

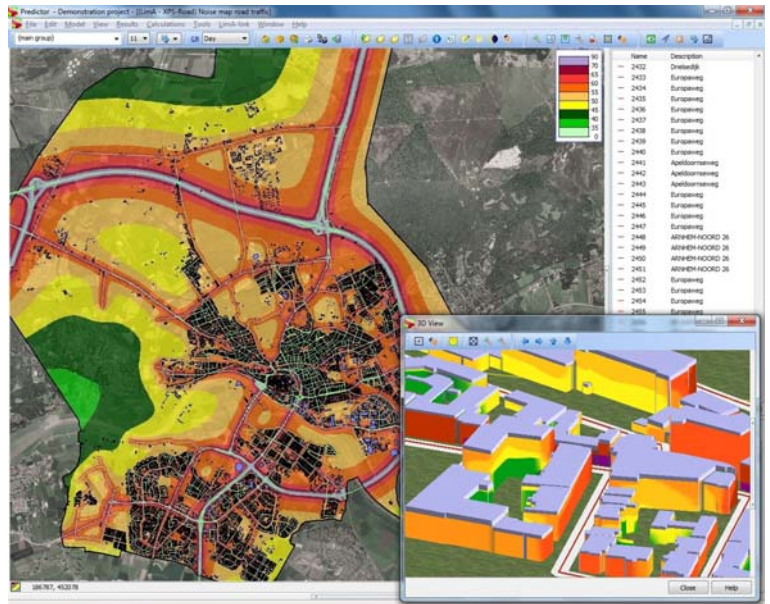
Predictor™ – LimA™ Software Suite Type 7810 from version 11.2

Powerful and Intuitive Environmental Noise Calculation and Mapping

The Predictor–LimA software suite is the complete solution for all environmental noise projects. Noise calculations for industry, roads, railways, aircraft and wind turbines are all supported. The software is used by acoustic consultants, environmental authorities, heavy industries and educational institutes.

The suite bundles the intuitive Predictor software and flexible LimA system in one powerful, integrated, state-of-the-art package that provides the best solution for whichever project you have, from small-scale industrial situations to large-scale city noise mapping. Predictor and LimA use the state-of-the-art LimA calculation cores with huge capacity and high calculation speed so that you get results quickly while reducing your investment in computing power.

Depending on the task, you can use the tool that suits you and the task best for efficient, powerful environmental noise calculation and analysis. Predictor – LimA software suite allows you to do most of your projects quickly and easily, with the intuitive functionality of Predictor and the flexibility of LimA. In addition, the LimA system provides the tools to fully integrate environmental noise calculations in other Geographical Information Systems (GISs).



Uses, Features and Benefits

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| <p>Uses</p> <ul style="list-style-type: none"> • Environmental noise mapping, management, action planning and impact assessment • Noise calculation for industry, road traffic, rail traffic, air traffic and wind turbines • Fulfilment of European Commission directives such as Environmental Noise Directive (2002/49/EC) in accordance with Guidelines on Revised Interim Computation Methods (2003/613/EC) and revised Annex II (Directive 2015/996/EC) • Fulfilment of Industrial Emissions (IPPC) Directive 2010/75/EU and similar • Integration in other (GIS/management) systems • Educational purposes | <p>Features and Benefits</p> <ul style="list-style-type: none"> • User friendly and easy to learn, even with infrequent use • Fast and accurate calculations, extremely powerful and professional • State-of-the-art 64-bit and WMS support for direct use of online georeferenced maps as background maps • Time-saving integrated and automated bookkeeping for model data and results • Automated reverse engineering and instant noise maps using noise measurements to help create accurate noise calculations • Make use of automated workflows (import, clean, calculate, plot, etc.) to reduce the risk of human error on larger projects • Network modelling and calculation license included in all configurations is a very cost-effective solution for multi-person use • English, Chinese, Spanish, and Russian Predictor interface for easier use in relevant countries |
|--|--|

The powerful Predictor – LimA software suite bundles the following software into one state-of-the-art software package:

- **Predictor:** Intuitive software for environmental noise calculations and mapping; uses the powerful LimA calculation cores
- **LimA:** Modular and flexible system for environmental noise calculations and mapping
- **Acoustic Determinator:** Software for the determination of sound power levels
- **Predictor Analyst:** Software for accumulation and analyses of noise maps

Predictor and LimA can be used as stand-alone applications or as one integrated application by using the LimA-Link option in Predictor. Because Predictor and LimA both use the same fast LimA calculation cores, there is no difference in calculation speed or capacity.

The suite offers three basic implementations:

1. **Predictor:** For most projects.
With the intuitive and powerful Predictor user interface, projects that require the calculation standards supported by Predictor, can be handled quickly and easily.
2. **LimA:** For calculation standards not supported by Predictor.
In addition to the calculation standards supported by Predictor, LimA also supports German and East European standards.
3. **LimA integrated in other (GIS) systems:** For implementing environmental noise calculation and analysis functionality in other systems.
Modular and flexible, LimA is the preferred software for system integration.

Acoustic Determinator and Predictor Analyst can be used as stand-alone software as well as in conjunction with Predictor and LimA.

Fast and Accurate Calculations

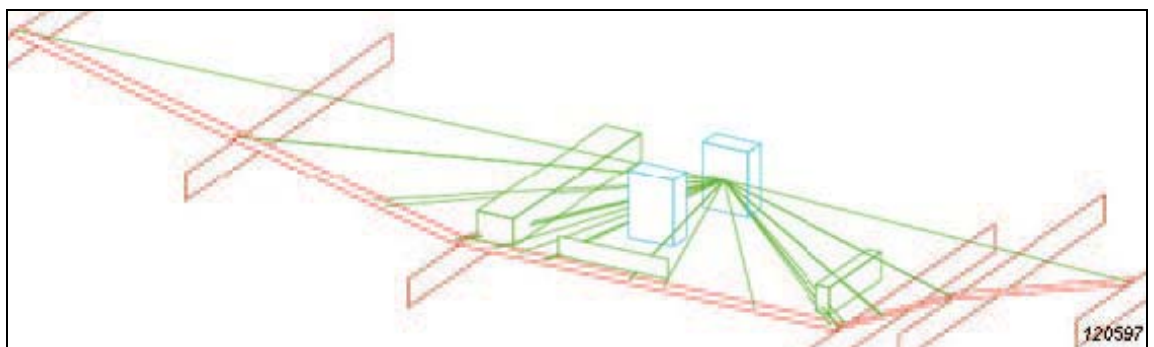
Fast Calculations – Among the Fastest on the Market

Predictor and LimA use LimA's state-of-the-art calculation cores, which have been [independently proven](#) to be the fastest calculation cores available for Calculation of Road and Traffic Noise (CRTN) calculations. LimA calculation cores have a huge capacity, high calculation speed and support 64-bit systems, for even the most demanding tasks, providing results quickly while reducing your investment in computing power.

Accurate Calculations – Unique 3D Geometry Analysis

The 'method of projection' used by Predictor and LimA is widely seen as the most accurate approach to source segmentation in environmental acoustics. Stapelfeldt introduced it to the market with LimA in 1989, and since then it has been included in all major commercial calculation software. Unlike other software, however, Predictor and LimA also apply this method for reflection analysis, so that this is also analysed in 3D. Another unique feature is the geometry analysis for lateral diffraction – this allows you to find the shortest sound path in complex 3D situations.

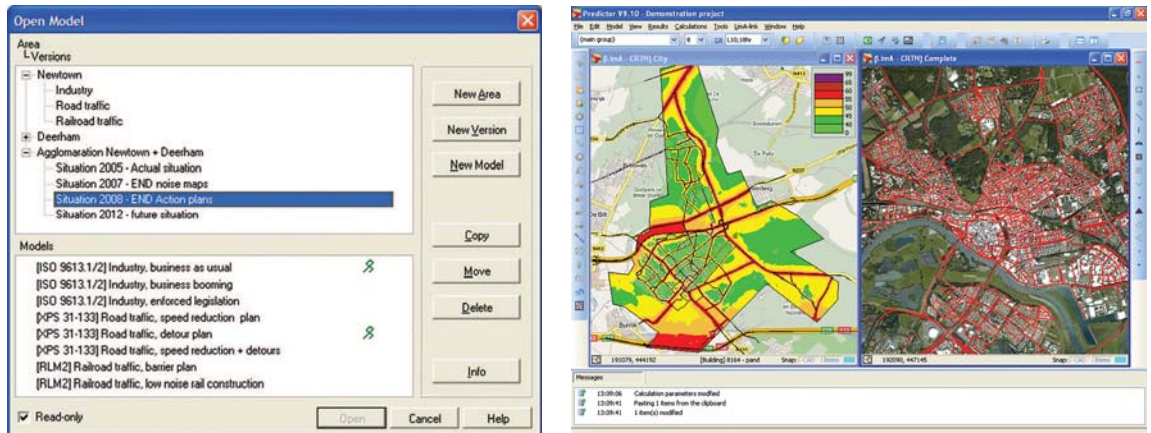
Fig. 1
The method of projection ensures correct segmentation (in 3D) into sections with the same propagation conditions. Results are less sensitive to small changes in receiver point position. These factors lead to more realistic results



Fast Learning Curve, Even for Infrequent Use

Predictor has the most intuitive interface available. More than any other noise calculation software, Predictor has been designed according to the Windows® software design guide, helping you to be familiar with it from the very start. Predictor's intuitive interface and well organized project structure is designed to guide and support you, so you can spend your time more efficiently and focus on the project and not on the software. All scenarios and action plans are maintained within one Predictor project. This enables you to focus on your work and not spend valuable time searching for the correct files on the network.

Fig. 2
Left: The unique Model Manager is the central point for all data access in a Predictor project
Right: The intuitive multi-model view enables you to have several models open at the same time



Accurate and Straightforward Modelling, also for Complex Situations

Predictor's intuitive functionality, including powerful (GIS) import and 2D/3D edit options, will enable you to handle all kind of projects in an efficient manner. Complex situations with undulating terrain, flyovers, bridges and indoor/outdoor calculations, or large projects with hundreds of thousands of objects, can be set up just as easily and straightforwardly as a simple noise map for an industry or a stretch of road. Predictor also supports the use of macros for efficient automation of geometrical processing.

Time-saving Integrated Bookkeeping for Model Data and Results

Any noise calculation project comprises both input data and results, requiring a consistency between the two at all times, so that the results you report are what you modelled. To ensure this consistency, Predictor monitors the results at all times and new input data are validated immediately at entry time. This is unlike any other noise calculation software.

Results that are invalid due to modifications in the input data are automatically set to be recalculated. This unique and automated validation feature not only reduces recalculation time but, more importantly, ensures that results are always up-to-date and consistent with the input data. Reported results are, therefore, always reproducible, saving valuable time and leading to higher quality.

Powerful Result Analysis and What-if Scenarios

By using intuitive tables, Predictor ranks the individual noise sources (or groups of noise sources) on demand, clearly showing the importance of each source (or group of sources). This functionality enables rapid troubleshooting and notifications on noise reduction activities. The effects of noise reduction can also be studied by introducing a reduction to the emission of a source (or groups).

Predictor immediately makes available what-if results, for example, "What if the speed of traffic is increased from 10 km/h to 100 km/h?" Or, "What happens if all exhaust ventilators are reduced by 6 dB?" What-if analysis is provided without you having to start a new calculation. In addition, colour-coded, sound pressure contours visualize the situation in an easy to understand way and with the multi-model view, scenarios can easily be compared.

Predictor User Interface Examples

Fig. 3

Left: Model view with multi-layer DXF background as snap option for items (buildings, roads etc.), enabling faster modelling
Right: Model view of Arnhem, Holland, with 70,000 buildings and 2500 roads on a satellite image as background

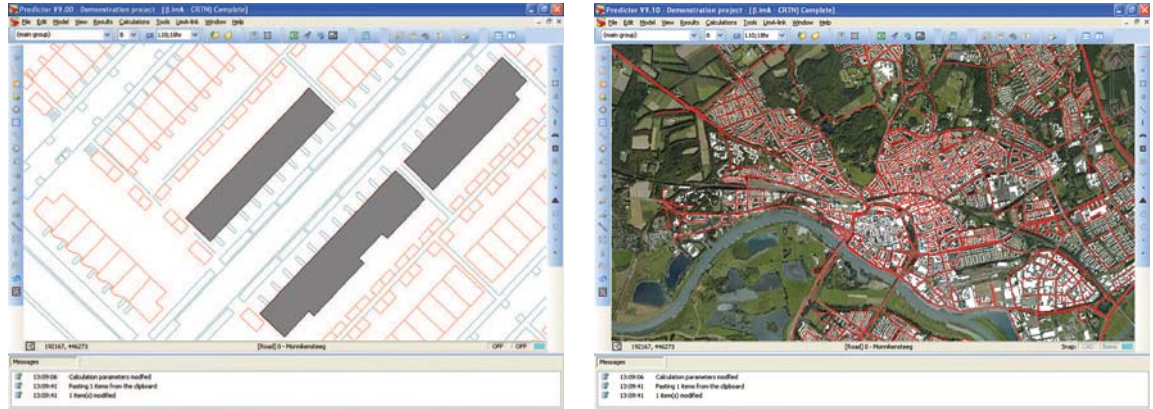


Fig. 4

Left: 2D Cross section with noise contours of a shooting range with 3D source directivity and hanging barriers
Right: 2D Cross section with noise contours of road with a cantilever barrier

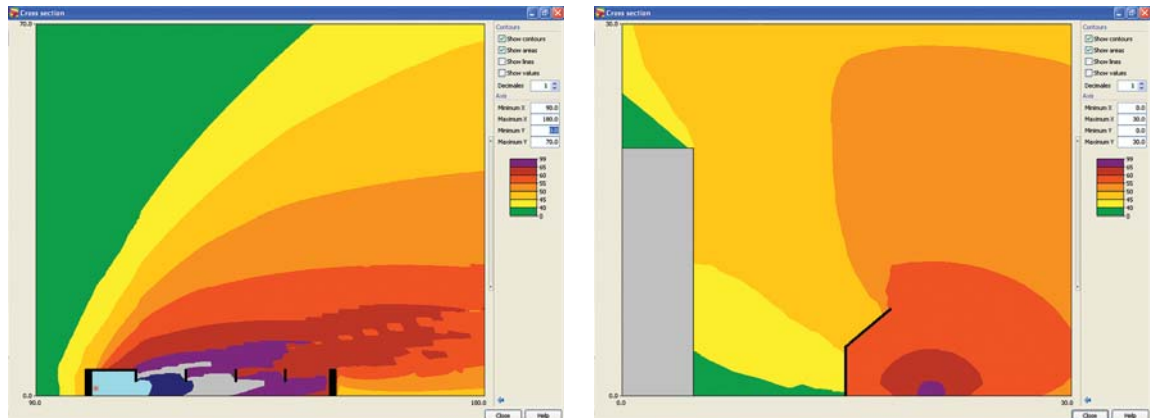


Fig. 5

Left: 3D view of Blanes in Spain with terrain model. Items such as buildings are mapped on top of the terrain model making it easy to create real-life models from input data
Right: 3D view with vertical contours on the facades of buildings

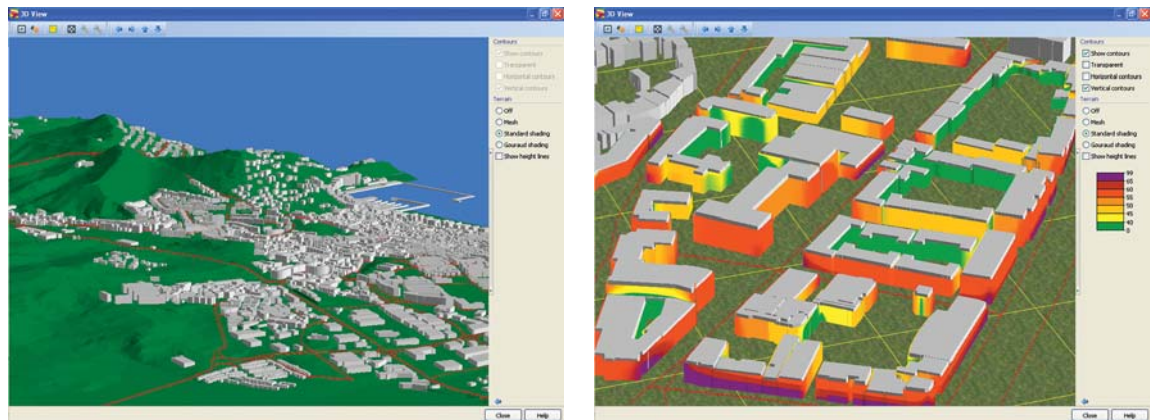
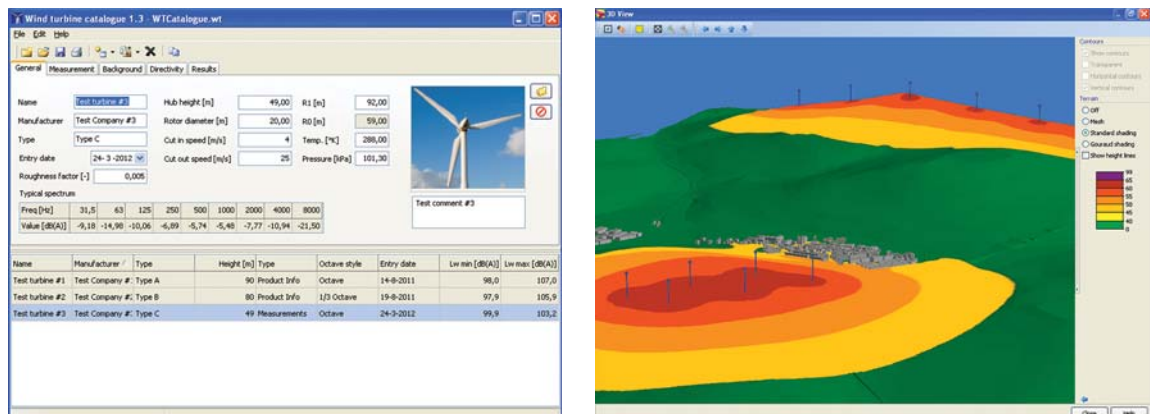


Fig. 6

Left: Wind turbine database with option to calculate sound power level based on IEC 61400-11. Equivalent sound power level at turbine height, calculated using various parameters: turbine height, cut-in and cut-out speed, etc.
Right: 3D model: wind turbine noise contours



Software Concept

LimA's software design has been built on an open structure that provides a high level of customization. Different tasks are handled by different modules and can, therefore, be delegated to other processors or machines. Also, the geometry manipulation tools, which are provided in the graphical user interface, can be used for parallel background processing for large projects that need to handle millions of objects.

While a single model file may be limited in its size, depending on the operating system, it is no problem for LimA to deal with model data stored in thousands of files. LimA modules run under Windows® desktop and server systems, either 32- or 64-bit.

Flexibility

With the LimA concept, many different regulations for environmental acoustic analysis are supported. In addition, it offers the chance to use the user-defined model data for other purposes, for example, solar radiation or air pollution analysis.

Efficiency in setting up large data models is ensured by a range of external data formats, which are supported in both importing and exporting, among them CityGML, the INSPIRE* conforming standard of the Open Geospatial Consortium, Inc. (OGC®). A comprehensive set of data manipulation tools help to refine raw data that cannot be directly used for acoustic analysis. To customize data, you can introduce your own object types, define new attributes and configure online help and input selection. Even introducing a customized DLL for manipulating attribute content based on user input is possible.

Extensibility

LimA's software architecture and its extremely fast calculation speed make it the preferred software for integration with other tools. LimA modules can run behind external software with interface tools to other solutions. Tools and functionality include:

- LimA^{arc}: Plug-in tool for ArcGIS®
- On-demand noise mapping Day, Evening, Night (oDEN): Server based user interface for noise calculation via the Internet
- GKZ Organizer: Provides automated processing of noise maps, starting with collecting model data from Web Service, then calculates noise and exposure, prepares results graphics and finally reports
- MapWindow GIS: An Open Source GIS tool. It can be used to set up LimA models, display results and organize calculation requests
- Linux support: Nearly all LimA modules are available for Linux-based operating systems

Macro Ability

LimA's user interface supports menu driven interaction as well as command line input. Individual commands can be combined to powerful "one line" sequences or written to macro files, thus allowing use in any project.

Commands support a range of functionalities:

- Geometry manipulation
- Attribute manipulation
- Handling of variables
- External file I/O
- Search loops, IF and WHILE constructions, calling of other macros

Where more complex data manipulation is needed, it is good practice to design the intended workflow by writing a macro and applying it to the model data. This ensures a clear and documented overview over the whole process, avoids tedious work, and, if needed, the job can be redone by a simple button click. For large amounts of data, this approach is far more efficient than conventional Windows® techniques.

* Infrastructure for Spatial Information in Europe (INSPIRE)

Workflows

Macros may call up processes by other LimA or third party software, wait for results and then continue their job. Thus, workflows can organize the whole noise mapping task including uploading data via the Web Feature Service; preprocessing model data; calculating grid, facade and QA values; converting results into graphics and statistics; and uploading results.

Other workflows may, for instance: compare two alternative facade calculations; find the worst noise level for each building; mark this position in a graphic and label the noise level and its change; create a tabular list; and plot and export the results to a shape file.

LimA User Interface and Integration Examples

Fig. 7

Left: Model view with calculated noise contours in a stadium using 3D loudspeaker directivity
Right: Model view with estimated sound power levels of unknown sources at three heights for a petrochemical plant using reverse engineering

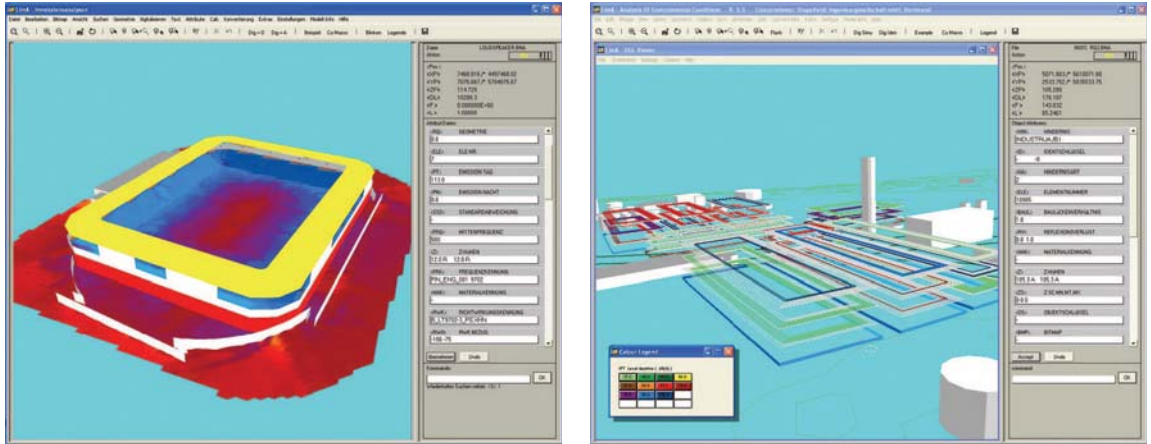


Fig. 8

Left: Model view showing coloured buildings. The colours represent the most relevant Noise Emitter Group, for example, a specific road or industrial compound
Right: Overview of a 40,000 km² area that was split up in 10x10 km tiles for automated data refinement by LimA macros

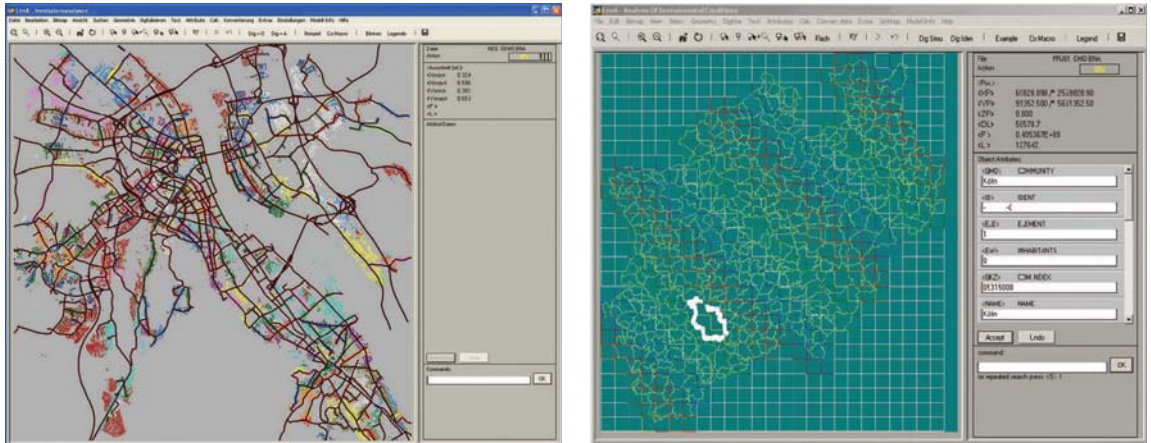


Fig. 9

Left: Example of the ODEN web-based user interface showing 3D LimA model data on a satellite image
Right: Example of the LimA^{arc} (ArcGIS plug-in tool) user interface showing 3D LimA model data and calculated contours using external LimA modules

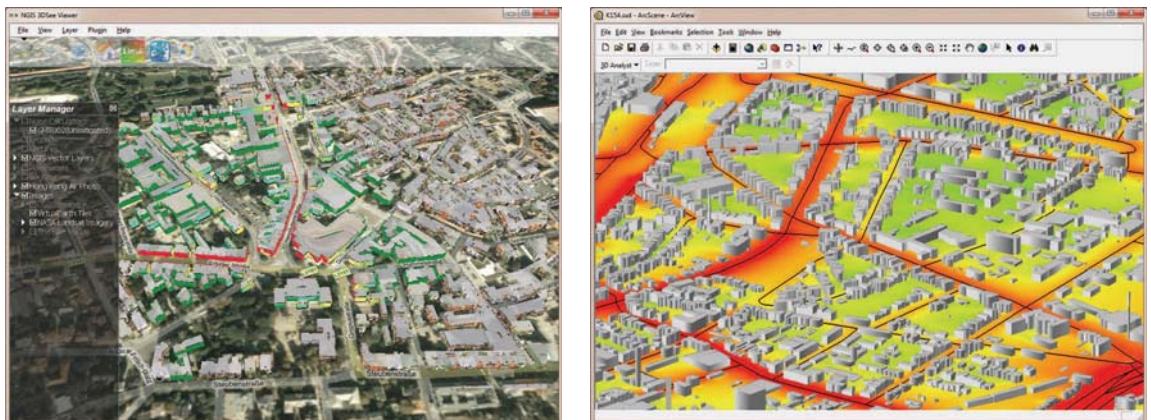
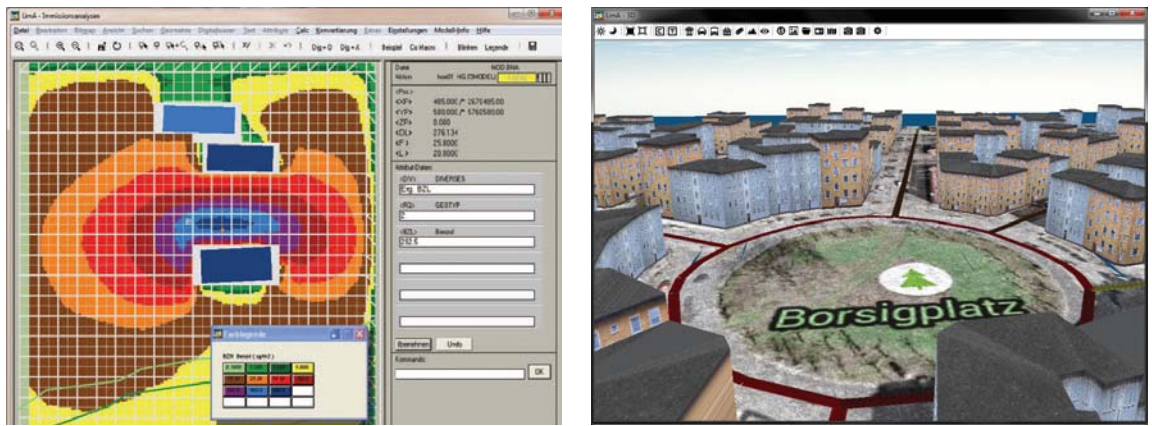


Fig. 10

Left: Model view with air quality contours as a result of linking LimA with freeware AUSTAL
Right: LimA 3D view with Google Maps™ image projected onto the terrain



Configurations and Options

Configurations

The Predictor – LimA software suite is available in several configurations to match various applications and budgets. All configurations include the intuitive Predictor interface, SourceDB with the Imagine Sound Power database, and Georeference for quickly creating georeference models from aerial photos. All configurations also include dual core support and a modelling license, allowing modelling and calculation with the Predictor system on several linked PCs.

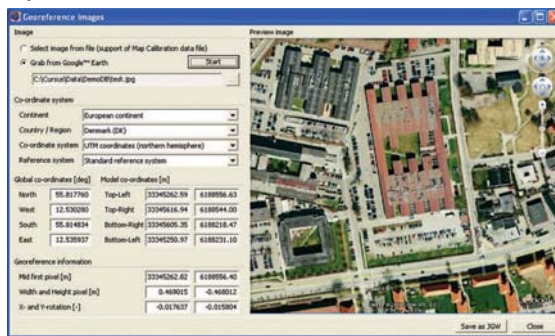
See Table 1 for an overview of the following configurations:

- **Predictor – LimA Plus Type 7810-A:** Enables you to calculate the majority of models used for environmental impact assessments. LimA-Link is also included for advanced geometrical processing of Predictor models in LimA. Acoustic Determinator is included to ease creation of sources with real life noise data. Predictor – Lima Plus is the ideal multi-purpose tool for environmental noise mapping and impact assessment and can be used to fulfil Industrial Emissions (IPPC) Directive 2010/75/EU
- **Predictor – LimA Advanced Type 7810-B:** Enables you to calculate noise contours for large models for all methods. The software includes both Acoustic Determinator and Predictor Analyst. LimA-Link is also included for advanced geometrical processing of Predictor models in LimA. Predictor – LimA Type 7810-B is the ideal multi-purpose tool for environmental noise mapping, management and impact assessment. It can be used for fulfilment of European Commission directives such as Environmental Noise Directive (2002/49/EC), in accordance with Guidelines on Revised Interim Computation Methods (2003/613/13 EC) and the European Commission's Assessment of Exposure to Noise Working Groups Good Practice Guide, as well as fulfilment of Industrial Emissions (IPPC) Directive 2010/75/EU.
- **Predictor – LimA ISO Type 7810-C:** Enables you to calculate plus-sized models according to the ISO 9613 method and the British BS 5228 standard. Also, a link to the ENM software from RTA-technology is supported. Type 7810-C is the ideal tool for consultants who are doing assessment and impact studies for industrial noise, and it can be used to fulfil Industrial Emissions (IPPC) Directive 2010/75/EU
- **Predictor – LimA NMPB Type 7810-D:** Enables you to calculate plus-sized models according to the French XPS/NMPB (road and rail) EU-interim method for road traffic noise. It is the ideal tool for consultants who are mainly doing assessment and impact studies for road traffic noise.
- **Predictor – LimA CNOSSOS Type 7810-E:** Enables you to calculate noise contours for plus-sized models according to the new European CNOSSOS method or the Harmonoise Engineering method. It is the ideal tool for authorities, consultants, universities and other educational institutions, who want to use these state-of-the-art methods
- **Predictor – LimA DAL 32 Type 7810-F:** Enables you to calculate plus-sized models, according to the Nordic DAL 32 method. It is the ideal tool for consultants who are doing assessment and impact studies for industrial noise in Nordic countries and can be used to fulfil Industrial Emissions (IPPC) Directive 2010/75/EU
- **Predictor – LimA Standard Type 7810-G:** Predictor – Enables you to calculate standard-sized models for all methods. LimA-Link is included for advanced geometrical processing of Predictor models in LimA. It is ideal for consultants who want a general purpose tool for assessment and impact studies for industrial noise and for road traffic noise and can be used to fulfil Industrial Emissions (IPPC) Directive 2010/75/EU

- **Predictor – LimA NAFTA Type 7810-H:** A dedicated configuration for the North American market that enables you to calculate plus-sized models for road traffic, industry and wind turbines. It includes the TNM, ISO 9613 and ENM-link methods. Type 7810-H is the ideal tool for consultants who are doing assessment and impact studies for industrial noise and/or road traffic noise in North America and it can be used to fulfil Industrial Emissions (IPPC) Directive 2010/75/EU
- **Predictor – LimA ISO Entry Type 7810-I:** Enables you to calculate standard-sized models for industry and wind turbines. It includes the LimA-ISO method. Type 7810-I is the ideal tool for consultants and wind farm developers who are doing assessment and impact studies for industry or wind farms, and it can be used to fulfil Industrial Emissions (IPPC) Directive 2010/75/EU

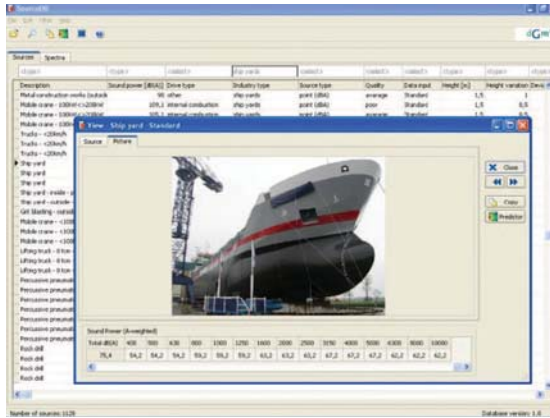
Options

Fig. 11
Example of Georeference window showing Google Earth™ bitmap and local and global coordinates for a certain location in Denmark



Georeference (Included with all Configurations): Georeference is used to calibrate bitmaps for use on local coordinate systems. After the bitmap is calibrated, it can be used directly in Predictor as a background map. This enables quick creation of impressive models that geometrically fit in with other models and data.

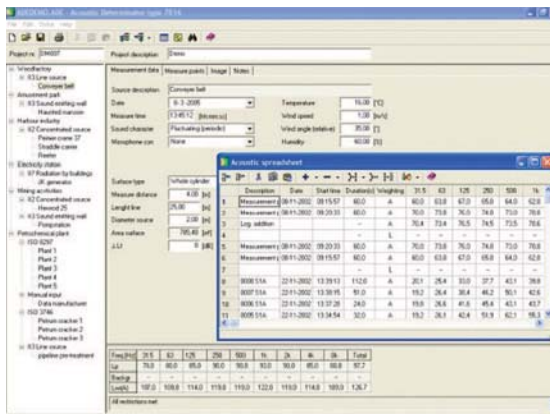
Fig. 12
Example of SourceDB window showing a shipyard in the Imagine database with an average sound power level of 72.4 dB/m²



SourceDB (Included with all Configurations): SourceDB is a convenient software for maintaining databases with 1/3-octave sound power levels for industrial sources. Sources can be points, lines or areas. Additional information like drive type and industry type can be added as well as measurement conditions and pictures. Formulas can be stored in the database to calculate the sound power level using a powerful script programming language. With the Copy to Predictor option, sound powers can be used directly in a Predictor model.

The software also includes the Imagine database, developed for the European “Improved Methods for the Assessment of the Generic Impact of Noise in the Environment” (IMAGINE) project. The software also includes industrial noise sources and supplies data for applications in situations where measurement results cannot be used. The sources range from very specific individual noise sources (for example, a fork lift truck) to sound power levels for types of industry as a whole. For each source, formulas can be found that can be used to predict sound power levels based on power consumption, rpm, etc.

Fig. 13
Example of Acoustic Determinator window showing the project tree structure and the internal acoustic spreadsheet for dB averaging, cumulating and spectra weighting



Acoustic Determinator (Included with Predictor – LimA Software Types 7810-A/B): Acoustic Determinator is used to determine the sound power levels of industrial noise sources by measuring the sound pressure level according to ISO 3744, ISO 3746 and ISO 8297, as well as eight Dutch calculation methods (see Fig. 13). The sound power levels calculated in Acoustic Determinator can be exported to SourceDB or used directly as input for a noise source in a Predictor model.

Acoustic Determinator is also available as separate product, [Type 7816](#).

Fig. 14

Example Predictor Analyst windows showing noise contours from different sources and their accumulation exported to, and shown on, a Web site



Predictor Analyst (Included with Predictor – LimA Software Type 7810-B): This module has advanced GIS-like functionality for organising, accumulating, viewing, analysing and publishing (on the Internet) of noise maps (Fig. 14). The Analyst module enables you to obtain data that is required according to the EU Environmental Noise Directive without the need for an expensive GIS system. Cumulated and difference maps can be created. All maps can be combined with demographic GIS data files to determine noise exposure (of people/dwellings). Results from different calculation software can be combined.

Predictor Analyst is also available as a separate product, [Type 7813](#).

Optional Software Packages

- **LimA Aircraft Module BZ-5441:** Enables calculation of aircraft noise in accordance with ECAC Doc. 29 and the German AzB method, and allows simulation of a moving point source
- **Calculation Client BZ-5552:** Enables Predictor – LimA Advanced Type 7810-B calculation licenses with 2-core support on two additional workstations within the same network environment as the main Predictor – LimA package, for increased calculation speed of large and very large models
- **4-core Support for Predictor – LimA Plus BZ-5703:** Enables four cores for calculation on a single PC running Predictor – LimA Plus Type 7810-A for increased calculation speed
- **4-core Support Predictor – LimA Advanced BZ-5704:** Enables four cores for calculation on a single PC running Predictor – LimA Advanced Type 7810-B or Calculation Client BZ-5552 for increased calculation speed of large models
- **8-core Support BZ-5890:** Enables eight cores for calculation on a single PC running Predictor – LimA Advanced Type 7810-B or Calculation Client BZ-5552, for increased calculation speed of large models
- **LimA Graphical User Interface BZ-5700:** Enables use of LimA on a second computer for the creation and viewing of models and results created using the main Predictor – LimA software suite

Customized Versions and Add-ons

Upon request, customized versions and add-ons can be developed for all software within the Predictor – LimA software suite.

Examples of customer-specific add-ons for LimA:


- Single file converters for: ArcGIS, ArcView®, ArcInfo®, Atlas GIS™, GeoMedia®, MapInfo®, MOSS/MX, SICAD® SD, SICAD SQD, SoundPLAN® (ASCII), VISUM®, ESZI and GRANIS
- LimA^{sol}: Solar radiation and shadowing analysis
- AUSTAL, IMMIS^{net}, IMMIS^{Luft}: Air quality and meteorological modelling modules
- Support of Web Feature Services (WFS-T) and Web Coverage Services (WCS), in order to exchange data with external servers via the Internet
- Automated macros for advanced geometrical handling

For more information concerning customized versions and specific add-on's, contact your local Brüel & Kjær representative.

Support and Services

A Predictor – LimA Software Support and Maintenance Agreement ensures that you have the latest and best supported tools. It also ensures that you get optimal support, even during critical phases of your work, and gives you the benefit of continual software improvements, which provide immediate access to product enhancements and helps you avoid security issues.

A valid Predictor – LimA Software Support and Maintenance Agreement gives you the rights to all Predictor – LimA Software patches and upgrades within the subscription period. If you ever experience a software problem with Predictor – LimA, the agreement entitles you to support from local and, where



required, global Predictor – LimA experts. Brüel & Kjær guarantees response to your Predictor – LimA problem within two working days after we have received your request. In addition it entitles you to free access to official Predictor-LimA support webinars run by global Predictor-LimA experts.

The first year's subscription to Brüel & Kjær's Predictor – LimA Software Support and Maintenance Agreement is mandatory for all packages.

To optimize your use of Predictor – LimA, we recommend that you ensure that this agreement is valid at all times. The agreement can be automatically renewed, which ensures that you are always covered and saves you money because renewals cost less than single-year agreements.

In addition, Brüel & Kjær offers both product (Predictor – LimA) and application (calculation and mapping) training courses to holders of valid agreements at advantageous rates. Courses are held at the Brüel & Kjær University (located at the corporate headquarters), national training facilities, on site at a customer location and distance learning via webinars.

Predictor – LimA training courses enable you to get the most out of your software. Application training courses are not product-specific and give you an insight into calculation software and applications in general, thus improving your use and understanding of them. See www.bksv.com for more information about training courses.

PROJECT

File: Open, close, zip, install demonstration project, list recently used projects

Model Manager: Areas, versions, models

Import: Items from SHP/MIF/DXF/TXT/GMF; measurements from Sound Level Meter Types 2260/2250; models from Predictor projects

Export: Items to SHP/MIF/TXT/GMF/KML (Google Earth); results to SHP/DXF/TXT/KML; model to Predictor project

MODEL

Model Information: Method, make final option, model boundaries

Sources: Wind turbine, point source, line source, area source, emitting facade, emitting roof, moving point source, road, railway

Objects: Barrier (including cantilever option), bridge, building, foliage region, ground region, housing region, industrial site

Ground Model: Height line, height point

Calculation Points: Receiver, horizontal grid, vertical grid, contour point

Miscellaneous: DIV point, DIV line, DIV area, address point, GPS point

Groups: Unlimited nested grouping structure for sources

Periods: Time periods for day, evening, night and compound (Lden) period

EDIT

- Undo/redo, delete, copy/paste/paste special (as other item), snap (with offset to items or DXF background), move, rotate, rescale and simplify
- Multi-edit, polyline/polygon edit (add/insert/remove node, swap nodes, break/join/connect)
- Search and select (on item attributes), select (all, from active group, invert, group, ungroup, window, within user-defined area)
- Batch create items (parallel items/contour points around sources/receivers on facades)
- Import from SourceDB (sound power database), Import from Acoustic Determinator Type 7816*, LimA-Link* (export/import), add receiver or source from measurement

* Dependent on configuration. See Table 1.

VIEWING AND VERIFICATION

- Display options, backgrounds (SHP/MIF/DXF/DWG/BMP/JPG), Georeference (bitmap calibration)
- Zoom (in/out/window/previous/selection/extents/pan)
- Multi-model view, 3D view with edit option, cross-section view, measure distance view
- List of items, list of item history
- Check model, check links, remove duplicates
- Select background model, compare foreground and back ground model (items)

CALCULATION

- Batch calculation, selective calculation (hor. grids/vert. grids/receivers, contour points), test calculation (with export to SHP for displaying propagation paths), ground model calculation
- Calculation settings: meteorological correction, ground attenuation, optimization (fetching radius, dynamic error margin), air absorption, order of reflection, result storage (source/group/total)
- Server settings for Calculation Client BZ-5552

RESULTS AND SCENARIO COMPARISONS

- Table of results, table of comparisons (results/control values), table of control, control values, group reductions
- Contours (transparent/cumulated/difference), result labels, active period, active group
- Building results (on address points)

REPORTING

Print Results: From all result tables with interactive preview of selected receivers, number of sources, ranking, columns, groups and group reductions (Printer/PDF/RTF/XLS/BMP/JPG/WMF)

Print Items: With re-usable item profiles (Printer/PDF/RTF/XLS/BMP/JPG/WMF)

Print Model: With interactive preview and re-usable print templates (Printer/PDF)

TOOLS

Windcatalogue, SourceDB, Georeference, Acoustic Determinator Type 7816*, Predictor Analyst Type 7813*

Specifications – LimA Software version 11.2

PROJECT

- Customized project settings, based on configurable template
- Bookkeeping of user actions in user related log files as well as central project log file
- Selectable sub-sets of objects and regulations
- Support of automated merge of data setup or modified by several people in parallel
- Customizable template files preset dialog menus depending on intended task
- Automated workflows support fully automated processing of complex tasks
- Semi-automated workflows can guide user action
- User-defined DLL will support any kind of object attribute manipulation (for example, design emission model based on new object "bus lane" with extra attributes)
- Tracking of model modifications, using attributes such as User, Date, Period of validity, Origin of data, Modification index

INPUT

- Digitize data on screen or on tableau
- Attribute input supports database link, text list link (using Ident of up to 64 characters)
- Command loops help to efficiently edit large number of objects (for example, add 3 m height to all buildings of height 12 m in a certain region)
- More than 40 "Geometry Processing Features" (simple ones such as "move polygon" or complex ones such as "concatenate facade segments into buildings")
- Supporting the most complex terrain modelling features (contour lines, embankments, escarpment edges, terrain construction lines (reshaping terrain, e.g., along planed road), regular or irregular grid)
- Macros:** Support complex geometry processing (e.g., "create embankment along a number of adjacent non-parallel 3D railway tracks" or "pass on attribute information to matching objects")
- Open Data Structure:** For background or project related database for:
 - Meteorological data
 - Emission Spectra
 - Reflection and transmission loss
 - Directivity including frequency related and omnidirectional (5/10 degree resolution) directivity of loudspeakers

Import/Export: Vector/attribute data from DXF (AutoCAD®), SHAPE (GIS), measurement data from Sound Level Meters Types 2260/2250, TNM (FHWA), KML (Google Earth), Predictor models

VIEWING AND VERIFICATION

- Bitmaps in foreground or background
- Colour and pen coding according to attributes
- Automated guidance to objects recognized as critical during model setup in calculation core
- 3D OpenGL viewing with moving camera on track or automated collection of screenshots for sensitive positions
- Video-style display of changes in noise maps (for example, aircraft bypass)
- Automated statistics on objects and attribute content
- Manipulation of objects can be automatically reported to any text file

REPORTING AND EXPORT

- Create plots in HPGL or EMF format
- Export results to KML
- Create all kinds of statistics with built-in general statistics tools
- Analysis of quality of results, depending on calculation parameters, according to DIN 45687

CALCULATION

- Supports a wide range of regulation, octaves and 1/3-octaves
 - 24 emission attributes to calculate hourly data for a whole day
 - Generate separate result columns to document influence of groups of sources
 - User control of result quality while tuning speed
 - Server concept for up to 250 LimA servers in a network environment
 - Scalable report tables offer deep insight into calculation, separately showing detailed geometry parameters of the sound path for each reflection and listing relevant reflectors. Also supporting visual check
 - During each calculation a model file is created which keeps track of the data how it has been used after all internal processing
- Wide range of analysis features, including:
- Reverse Engineering defines source levels from measurements in complex environment with respect to background noise, multiple unknown sources (octaves supported)
 - Fixing quotas to optimize industrial land use next to settlements
 - Uncertainty analysis with respect to a range of influences
 - Optimizing barriers (also grouped barriers) with respect to interaction of screening effects
 - Non-stationary sources (checking for worth or best position)
 - Finding optimal positions for a source with respect to surround settlements (find suitable wind park position)
 - Create “logical” noise maps, showing the areas where certain sources or “noise emitter groups” contribute the dominant noise level
 - Instant Noise Map, using measurement to automatically adjust a noise map

Recommended PC for Predictor – LimA Software Suite Type 7810

Operating System: Microsoft® Windows® 10, 64-bit

Graphics Adaptor: Intel or Nvidia

RAM: 8 GB

Drive Space: At least 1 GB of free disk space, plus disk space used as a working area

For calculation of large Advanced-sized terrain models, tiling is recommended in combination with Calculation Client add-ons and/or the multi-core option for multi-processor computers

Note: Predictor-LimA can be used with Windows® 7, Windows® 8 or Windows® 10 (32 or 64 bit)

Configuration Overview

Table 1 Overview of Predictor – LimA Software Suite Type 7810 configurations

	Type 7810-B	Type 7810-A	Type 7810-G	Type 7810-C	Type 7810-D/E/F	Type 7810-H	Type 7810-I
Calculation Method	All*	All*	All*	ISO, BS 5228, ENM-Link	NMPB/ CNOSSOS/ DAL	ISO, TNM, ENM-Link	ISO
Model Size[†]	Advanced	Plus	Standard	Plus	Plus	Plus	Standard
Predictor Software (incl. Windcatalogue, SourceDB and Georeference)	✓	✓	✓	✓	✓	✓	✓
LimA-Link	✓	✓	✓	–	–	–	–
LimA Software	✓	✓	✓	–	–	–	–
Acoustic Determinator (Type 7816)	✓	✓	O	O	O	O	O
Predictor Analyst (Type 7813)	✓	O	O	O	O	O	O
LimA Aircraft Module BZ-5441	O	O	O	–	–	–	–
LimA Graphic User Interface BZ-5700	O	O	O	–	–	–	–
LimA^{arc} ArcGIS Plug-in WT-9686	O	O	O	–	–	–	–
4-core Support for Predictor–LimA Plus BZ-5703	–	O	–	–	–	–	–
4-core Support for Predictor–LimA Advanced BZ-5704	O	–	–	–	–	–	–
8-core Support[‡] BZ-5890	O	–	–	–	–	–	–
Calculation Client BZ-5552	O	–	–	–	–	–	–
Key: ✓ included, – not included, O optional add-on							

* All = for Predictor and LimA: CNOSSOS, ISO 9613, NFS 31-133, DAL 32, Harmonoise, CRTN, RMR – SRM2, NMPB – 2008, XPS 31 – 133, BS 5228; for Predictor only: HJ2.4-2009, CRTN NZ, TNM (32 bit only), ENM-link (32 bit only); for LimA system only: MSZ 15036, RLS 90 (including draft 2016), DIN 18005, RVS 3.02, UT2.1 – 302, VDI 2714 – 2720 – 2571, OAL 28, SCHALL 03 (1990 and 2014), AKUSTIK 04, TRANSPAPID, OAL 20, CRN, MSZ 2904, VBUS, VBUSch, VBUF and VBUI

[†] Size per model without tiling:

Advanced – 200,000 emitters and 1,000,000 obstacle or terrain edges;

Plus – 12,000 emitters and 60,000 obstacle edges and 1,000,000 obstacle or terrain edges;

Standard – 4000 emitters and 20,000 obstacle edges and 1,000,000 obstacle or terrain edges.

For 64 bit the advanced model size is increased to 437,500 emitters and 2,187,500 obstacle or terrain edges

[‡] For additional cores, contact your local Brüel & Kjær representative

Ordering Information

Type 7810-A	Predictor – LimA Plus
Type 7810-B	Predictor – LimA Advanced
Type 7810-C	Predictor – LimA ISO
Type 7810-D	Predictor – LimA NMPB
Type 7810-E	Predictor – LimA CNOSSOS
Type 7810-F	Predictor – LimA DAL 32
Type 7810-G	Predictor – LimA Standard
Type 7810-H	Predictor – LimA NAFTA
Type 7810-I	Predictor – LimA ISO Entry

All Predictor – LimA Software Suite Type 7810 configurations include the following accessories:

- Program protection key (Hasp key)
- Installation Manual

Note:

- Setup software and license file(s) are available via download
- Predictor – LimA Software Suite Software Maintenance, Upgrade and Support Agreement for first 12 months after purchase must be purchased with the above

OPTIONAL SOFTWARE

BZ-5703	4-core Support for Predictor – LimA Plus
BZ-5704	4-core Support for Predictor – LimA Advanced
BZ-5890	8-core Support for Predictor – LimA Advanced
BZ-5441	LimA Aircraft Module
BZ-5700	LimA Module 5 (Graphic User Interface)

The above license packages are made available via downloadable license

BZ-5552	Predictor – LimA Calculation Client License Pack
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Includes:

- Program protection keys (2)

Note:

- Setup software and license file(s) are available via download
- Predictor – LimA Software Suite Software Maintenance, Upgrade and Support Agreement for first 12 months after purchase must be purchased with the above

WT-9686	LimA ^{arc} ArcGIS Plug-in (add-on)
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Type 7813	Predictor Analyst Software
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Type 7816	Acoustic Determinator Software
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AVAILABLE ACCESSORIES

Type 2250	Hand-held Analyzer
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Type 2270	Hand-held Analyzer
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SERVICES

7810-A-MS1	Predictor – LimA Plus, Support and Upgrade Agreement (1 year)
7810-A-MS2	Upgrade to Version 11 from Version 10 including 7810-A-MS1
7810-B-MS1	Predictor – LimA Advanced, Support and Upgrade Agreement (1 year)
7810-B-MS2	Upgrade to Version 11 from Version 10 including 7810-B-MS1
7810-C-MS1	Predictor – LimA ISO Plus, Support and Upgrade Agreement (1 year)
7810-C-MS2	Upgrade to Version 11 from Version 10 including 7810-C-MS1

7810-D-MS1	Predictor – LimA NMPB Plus, Support and Upgrade Agreement (1 year)
7810-D-MS2	Upgrade to Version 11 from Version 10 including 7810-D-MS1
7810-E-MS1	Predictor – LimA CNOSSOS Plus, Support and Upgrade Agreement (1 year)
7810-E-MS2	Upgrade to Version 11 from Version 10 including 7810-E-MS1
7810-F-MS1	Predictor – LimA DAL 32 Plus, Support and Upgrade Agreement (1 year)
7810-F-MS2	Upgrade to Version 11 from Version 10 including 7810-F-MS1
7810-G-MS1	Predictor – LimA Standard, Support and Upgrade Agreement (1 year)
7810-G-MS2	Upgrade to Version 11 from Version 10 including 7810-G-MS1
7810-H-MS1	Predictor – LimA NAFTA Plus, Support and Upgrade Agreement (1 year)
7810-H-MS2	Upgrade to Version 11 from Version 10 including 7810-H-MS1
7810-I-MS1	Predictor – LimA ISO Standard, Support and Upgrade Agreement (1 year)
7810-I-MS2	Upgrade to Version 11 from Version 10 including 7810-I-MS1
7810-X-100	Upgrade from 7810-C/D/E/F to 7810-A (both version 11)
7810-X-200	Upgrade for version 10 from 7810-A to 7810-B (both version 11)
7810-X-300	Upgrade for version 10 from 7810-G to 7810-A (both version 11)
BZ-5441-MS1	LimA Aircraft Module, Support and Upgrade Agreement (1 year)
BZ-5441-MS2	Upgrade to Version 11 from Version 10 including BZ-5441-MS1
BZ-5552-MS1	Predictor – LimA Calculation Client, Support and Upgrade Agreement (1 year)
BZ-5552-MS2	Upgrade to Version 11 from Version 10 including BZ-5552-MS1
BZ-5700-MS1	LimA Module 5 (Graphic User Interface), Support and Upgrade Agreement (1 year)
BZ-5703-MS1	Support and Upgrade Agreement (1 year) for BZ-5703
BZ-5703-MS2	Upgrade to Version 11 from Version 10 including BZ-5703-MS1
BZ-5704-MS1	Support and Upgrade Agreement (1 year) for BZ-5704
BZ-5704-MS2	Upgrade to Version 11 from Version 10 including BZ-5704-MS1
BZ-5890-MS1	Support and Upgrade Agreement (1 year) for BZ-5890
BZ-5890-MS2	Upgrade to Version 11 from Version 10 including BZ-5890-MS1

Predictor – LimA training courses
Calculation and mapping training courses



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