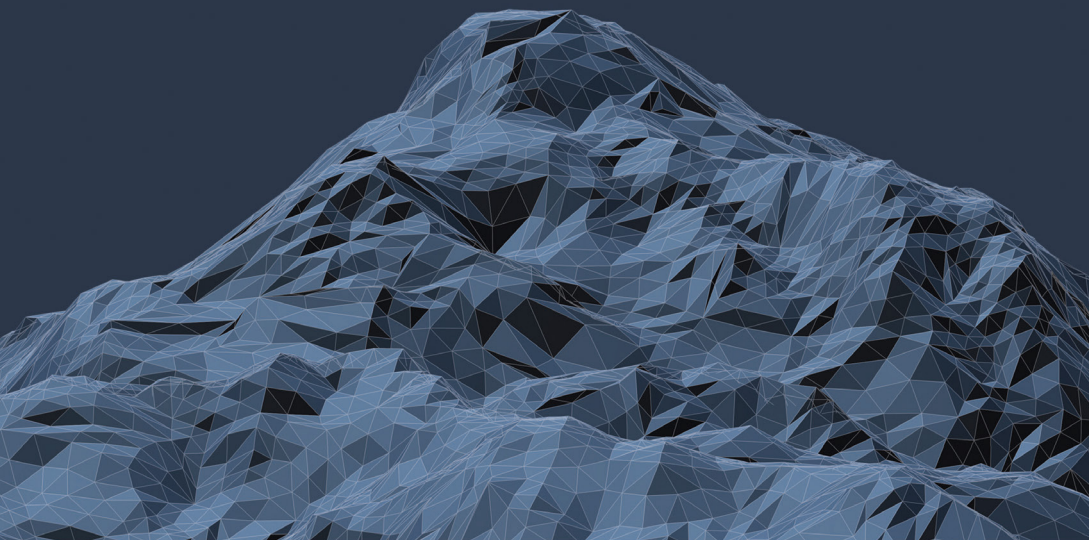


TRIAN**3DBUILDER**

Database Generation System



BROCHURE

DATABASE GENERATION SYSTEM

BUILD A BETTER WORLD

Trian3DBuilder offers comprehensive features required for the generation of geospecific correlated terrains optimized for real-time rendering. With its simple workflow and new concept use based on modular construction templates, Trian3DBuilder is one of the most powerful terrain-creating tools on today's simulation market. Flexible licensing options, with the choice for various feature/export upgrades, a short training period and an overall simplified tool chain can help cut costs in everyday production process.

KEY FEATURES

- Ease of Use
- Buildings and Airports
- Complex Road Networks with OpenDrive Export
- Export to a Multitude of Industry Standard Formats
- Multi-Core Support
- Geospecific, Geotypical and Generic Databases
- Interactive 2D / 3D Editing



TERRAIN TYPES

Geospecific terrains are generally based on real-world data such as satellite imagery or vector source data. Geotypical and generic terrains are, in contrast, generated mathematically using landcover data or height/slope dependent texturing. The natural terrain structure is preserved and objects are placed automatically fitting the underlying texture. All approaches can be combined flexibly.



WORKFLOW

Trian3DBuilder's intuitive user interface has been designed by following a user-driven approach and is not made specifically for highly specialized terrain engineers. Vector and elevation data can be verified, edited or created with a comprehensive set of tools. The data can be edited synchronously in 2D or in 3D by using the interactive WYSIWYG mode of the integrated 3D viewer which also offers full paging support.

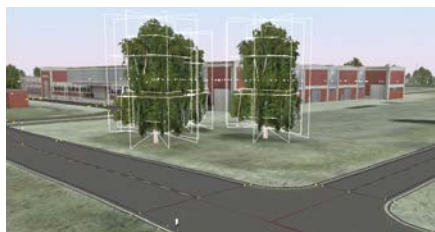


GENERATION

The novel generation algorithms have been developed for high performance and 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. With the basic license, multi-core systems are used to full capacity.

The flexible combination of modular generation rules for vector features provides a convenient set of capabilities. Complex vector features can be cut into the ground mesh with smooth transition borders and rendered into the ground texture. Objects may be placed and generated due to various rules.

Unlimited terrain LODs with file structure management, automatic grouping of objects, various terrain simplification types and many other generation features provide fast terrain rendering and paging. Through specific generation settings for each terrain tile and the support of multi-tile grids, each project can be set up optimally to the scenario's demands.



GEOTYPIC GENERIC MODULE

BE INDEPENDENT FROM EXPENSIVE SOURCE DATA

The Geotypic Module adds the capability to generate photorealistic terrains only on the basis of elevation and landcover data. Texture sets for various terrain types are combined to form a heterogeneous landscape. With the vector definition for each texture, the terrains may be densely populated with hand-modelled or generically generated objects. Thus, a completely featured terrain can be set up in minutes.

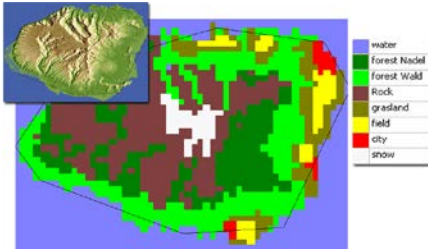
KEY FEATURES

- Generic & Geotypic Texturing
- Automatic Object Placement
- Height/Slope Ramp Dependent Texturing
- Independent from Expensive Satellite Images
- Various Texture Sets Included
- Sensor Compatibility



GEOTYPIC TEXTURING PROCEDURE

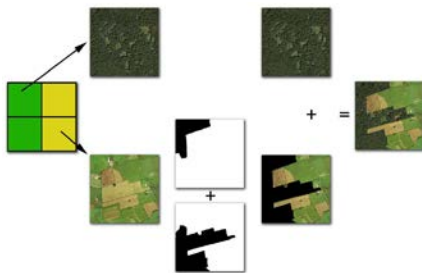
→ Height and land-class data



→ Various ground textures



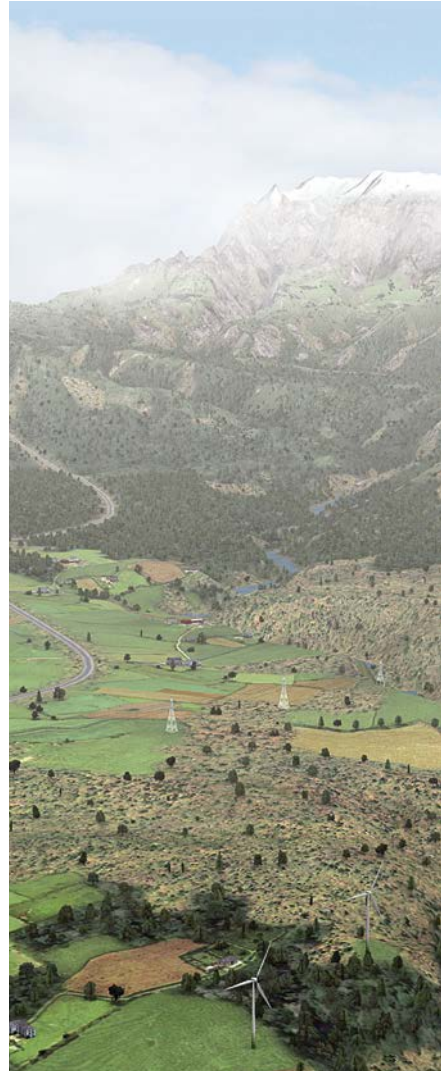
→ Texture transitions with alpha maps



→ Information about object placement



→ End result with preserved structure and object placement



ROADS AND ROADS PLUS MODULE

BUILD COMPLEX ROAD NETWORKS IN MINUTES

Trian3DBuilder's capabilities for fully-featured road networks of arbitrary size, applicable for driving simulations, are unique on the market. Real-world navigation data is analyzed and parametrized automatically. The visual database is generated with additional AI information's for driving and traffic simulation.

KEY FEATURES

- 3D Profiles, Lanes, Signals and Markings
- Crossings from Arbitrary Roads Constellations
- Huge Road Networks from Real-World Data
- OpenDRIVE Export
- Streetcar Support
- Using Construction Rules (Arc/Clothoid Based)



ROADS GENERATION

Roads are generated from 3D profiles with arbitrary lane settings and lane count and are cut into the terrain mesh. Smooth transitions between different road settings are supported. Street generation templates are automatically assigned to the input data based on vector attributes. The data is preprocessed automatically and can also be edited by hand in 2D or 3D view. Road markings are created as well as generic bridges and tunnels.



INTERSECTIONS

Any line constellation is supported to form most complex crossings and various junction types. Forks and motorway exits are supported as well as smooth transitions between different lane settings of roads. Those features can be combined with tunnel and bridge generations.



REAL-WORLD DATA

Besides other standard formats, OpenStreet-Map and navigation data may be imported and is 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 helps set up a project without deep knowledge of the software.



RAILS FOR STREETCARS AND TRAINS

Rails are created with power lines and can be combined with roads. Switches and waiting areas are supported.

OPENDRIVE EXPORT

OpenDRIVE is an open file format for the logical description of road networks. The Roads Plus Module contains an exporter, which exports all AI information related to the roads. This logical information includes traffic signs and lights, which are connected to roads and crossings and can be grouped by controllers.

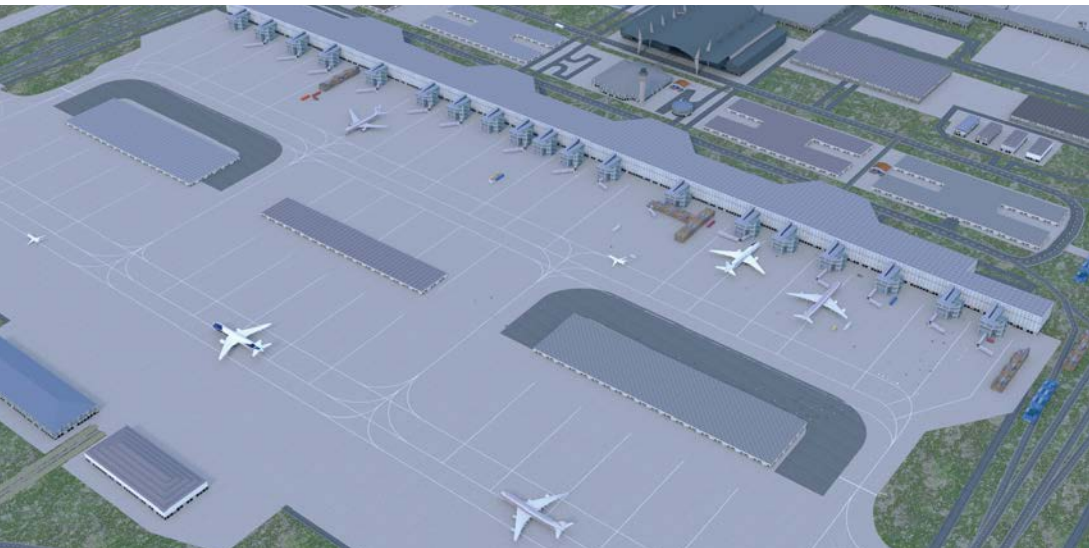
AUTOMATIC AIRPORT GENERATION

BUILD AIRPORTS IN NO TIME

The Airport Module enhances Trian3DBuilder with the quick generation of complex airports. Choose from a huge airport database from all over the world, adjust the settings and import to a detailed editable vector data. The airport is integrated in a terrain of arbitrary size and can be exported to any standard format.

KEY FEATURES

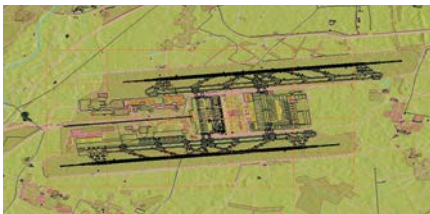
- Automatic Airport Generation
- Over 20.000 Airports (Continuously Updated)
- Fully Featured (Runways, Lighting, Taxiways)
- Simple Modification of All Features
- Integration into Surrounding Terrain
- Library of Models (Control Towers, Aircrafts...)



WORKFLOW

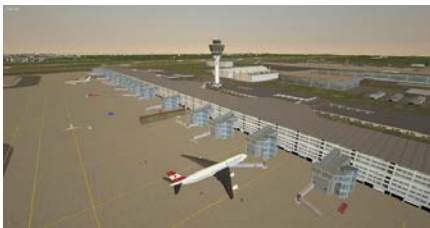
With its very simple workflow Trian3DBuilder supports the generation of extensive airports in a matter of minutes.

- **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**
The 3D model can be generated right away.



2D & 3D EDITING

The imported vector data can optionally be worked over with an extensive set of vector editing tools and may be 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, 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



MARITIME DATABASES

AUTOMATIC SEABED CREATION

Trian3DBuilder's capabilities for the creation of densely populated landscapes covers special features for maritime simulation and nautical training. Combine common data sets for the creation of inland areas with nautical charts for sea areas, which provides a perfect resemblance of the under water with all maritime signals.

KEY FEATURES

- Import ENC Data: S57, S63, 7Cs
- Seabed from Depth Contours and Soundings
- Coastline with Quay Walls, Shoreline Constructions and Piers
- Buoys/Beacons with Topmarks
- Lights with Blink Code, Color, Direction, Range & Intensity



WORKFLOW

The workflow is fast and intuitive:

→ Import ENC Data

→ Modify Attributes

Like coastline height/depth, water height, pontoon height, data processing options.

→ Data is Translated into Vector Data

All vector data is imported with the correct modifier and settings. Models and textures are already assigned.

DATA OPTIMIZATION

The imported ENC data can be processed and optimized for the build process of Trian3DBuilder. This covers, among other things, detection and deletion of double vectors and allows to combine various ENC data sets.

PROJECT

After importing the ENC Data, the project settings are automatically adjusted to delauney triangulation for the seabed mesh construction from depth contours.

Inland waters are cut into the terrain mesh and can also be traveled by ship. Land areas can be edited without limitation.



BUOYS AND BEACONS

All buoys and beacons with lights and blink code are placed automatically. Included are models which can be combined to almost all constellations of buoys with or without beacons.



COASTLINE

Quay walls, shoreline constructions and piers are placed automatically.



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 that information, the visualization software can calculate arbitrary sensor views depending on physical attributes and requirements: night vision, thermal imaging, radar, etc.

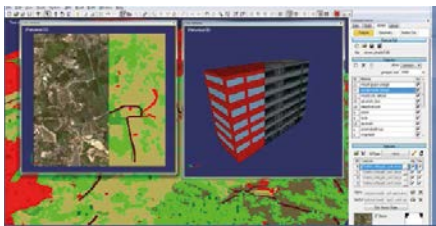
KEY FEATURES

- Simple Definition and Assignment of Properties
- Assignment to Texture Pixel or Mesh Faces
- 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. The allocation is realized with additional texture layers. The application automatically assigns an arbitrary count of classes holding weights for various material types (e.g. 30% Sand and 70% Asphalt). For performance reasons, negligible percentages can be filtered out.



NIGHT VISION, INFRA-RED OR CUSTOM SENSOR

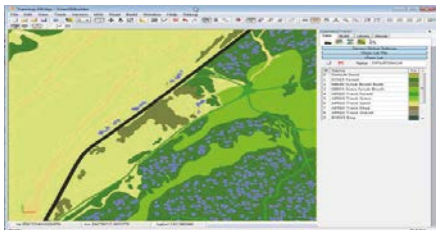
The Sensor Module helps to enhance a terrain database optimally for sensor simulation in any simulation system for e.g. night vision or infrared visualization. Prefabricated sensor textures for all geotypical ground types and for many objects in the library are included. Additional sensor textures can simply be added. To verify the sensor attributes in the internal viewer one may choose between ID-coloured, night vision and grey-scale view.

Additionally, the sensor can be used to place engine specific clutter elements like vegetation or surface attributes for vehicles.

SENSOR CLASSES

The attribute sets are arranged in classes (IDs). With the simple GUI physical properties can be defined quickly and easily. For the ease of editing and verification, colours can be assigned to the texture classes.

Using those colours the landscape can directly be verified 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 scene graph or optionally in a separate XML file. Various settings like texture format and channel encoding can be adjusted to any IG's requirements.



VBS DATABASES

DETAILED DATABASES FOR VBS

Benefit from the convenient editing features of Trian3DBuilder to create complex terrains for Bohemia Interactive's VBS2/VBS3. The export covers all common functionalities you might already know from VBS, but it also has unique features like the support of complex roads with various lanes and junctions. For this purpose they are split up into smaller geometries and exported to p3d.

KEY FEATURES

- Setup or Convert Projects in Minutes
- Geospecific, Generic and Geotypical Texturing
- Multi-Grid Support
- Generate Buildings with Interiors & Various Roof Types
- Object Attributes: Collision, Shadow, etc.
- Export to Arbitrary Packer Version (VBS Version 1.6 - 3.x)
- Complex Roads & Junctions



EASE OF USE

The exporter pursues the main applications concept of ease of use. When setting up a project the terrain settings, such as tile size and texture resolution, are automatically adjusted to the VBS format constraints. This also applies when switching to an existing database's export format.

PHYSICS & SHADOW VOLUME

Trian3DBuilder is exporting or generating all objects with physical attributes for collision detection and shadow calculations.

GENERAL FEATURES

- **Object Placement**
Objects from VBS libraries can be imported & placed. Convert existing objects (e.g. from OpenFlight, OpenSceneGraph).
- **Object Generation**
Buildings from outlines with misc. roof types. Free-standing walls, pipelines, power lines, roads, etc.
- **Object Attributes**
Collision, Mass Definition, Shadows, LODs
- **Texturing**
Geospecific, Geotypical, Generic, Render to Texture



VBS2/VBS3 ATTRIBUTES

- **VBS Surface**
Define clutter objects and surface types.
- **VBS Objects**
Define armour, destruction type etc.
- **Road & River Templates**

ROADS

Trian3DBuilder supports VBS Roads, which are generated with VBS strade. Another option is to export the profiled roads, generated by the Trian3D Roads module to create complex crossings, markings and bridges. Profile roads are split up into smaller geometries and placed as p3d.



BENEFITS OF TRIAN3DBUILDER

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



STEEL BEASTS PROFESSIONAL DATABASES

DETAILED DATABASES FOR STEEL BEASTS PROFESSIONAL

The Trian3D Steel Beasts Pro Exporter is updated with the brand new eSim Games SDK to support the novel features of Steel Beasts Pro 4.0. Users can now benefit from the Trian3D Sensor Module and the geotypical functionalities to create Steel Beasts Pro terrains even faster!

KEY FEATURES

- Theme definition via Sensor and Geotypic Module
- Classification of all Steel Beast Pro theme parameters
- Convert your models to Steel Beasts Pro (Direct X)
- Assign Steel Beasts Pro Model Attributes (Collision, Mass, ..)
- Complex Roads & Junctions
- Use Steel Beasts Pro models within Trian3DBuilder



TRIAN3D MODEL LIBRARY XT

Trian3DBuilder is now delivered with an extensive library of detailed models optimized for real-time rendering. All objects have been modelled in outstanding quality and are delivered with LODs to be integrated into performant 3D scenarios. The extension pack automatically integrate the models to your Trian3DBuilder Library.

The model library is provided to all current and future Service & Support customers of Trian3DBuilder.

FEATURES

- Almost 500 objects
- Different scenarios
- Buildings
- Traffic signs & signals
- Vehicles
- Vegetation
- Dozens of additional objects



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.

CORE PRODUCT

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

TRIAN3D EXPORTER

- **FLT/MFT Exporter**
export to OpenFlight and MetaFlight
- **GDB Exporter**
export to VT Mäk's VR-Forces/
VR-Vantage format
- **FBX Exporter**
export to Autodesk's standard
exchange format
- **VBS2/VBS3 Exporter**
export to Bohemia Interactive's
VBS2 & VBS3 format
- **Steel Beasts Pro Exporter**
export to e-Sim Games' Steel
Beasts Pro format
- **Havok Vision Exporter**
static export to Havok's Vision
Engine

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
- **Roads Plus Module**
includes Roads Module, arc/
clothoid curves, tram tracks and
OpenDrive exporter
- **Airport Module**
automatic airport generation
from large library and airport
editing
- **Sensor Module**
physical classification of terrain
and objects
- **Maritime Module**
import ENC data for seabed
creation, buoys and beacons
- **Software Development Kit**

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TRIAN**GRAPHICS**
Intelligent Terrain Solutions

