methods with input of sound power level as 1/3 octaves (e.g. for CNOSSOS-EU).
- Railway object, attribute MIND_I: Prevent negative values, which could occur after import or user input.
- Fixed error "ARB_create_context" when opening 3D view
- Calculation Method Schall03 (1990), railway object: Bugfix regarding selection "Type of track". Correction was not applied correctly in the calculation.
- Road object: When using the function *self-screening* in combination with *road width per polygon point*, the width of the self-screening was not considered correctly.
- Calculation Method TNM 2.5: Maximum number of edges considered in the screening calculation increased. Potential change of calculation results with larger calculation models.
- Aircraft noise: When specifying / importing an aircraft group with suffix "-S" or "-L", the aircraft group is now correctly assigned. Example: Aircraft group with ID "S3_M070_TU_NX-S" is assigned to "S3_M070_TU_NX".
- Fixed possible crash when using the function "Optimize walls"
- Fixed incorrect display of façade bitmaps
- Bugfix for arithmetic expressions / conditions: In some cases, the expression was not
- evaluated correctly.

Attributes, Variables and Keywords

- Object crossing: Attribute TYPE for setting "Crossing is Roundabout" added
- Railway object: Access to list "number of trains" via attributes CXX_TYP/ND/NE/NN/ V/L/P/DFZ/NAXLE extended up to C99 (instead of maximum C13 before).
- Aircraft noise, Aircraft Group: Attribute ACFTXXT/E/N extended up to ACFT99T/E/N (before max. 50)

New Features of CadnaA Version 2022 and 2022 MR1

Configuration of Calculation

- Rename Tab „Country" in Tab „Standards". In Tab Standards:
  - Removal of the country selection. The calculation methods for the noise types industry, road and railroad are now always selected individually (analog to previous country selection „user defined")
  - „Parameter Check" becomes „Template", see separate section later in this document.
- New calculation methods according to CNOSSOS-EU, see separate section later in this document.
- Calculation method CNOSSOS-EU: Setting „Calculation acc. to" to define the EU-version or a specific national implementation can now be set separately for each noise type in the tabs industry, road and railroad (previously: one setting for all beforementioned noise types).
- Railroad Tab (CNOSSOS-EU): New input parameter number of „Train-Barrier-Interactions", default value is 0.
- Tab Road (CNOSSOS-EU): Button „Vehicle classes" extended to selection menu. This now shows default vehicle classes defined in the internal default library and user-defined entries of the local library.
- Tab Evaluation Parameters: When using the Evaluation Parameter „DIN4109tot" or „f(x)=DIN4109totd/n" the noise type industry is now always considered with target value Lde, independent of the setting of other Evaluation Parameter (previously: Ld).
- Tab Evaluation Parameters: When using the Evaluation Parameter „DIN4109tot" or „f(x)=DIN4109totd/n" the case distinction regular case/special case for the noise type Industry is now also carried out for the calculation in the grid (previously only for Receivers and Building Evaluations).
- Tab Ground Absorption: Default value for resolution at map of ground absorption = 1m (previously 2m)
- Calculation method SonRoad18: Implementation of further developments and supplements published in 2021 [1]
- New template for the definition of calculation parameters according to SonRoad18 (2021) with propagation according to ISO 9613-2 considering 17534-3 (test cases)
- Road object (SonRoad18): New import from SonRoad18 webtool
- Road types (SonRoad18): Further vehicle categories added

Building Noise Map

- Setting „Lower Rcvr max 20cm below eave" additionally considers that no receivers with a relative height < 2.0 m above ground are generated (according to BUB 2021).

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[1] Calculation Method: sonROAD18 – Berechnungsmodell für Straßenlärm – Weiterentwicklungen und Ergänzungen, Empa-Nr. 5214.019298, 5214.023513, 2020-11-30

Calculation | Configuration | Calculation Methods (CNOSSOS-EU)

The following calculation methods have been introduced into CadnaA to implement the European Directives 2015/996 and 2021/1226 and their national implementations. After selecting "CNOSSOS-EU" in the "Standards" Tab, the European or national implementations can be selected for each noise type Tab:

- Industry:

„Calculation acc. to"	previously	Comment
2015/996 EU	CNOSSOS-EU	Implementation of additional specifications from ISO TR 17534-4, Version 2020[2]
2021/1226 EU	-	Implementation of the EU Directive 2021/1226

- Road

„Calculation acc. to"	previously	Comment
2015/996 EU	CNOSSOS-EU	Implementation of additional specifications from ISO TR 17534-4, Version 2020**Fehler! Textmarke nicht definiert.**
2015/996 DE (BUB 2018)	CNOSSOS-DE	
2015/996 AT (RVS 2019)	CNOSSOS-AT	
2021/1226 EU	-	Implementation of the EU Directive 2021/1226
2021/1226 DE (BUB 2021)	-	Implementation of the national interpretations of EU Directive 2021/1226 for Germany and Austria.
2021/1226 AT (RVS 2021)	-	

- Railroad

„Calculation acc. to"	previously	Comment
2015/996 EU	CNOSSOS-EU	Implementation of additional specifications from ISO TR 17534-4, Version 2020[1]
2015/996 DE (BUB 2018)	CNOSSOS-DE	
2015/996 AT (RVE 2019)	CNOSSOS-AT	
2015/996 FR (SNCF 2021)	-	Implementation of the national interpretations of EU Directive 2015/996 for France.
2021/1226 EU	-	Implementation of EU Directive 2021/1226
2021/1226 DE (BUB 2021)	-	Implementation of the national interpretations of EU Directive 2021/1226 for Germany, Austria, Belgium and France.
2021/1226 AT(RVE 2022)	-	
2021/1226 BE (Infrab. 2022)	-	
2021/1226 FR (SNCF 2022)	-	

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[2] Existing projects saved with CadnaA 2021 MR2 (or earlier) are displayed with the addition "w/o 17534" in the calculation configuration when opened with CadnaA 2022. For new CadnaA files this selection option is no longer available.

New Feature „Templates"

- CadnaA-internally defined Templates for calculation according to a specific standard, regulation, guideline or method, which takes into account settings of the Configuration of Calculation, Building Noise Map, individual Objects and Areas of Designated Use. A template can be selected at the following places in CadnaA:
  - Configuration of Calculation, Tab „Standards": When a Template is selected, the current settings are compared with the Template and deviations are displayed. With a click on OK all settings of the Template are taken over into the project.
  - For new projects in the File menu → New (Template). A new CadnaA model can thus be initialized with a basic setting. The selected template is saved in the calculation configuration, "Standards" Tab.
- In the menu „New (Template)" additional user defined CadnaA files can be used as templates by placing them in the installation directory in the subdirectory templates/new.
  This path can be customized via an entry in the INI-file (section [Main], Variable NewTemplateDir= „C:\example").

CadnaA-Objects

- Railroad (CNOSSOS-EU): representation of emission now in 1/3-Oktave Band Spectrum (previously in octaves)
- Bitmap: The feature „Choose region in browser" upon import from Google Maps is now based on the Microsoft Edge browser which is usually available by default on Windows systems.

ObjectScan

- New default entry „2021/1226, People in level classes (Median)" for evaluation according to EU Directive 2021/1226 or a national interpretation.
- New default entry „2021/1226, Noisiest grid point in/near building" and „2021/1226, Quietest grid point near building" for determining the loudest/quietest immission level in the grid following the procedure of the test tasks for BEB 2021. Detailed instructions can be found in the CadnaA Reference Manual.
- New default entry „2020/367": Calculation according to EU Directive 2020/367 on the assessment of harmful effects of environmental noise. Calculation of risk ischaemic heart disease (IHD), highly annoyed people (HA) or highly sleep disturbed people (HSD). The calculation procedure is performed in conjunction with the function in the Calculation | Multiple Source Effect menu. For more information, please refer to our reference manual.
- Default entries reorganized with hierarchical menu. User-defined entries can also be stored hierarchically by specifying "\" in the name.
- New Option „Grid Point as Rectangle": When checking whether a grid point lies within an area/inside a window, the associated rectangle is used instead of the x/y position of the point. If rectangle and area/window intersect, the grid point is taken into account.

- New Attributes for „Formula for Summation" LPx_MIN8 and LPx_MAX8. With the help of these attributes the minimum/maximum value of the 8 neighboring grid points (horiz., vert., diag.) can be determined. This function is used in connection with the preset „2021/1226, Quietest grid point near building ".

Libraries

- New library „Vehicle Classes" for the definition of different emission parameters according to CNOSSOS-EU or a country-specific implementation.
- Library „Road Surfaces" for CNOSSOS-EU extended by the input of speed ranges. In addition, it can be defined whether a road surface is valid for 2015/996 and/or 2021/1226.
- Library-Manager: New option „Keep both". When importing to the local / global library, if the ID between existing library entry/library entry to be imported is the same, both are kept.

Attributes, Variables und Keywords

- For calculation method CNOSSOS-EU, new keywords for setting „Calcluation acc. to" for each noise type tab.
    - Tab Industry = CNS_ICNTRIN,
    - Tab Road = CNS_ICNTRRD,
    - Tab Railroad = CNS_ICNTRRL,
    - Tab Aircraft = FLG_ICNTRY.
- The previous keyword ICNTRY is still valid for the setting in the Industry Tab.
- For calculation method CNOSSOS-EU, new keyword CNS_VEHCLS for the selected vehicle class in the Tab „Road".
- For calculation method CNOSSOS-EU, new keywords CNS_VMAX_XX with XX indicating the vehicle class (1, 2, 3, 4A, 4B) for referencing the vehicle class-dependent maximum speed in the "Road" Tab.
- Keywords #(ImmValName, param1, param2) and #(ImmValUnit, param1, param2) extended. The name of a plot cell (in the plot designer) can now be specified as param2. Then evaluation parameter/unit of the plan cell is displayed.
- Object Railroad: New Attributes:
    - RAILROUGHI: Rail roughness as Integer
    - RAILROUGH: Rail roughness as String
    - DBR_STR: Select Bridge as String
    - RAI: Select curve radius as Integer
    - SQUEAL_MEAS: Measure against curve squeal (1/0)

Further Innovations

- Menu Options |Appearance: Double click on object type in list activates / deactivates the display of this object type
- Menu Tables |Variant: Double click on list object activates / deactivates this variant
- New Lua-function cna.activate_protocol() to activate/deactivate the protocol and cna.get/set_weighting() read/write the weighting under Options → Miscellaneous
- Keyword #(SetObjAtt, ...) now also accepts GLK_OPT as parameter 1 to set parameters in the Options | Building Noise Map menu.
- New attributes for accessing parameters of the Configuration of Calculations:
  - IND_OCT_3: Calculation in 1/3 octaves, see Tab Industry, e.g. with ISO 9613-2
  - SONR_VERS: SonRoad18 version, see Tab Road

Bug Fixes

- Optimization of the function „map of ground absorption" in the menu Calculation| Configuration | Tab Ground Absorption. In certain cases, the ground absorption areas could be incorrectly taken into account.
- An error has been corrected when importing directivities in XHN format, where the values were incorrectly interpreted as level correction instead of attenuation. It is recommended to re-import affected directives.
- Fixed incorrect import of barriers from *.prj-Dateien (Mithra).
- NMPB08, CNOSSOS-EU: Bug fix when using the meteorology correction in combination with industrial sources and input as A-level. In this combination it could occur that the day level was used for all reference times.
- Road (SonRoad18): Access to the global library via folder icon fixed
- Import: Bug fix when importing a CityGML file. When reaching 100% CadnaA did not react for some seconds.
- ObjectScan: Activation state of the objects was not considered for all presets.