



**BLUE MARBLE  
GEOGRAPHICS**  
MIND THE GAP BETWEEN WORLD AND MAP®

## RealSim Ltd

### How a Leading Gaming Engine User Uses Global Mapper for Terrain Model Generation and More

#### BACKGROUND

RealSim provides highly realistic interactive 3D environment simulations for a range of clients and applications, including urban planning, marine simulation, and historical environment re-construction.

RealSim is passionate about the empowering potential of merging the technology of high-end gaming engines with 3D survey data and graphic design. The success of RealSim is built upon the skills and expertise of a talented team who collectively have over 20 years of experience in various 3D visualization and spatial technologies.

#### CHALLENGES

RealSim environment simulations are built upon a popular middle-ware game engine, Unity3D, which is used by over 1 million game environment professionals around the world. RealSim has customized the platform to be equipped with various simple-to-use yet insightful spatial, lighting and scenario analysis tools.

One strength of gaming engines is their ability to process large volumes of 3D vector and raster information in real-time. When allied with physics engine technology for simulating environmental effects, gaming engines are an ideal platform for real-world environment simulation.

Gaming engines are not, however, equipped with gridding tools and thus do not readily import standard GIS terrain data. Height maps are required as a method of processing elevation data for a terrain surface in Unity3D. The height map is a top-down image mapping a specific area, but instead of using color photography, each pixel is a shade of gray. This gray does not contain an absolute elevation value, but represents a relative scale where a linear relationship is deter-

#### CASE STUDY

## overview

#### INDUSTRY:

Information Technology - 3D Visualization

#### CUSTOMER PROFILE:

Located in Galway, Ireland, RealSim Ltd has been providing interactive 3D simulations for the past 8 years

#### PRODUCT:

Global Mapper

#### CHALLENGES:

Finding a GIS software solution to create realistic surface models

Converting 3D point data according to the requirements of the Unity3D gaming engine

Maintaining data quality by minimizing the number of times data is exported

#### SOLUTION:

Use Global Mapper to grid, rescale and export height maps

#### BENEFITS:

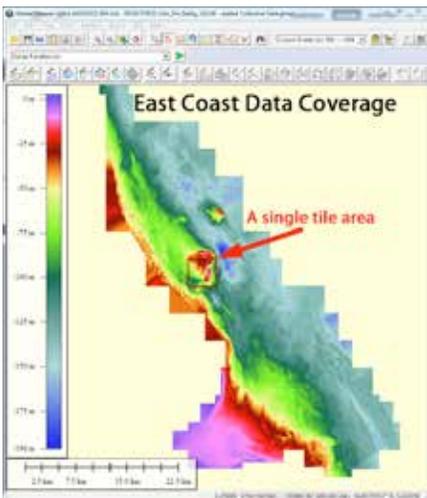
Global Mapper is easy-to-use

Global Mapper has the best value among comparable software options

Blue Marble's technical support and development team can provide custom enhancements to automate workflow and significantly improve the process



Bathymetry data for the coast of Northern Ireland, displayed in Global Mapper



## FROM THE BEGINNING

*“Global Mapper is an important part of our workflow process, where it is used to prepare the terrain data for our gaming engine.”*

GAVIN DUFFY  
MANAGING DIRECTOR  
REALSIM LTD

mined between the height of the terrain, and the shade of gray which is used. There are several ways to generate terrain data for use in Unity3D. The most accurate (loss-less) method of transferring spatial data into Unity3D is to export the data directly from a spatial mapping application, where this is supported. RealSim needed to find an application that could minimize the number of steps to convert from the 3D vector data available for a given location to the specific height map format required by Unity3D, while maintaining the integrity of the data and streamlining the process.

*“Global Mapper helped us bridge the gap between two distinctly different professions, GIS and Gaming. For gaming professionals who want to incorporate real-world terrain data into their game environments, I would highly recommend Global Mapper.”*

GAVIN DUFFY  
MANAGING DIRECTOR  
REALSIM LTD

## SOLUTIONS

RealSim started using Global Mapper in 2013 to develop a workflow to generate height maps for project locations, by gridding a terrain surface from 3D vector data. Video graphics cards, which are integral to how game engines efficiently process image data, work most efficiently when images contain pixels in ratios of 2 to the power of n, i.e. typically 512, 1024, 2048 and 4096. Terrain tiles are exported to fit one or more of these dimensions depending on the terrain resolution and area to be covered. The workflow also includes rescaling the terrain grid elevation values to fall within the range of 0 and 32767 and applying the Gradient Shader, without Hill Shading, to display the elevation values in greyscale. The data is exported as 16-bit GeoTIFF files, which are then converted to RAW files in Photoshop. RealSim also uses Global Mapper to export orthophotos that are tiled to the same spatial extents as the terrain tiles, so that both sets of data are aligned when imported into Unity3D.

At the request of RealSim, Blue Marble Geographics has recently developed a tool to streamline this process. This new tool automatically scales the elevation values and directly exports the terrain data into RAW format. The resulting data is thus ready for immediate use in Unity3D. This custom enhancement to Global Mapper is available to all users and has significantly improved the process and minimized the number of times data is exported, thus maintaining the quality of the original data.

## BENEFITS

“There are many GIS and geospatial software solutions on the market, but we chose Global Mapper because its terrain and gridding manipulation tools are at the core of its functionality,” stated Duffy. RealSim compared several products and found that pound for pound, Global Mapper has the best value for price. Global Mapper’s ease of use means that all of RealSim’s team, including non-GIS professionals, can easily start working on the project at hand. Since purchasing, they have expanded their use of Global Mapper to include creating terrain grids and applying custom shading, scaling data, generating tiles and creating customized coordinate systems.



Simulator, Map View



Simulator, 3D View

## FROM THE BEGINNING

“Blue Marble’s technical support team for Global Mapper has been excellent!”

GAVIN DUFFY  
MANAGING DIRECTOR  
REALSIM LTD

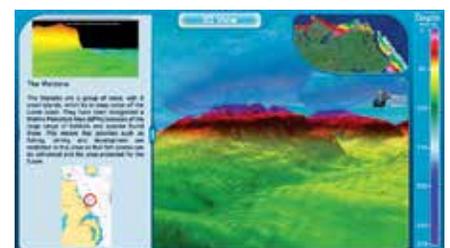
## EXAMPLE PROJECT

RealSim was commissioned by Titanic Belfast in 2014 to create an interactive 3D simulation of Northern Ireland’s seabed, on display at the Ocean Exploration Centre. The simulation allows users to freely explore the seabed and some of its fascinating features, such as shipwrecks, giant sand waves, and a submerged lagoon, and shows how these features are mapped by modern survey technologies.

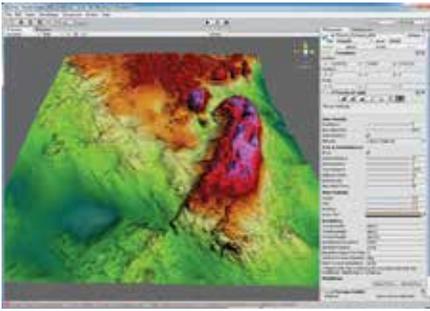
Using a large volume of seabed survey data collected off the coast of Northern Ireland, RealSim developed the 3D simulation using Global Mapper to process and import the data into Unity3D. The simulation is controlled by joysticks and contains two windows. The main window is a 3D seabed module color-shaded to reflect the depth. The seabed data contains a 5m resolution terrain model over the entire model area (approximately 80km by 5km). Within this there are areas of ultra-high resolution terrain gridded at 20cm to highlight particular



Simulator, 3D View above water



Simulator, 3D View with Info Tab



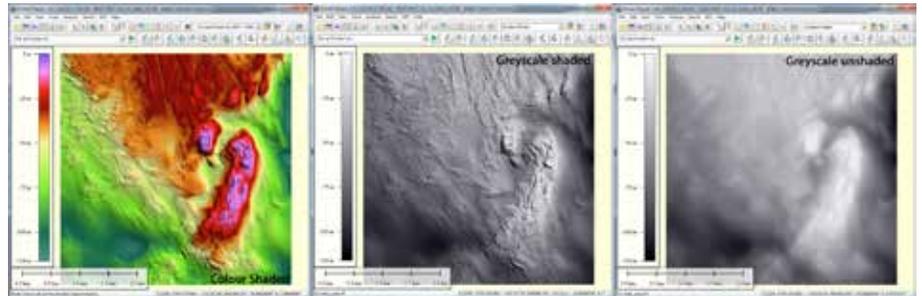
Terrain Tile placed in Unity3D

points of interest on the seabed, including shipwrecks and unusual morphology like giant sandwaves. RealSim is currently in the process of extending the model to the east coast, visitors will soon be able to navigate the seabed along the entire coast of Northern Ireland. Almost 50GB of bathymetry data will be gridded and tiled using Global Mapper to create RealSim's largest terrain model to date. To view this amazing project, watch this video titled "Titanic Ocean Exploration Centre Interactive 3D Seabed Simulation demo" at <https://youtu.be/B-ETgU6D5po>.

## THE BOTTOM LINE

"Pound for pound Global Mapper is the best value comprehensive terrain manipulation tool on the market."

GAVIN DUFFY  
MANAGING DIRECTOR  
REALSIM LTD



## ABOUT THE PRODUCT

Global Mapper is an affordable and easy-to-use GIS application that offers access to an unparalleled variety of spatial datasets and provides just the right level of functionality to satisfy both experienced GIS professionals and beginning users. Equally well suited as a stand-alone spatial data management tool and as an integral component of an enterprise-wide GIS, Global Mapper is a must-have for anyone who deals with maps or spatial data.

## ABOUT BLUE MARBLE GEOGRAPHICS

Trusted by thousands of GIS professionals around the world, Blue Marble Geographics is a leading developer of software products and services for geospatial data conversion and GIS. Pioneering work in geomatics and spatial data conversion quickly established this Maine-based company as a key player in the GIS software field. Today's professionals turn to Blue Marble for Global Mapper, a low-cost, easy-to-use yet powerful GIS software tool. Blue Marble is known for coordinate conversion and file format expertise and is the developer of The Geographic Calculator, GeoCalc SDK, Global Mapper, LiDAR Module for Global Mapper and the Global Mapper SDK.



# BLUE MARBLE GEOGRAPHICS

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