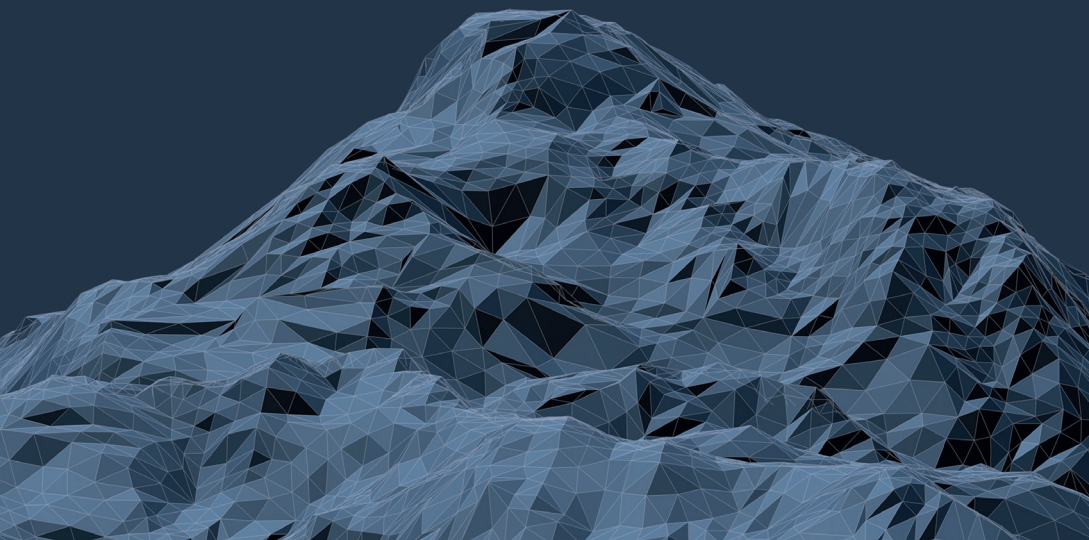


TRIAN **3DBUILDER**

Database Generation System



BROCHURE

DATABASE GENERATION SYSTEM

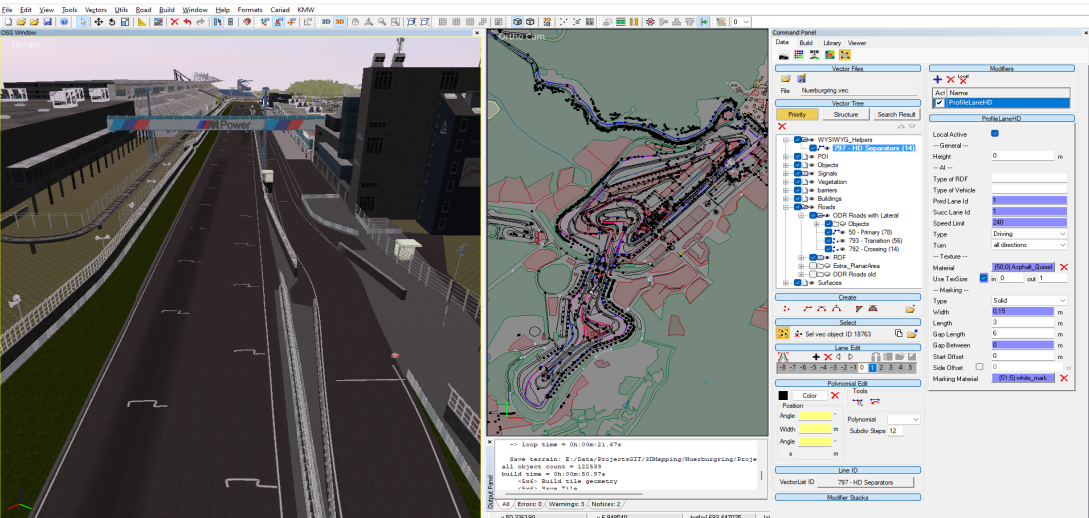
THE NEW KIND OF DATABASE GENERATION!

Trian3DBuilder is the ultimate tool for creating correlated 3d scene maps and digital twins optimized for real-time rendering. The geospecific or procedural 3d content is generated with a high degree of automation locally or on your server/cloud infrastructure. Its simple workflow and innovative UI concept based on modular construction templates make it the most powerful and flexible creating tool on the market.

Setup a project with a multitude of input data and create output for any target platform. The simplified tool chain will significantly reduce the cost of day-to-day production.

KEY FEATURES

- Highly-Accurate and Correlated
- Aerospace, Maritime, Automotive, Defense,...
- Full Automation, Server and Cloud Generation
- Interactive 2D / 3D Editing
- Geospecific and Procedural Databases
- Integrate any GIS Data Source and Export to Any Platform
- Complex Road Networks with OpenDrive Export



USE-CASES

The software offers features for a multitude of use-cases. For aerospace applications, landscapes of unlimited size are complemented with airport generation. Maritime use-cases based on ENC data are covered, as well as automotive requirements including road networks and urban environments for ADAS/AV development and validation.

TERRAIN FEATURES

Terrain tiles unlock paging and streaming support for vast landscapes on classic simulation platforms and in modern game engines. The correlated terrains are generated from geospecific input data or procedurally using landcover data, flexible generation rules and scripts.

All approaches can be combined flexibly, opening up a world of creative possibilities!

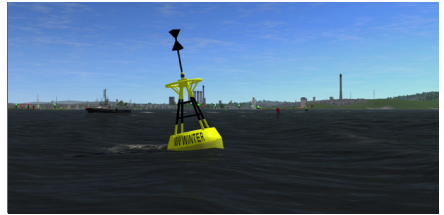
WORKFLOW

Trian3DBuilder's intuitive user interface is not only targeting highly specialised terrain engineers. Create, edit or verify vector and elevation data with a comprehensive set of tools! You can edit the data synchronously in 2D or in 3D using the integrated 3D viewer, which also offers full paging support.



GENERATION

The novel generation algorithms have been developed for high performance. They offer a variety of features for rapidly designing and creating sophisticated large-scale terrains for flight-, driving-, maritime and infantry simulations. A wide range of import and export capabilities for all kinds of georeferenced data types and projections are offered.



The flexible combination of modular generation rules for vector features provides a convenient set of capabilities. Complex 3D assets are generated according to those rules. Vector are cut into the ground mesh with smooth transition borders and rendered into the ground texture.

A multitude of optimization options including LOD support, file structure management, automatic object grouping, mesh simplification and many other generation features that ensure fast terrain rendering and paging.

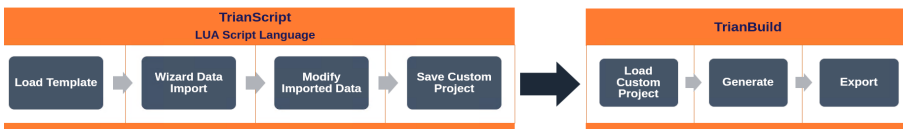


AUTOMATION

AUTOMATED TERRAIN GENERATION.

Trian3DBuilder offers a complete tooling for fully automated terrain generation. Integrate various data sources with the Project Wizard and application settings in a browser front-end, independent of the desktop application. This functionality is also fully scriptable.

You may assign generation templates based on the attributes of the input data. Adjust the input data with the script interface to also support complex use-cases. Procedural generation rules can be adjusted and scripted to generate variations of the created 3d scene maps for machine learning or to verify your perception or AV algorithms.



Use the generation core under Windows or Linux (optionally in a Docker container) to create your requested output formats locally, on a server infrastructure or in the cloud.

GEOTYPIC GENERIC MODULE

BE INDEPENDENT FROM EXPENSIVE SOURCE DATA

The Geotypic Module adds the capability to create photo-realistic terrains based on elevation and landcover data alone. Heterogeneous landscapes are formed by combining texture sets for various terrain types.

The vector definition for each texture allows you to populate the terrains with hand-modelled or newly generated assets, so you can set up a completely featured terrain in minutes.

KEY FEATURES

- Generic & Geotypic Texturing
- Automatic Object Placement
- Height/Slope Dependent Texturing
- Independent from Expensive Satellite Images
- Various Texture Sets Inclusive
- Sensor Material Support



ROADS MODULE

BUILD COMPLEX ROAD NETWORKS IN MINUTES

Trian3DBuilder has the unique ability to create fully functional road networks of any size, including a detailed environment for driving simulation, AI training data or ADAS/AV development and validation.

Robust algorithms create road networks from real-world navigation data of any quality (OSM, HERE RDF, HERE HD,...). Highly accurate HD data is supported as well as simple navigation data to create drivable roads. Traffic logic, sensor simulation materials and segmentation information are also generated.

KEY FEATURES

- Huge Road Networks from Real-World Data
- 3D Profiles, Lanes, Signals and Markings
- Crossings from Arbitrary Road Constellations
- Highly accurate from HD data
- OpenDRIVE Import/Export
- Full Environment
- Sensor Materials & Segmentation Data



ROAD GENERATION

Roads are created either from HD data with accurate lane description or more generic form navigation data including lane number, road type and turning directions. The roads are then cut into the terrain mesh with smooth height transition also in hilly areas. The data is pre-processed automatically and can also be fully edited by hand in 2D or 3D view. Road markings are created as well as bridges and tunnels. Optionally the roads can also be created from scratch.



ROAD CROSSING

The software allows you to create the most complex crossings and various junction types using any line constellation. You can also use it to create smooth transitions between different lane settings of roads, as well as fork and motorway exit options. These features can be combined with tunnel and bridge generations



REAL-WORLD DATA

OpenStreetMap and navigation data can be imported and automatically translated into road generation templates. Line data can be pre-processed and converted into an arc/clothoid-based representation, which corresponds to road construction rules. The project wizard makes it easy to set up a project without deep knowledge of the software.

MULTITUDE OF PLATFORMS

Trian3DBuilder exports in a variety of formats, tailored to support platform-specific features and, most importantly, sensor materials. Supported platforms are amongst others: IPG Carmaker, Hexagon VTD, Vector Dyna4, dSpace Aurelion, AV-Simulation SCANer,...



OPENDRIVE IMPORT, EDIT, EXPORT

OpenDRIVE is the open file format for the logical description of road networks. The format can be imported as a highly accurate road description, edited and re-exported. The software can also export OpenDRIVE and alternate road logic formats (Road5,...) created from the input navigation data. Traffic lights and signs are included in the format and can be controlled by the simulation.

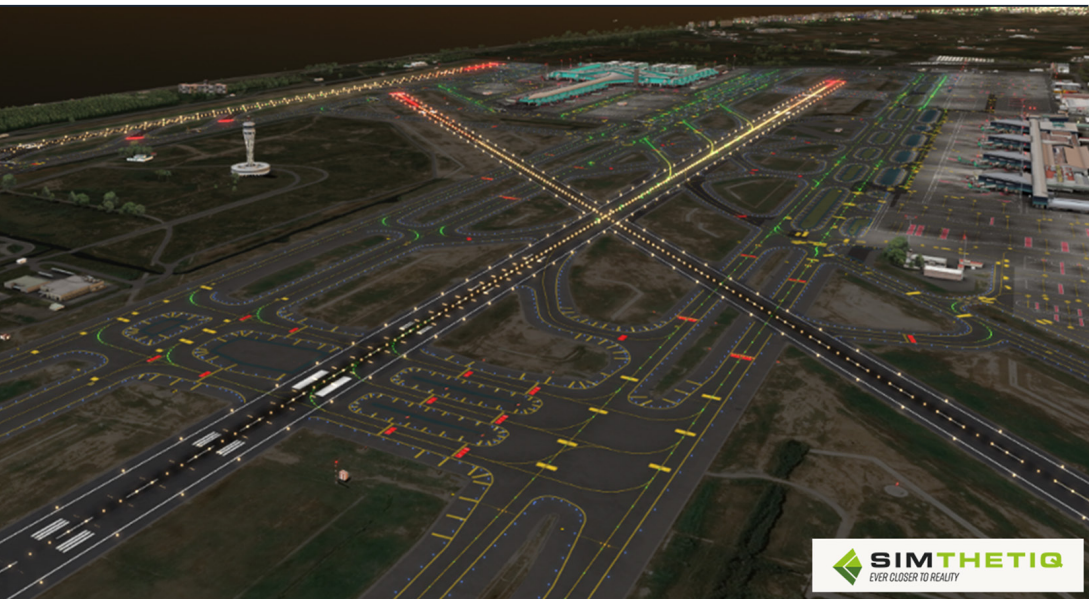
AUTOMATIC AIRPORT GENERATION

BUILD AIRPORTS IN NO TIME

The Airport Module delivers a powerful, efficient solution for creating intricate airports in Trian3DBuilder. Select from an extensive airport database spanning the globe, tweak the settings, and import to precise editable vector data. The airport is seamlessly integrated into a terrain of any size and can be exported to any standard format.

KEY FEATURES

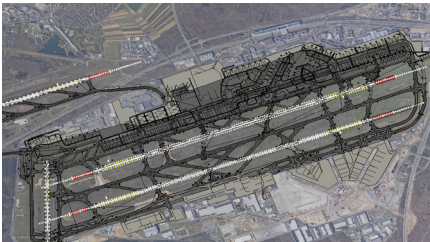
- Automatic Airport Generation
- Over 35.000 Airports (Continuously Updated)
- Fully Featured (Runways, Lighting, Taxiways)
- Simple Modification of All Features
- Integration into Surrounding Terrain
- Library of Models (Control Towers, Aircrafts...)



WORKFLOW

With its very simple workflow Trian3DBuilder supports the generation of extensive airports in a matter of minutes.

- Choose an airport by its ICAO code
- Modify the attributes
Like runway position, light settings or ground types.
- Import the airport
- The data is translated into vector data and the 3D model can be generated right away.



2D & 3D EDITING

The imported vector data can optionally be edited with a comprehensive set of vector editing tools and enriched with other data (e.g. Open Street Map). The terrain can be validated and modified in the internal 3D viewer with direct visual feedback.



SUPPORTED AIRPORT FEATURES

- Approach Lighting
ALSF_I, ALSF_II, CALVERT, CALVERT_ILS, SSALR, SSALF, SALS, MALSR, MALSF, MALS, ODALS, RAIL
- Additional Lighting
Edge, Touchdown Zone, and Center Lights
- Runway Light Indicator
PAPI, VASI, Left, Right
- Runway Marking
Threshold, Identifier, Touchdown Zone, Center/Edge Lines
Displaced Threshold and Stopway
- Taxiways
Lights, Signs, Center/Stop Lines
- Special Areas
Apron Areas, Helipads with Markings
- Placement of Special Objects
Tower, Wind Sock, Light Beacon



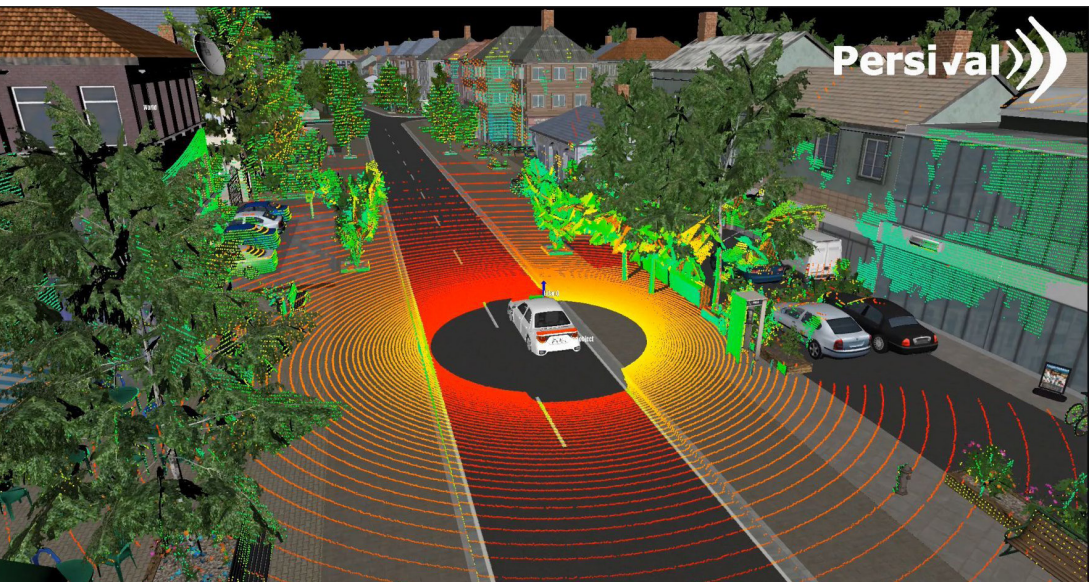
SENSOR DATABASES

SENSOR ATTRIBUTES FOR YOUR SIMULATION SYSTEM

The Sensor Module supports the generation of additional textures and surface descriptions, including information about the physical classification of terrain and objects. Using this information, the visualisation software can compute arbitrary sensor views depending on physical attributes and requirements: night vision, thermal imaging, radar, etc.

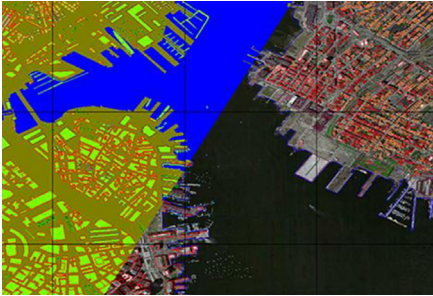
KEY FEATURES

- Simple Definition and Assignment of Properties
- Assignment to Texture Pixel
- Flexible and Quick Parametrization Through IDs
- Supports Any Sensor Application
- Compatible with Geotypical & Generic Texturing
- Preview Coloured Results in 3D View



MATERIAL PROPERTIES

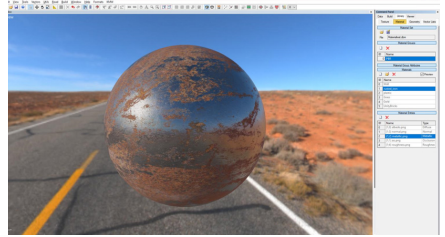
The Sensor Module allows the user to add physical attributes to each pixel of a database, which is realised through additional texture layers. The application automatically assigns an arbitrary number of classes containing weights for different material types (e.g. 30% sand and 70% asphalt). For performance reasons, negligible percentages can be filtered out.



SENSOR CLASSES

The attribute sets are arranged in class IDs. The simple GUI allows physical properties to be defined quickly and easily. Colour scans can be assigned to texture classes for easy editing and verification.

Using these colours, the landscape can be verified directly in Trian3DBuilder's internal 3D view.



COMPATIBILITY

To ensure compatibility with any image generator, the attribute set can be saved in the comment field of the terrain's scenegraph or optionally in a separate XML file. Various settings such as texture format and channel encoding can be adjusted to suit the requirements of any IG

NIGHT VISION, INFRARED OR CUSTOM SENSOR

The Sensor Module helps to enhance a terrain database for sensor simulation in any simulation system, e.g. for night vision or infrared visualisation. Predefined sensor textures are included for all geotypical terrain textures and many objects in the library. Additional sensor textures can easily be added. To check the sensor attributes in the internal viewer, you can choose between ID colour, night vision and greyscale view.



SERIOUS GAMES

DETAILED DATABASES FOR YOUR GAME ENGINE

Use Trian3DBuilder to construct new 3D scene maps for Unreal, Unity, VBS or any other real-time engine with a variety of export formats: OpenFlight, FBX, glTF, 3D Tiles, CDB, and many more.

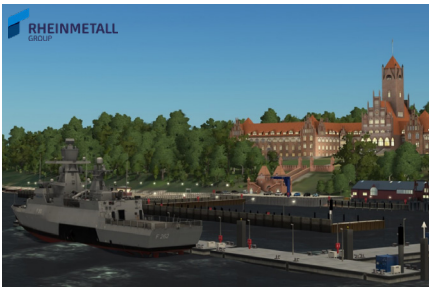
KEY FEATURES

- Setup or Convert Projects in Minutes
- Geospecific, Generic and Geotypical Texturing
- Place Engine Specific Objects or Various Other Formats
- Generate Buildings with Interiors & Various Roof Types
- Object Attributes: Collision, Shadow, etc.
- PBR Materials
- Edit Exported Terrain Data



EASE OF USE

The exporters follow the main application's concept of ease of use. The output is ready to be loaded into any target platform using the provided plugins or scripts. Template projects help to set up a new project, and settings are automatically constrained to an exporter's requirements.



GENERATION

Trian3DBuilder creates tile-based databases that support streaming/paging of very large scaled terrains at run-time. Depending on the target platform and use case, Trian3DBuilder generates all objects with physical attributes for collision detection and shadow calculation or with tags to control the respective platform functionality.

SUPPORT

Trian3DBuilder comes with extensive libraries of textures, geometries and special ground features, including vector definitions. In addition to various tutorials and sample projects, optional training courses and project support from TrianGraphics ensure rapid productivity.

FEATURES

- Importer Plugins/Scripts
Import plugins and scripts are provided for target platforms to simplify the import process
- Asset Placement
Convert existing assets to target format
- Asset Generation
Create buildings from outlines with multiple facades and roof types. Create walls, pipelines, power lines,... from GIS data
- Texturing
Using satellite imagery, generated ground textures, high-res tiling textures,...
- Vegetation
Splat maps to control procedurally generated content (vegetation, ground texture, ...)
- Roads, Rivers and Lakes
Cut into static terrain mesh to support dynamic mesh simplification.

BENEFITS OF TRIAN3DBUILDER

Buildings and objects are generated flexibly from vector data. The vector generation templates can be parametrized to e.g. clutter objects or to form roads and rivers in the render engine.



LICENSING

AS FLEXIBLE AS YOUR NEEDS

Trian3DBuilder is offering a multitude of licensing options. You can purchase only those modules that you really need and extend the software at any time. Conclude with a maintenance contract to automatically receive all software updates and benefit from TrianGraphics' premium support.

LICENSING OPTIONS

- **Trian3DBuilder (Core)**
export formats included:
FLT/MFT, OSG(ive, osg), obj, x,
3ds, dae

TRIAN3D MODULES

- **Geotypic Module**
terrain textures and object
placement without the need of
satellite imagery
- **Roads Module**
advanced roads and crossings
from real-world data OpenDRIVE
- **Airport Module**
automatic airport generation
from large library and airport
editing
- **Sensor Module**
physical classification of terrain
and objects
- **SDK / API**
Software Development Kit

TRIAN3D FORMATS

- **FBX Exporter**
export to Autodesk's standard
exchange format
- **Datasmith**
- **glTF and 3D Tiles**
- **OGC CDB**
- **VBS3 Exporter**
export to Bohemia Interactive's
VBS3 format
- **Steel Beasts Pro Exporter**
export to e-Sim Games' Steel
Beasts Pro format

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TRIANGRAPHICS
Intelligent Terrain Solutions

