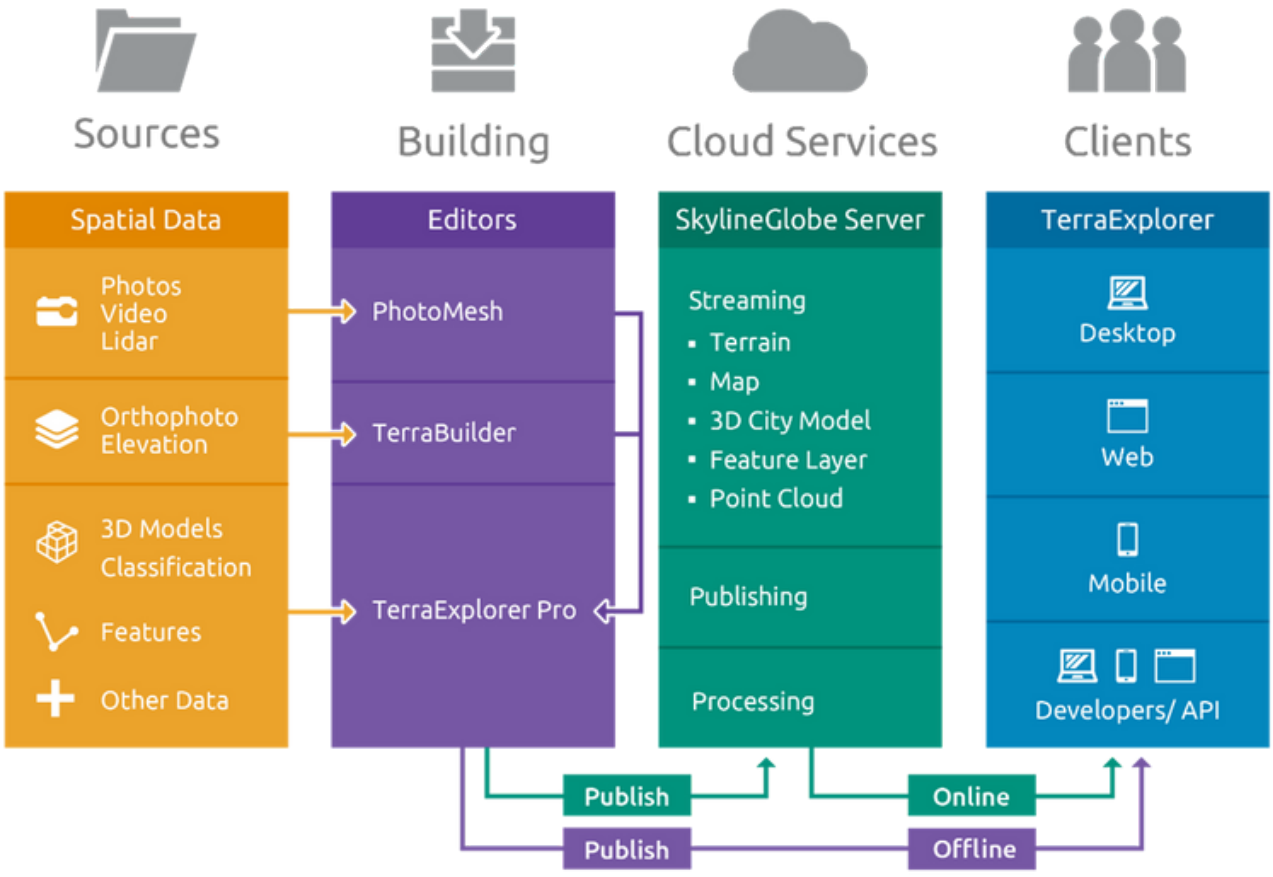
Skyline® it's your world™

SkylineGlobe - Products Overview

Skyline Software Systems, Inc. is a leading provider of 3D earth visualization software and services. The company offers a comprehensive platform of applications, tools and services that enable the creation and dissemination of interactive, photo-realistic 3D environments. The SkylineGlobe software suite sets the standard for 3D desktop and web-based applications, enabling an enterprise to build, edit, navigate, query, and analyze realistic 3D environments, and rapidly and efficiently distribute them to users.



PhotoMesh

Combining photos in a wide range of formats, PhotoMesh generates highly-detailed 3D meshes, orthophotos, point clouds, elevation models, and more. PhotoMesh's breakthrough 2D and 3D mapping technology is based on the highest-performance photogrammetry, computer vision, and computational geometry algorithms.

PhotoMesh employs elaborate tiling mechanisms to efficiently handle projects of any size, even large projects with hundreds of thousands of photos. Running on standard hardware, PhotoMesh can also exploit computer clusters and cloud computing to vastly accelerate the build by running a single project simultaneously on hundreds of fuser machines.

3D and 2D Mapping

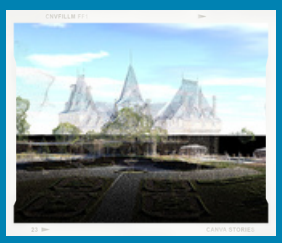
Transform aerial and ground photos and Lidar collections into city-scale, digital twin models with advanced color balancing and high-quality texturing, in a range of 3D mesh and point cloud formats.
Fully automated, high quality generation of multispectral true-orthophotos, Digital Surface Models (DSM) and Digital Terrain Models (DTM).

Digital Twin

PhotoMesh supports close-range photogrammetry, producing point cloud and mesh models with sub-millimeter accuracy.

Range of supported output formats ensures maximum interoperability with other 2D/3D GIS solutions


3D Mesh


Point Cloud


Orthophoto


DSM

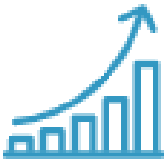

DTM

High Quality

PhotoMesh generates a full-3D mesh model that faithfully reproduces even small-scale details such as cars, trees, fences and walls - all with advanced color balancing and high-quality texturing.

Production Automation

Robust REST APIs allow developers to create, monitor, and manage project queues and to automate PhotoMesh production flows on local machines, remote servers, and the cloud.



Scalability

PhotoMesh efficiently handles even hundreds of thousands of photos using an elaborate tiling mechanism. PhotoMesh exploits multi-computer architecture (fusers) to further accelerate database creation, running a single project simultaneously on hundreds of machines.

High Performance

PhotoMesh can run its efficient algorithms fluidly on standard GPUs, or exploit multi-core and multi-computer processing to further accelerate database creation. A single project can run simultaneously on hundreds of fuser machines, processing tens of km2 per day.

Cloud Ready

TPhotoMesh can exploit computer clusters and cloud computing to run a single project simultaneously on hundreds of fuser machines. Sharing the workload involved in generating PhotoMesh output vastly accelerates the build process.

Usability

Intuitive GUI and powerful, versatile tools for accurate evaluation and adjustment of your input data and AT, including: a coverage map, photo inter-connection map, Lidar data integration, control points, photo projection on terrain and Lidar and much more.

TerraBuilder

TerraBuilder provides professional-grade tools for manipulating and merging aerial photos, satellite images, and digital elevation models of different sizes and resolutions. The resulting photo-realistic, geographically accurate terrain database can be made available to local TerraExplorer clients or published directly from TerraBuilder to SkylineGlobe Server for serving to remote TerraExplorer and WMS/WMTS clients.

Load

Load imagery and elevation layers in a wide range of data formats. TerraBuilder uses multi-core and multi-computer processing to support massive data set publishing while maintaining high performance.

Manipulate

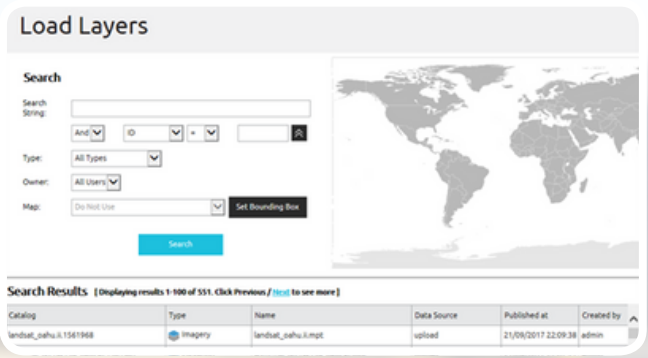
Powerful tools to crop, adjust, replace, resize, and reposition your photos, images, and digital elevation model to ensure maximum precision in the 3D terrain database result.

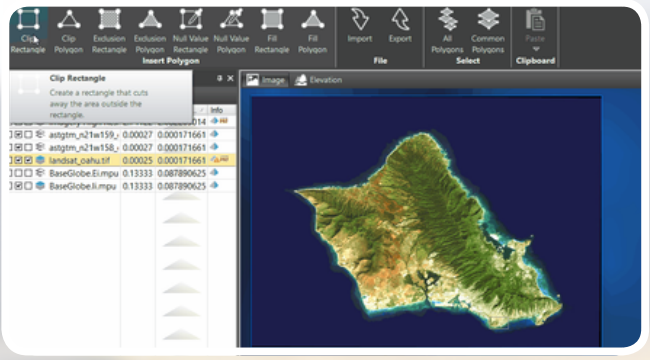
Create

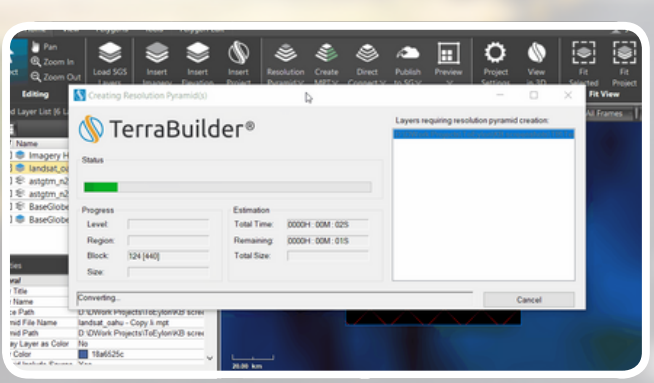
Merge all adjusted layers into a geographically accurate, multi-resolution terrain database. Optimized imagery and elevation formats can be generated for use by the on-the-fly, server-side terrain generator.

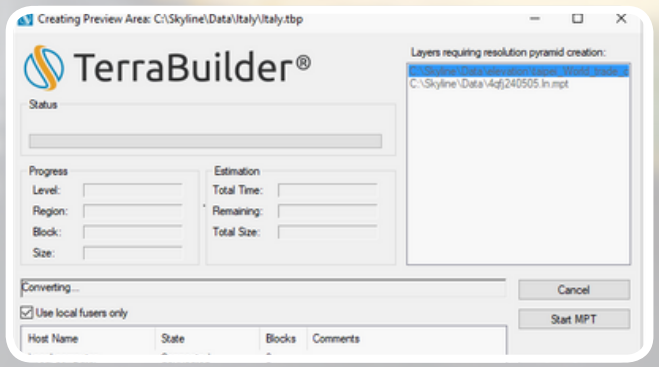
Publish

Publish the terrain database (MPT) to SkylineGlobe Server, Skyline's private cloud solution. The published MPT is available for use by TerraExplorer clients and standard geospatial clients, or as layers for a TerraBuilder project.



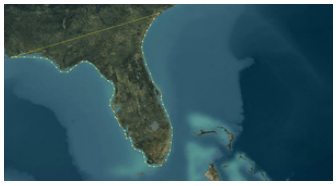






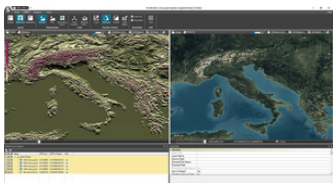
Interoperability

TerraBuilder's extensive plugin support allows you to load your data in the file format or database/server you need. Numerous formats/databases are supported including: Tiff (.tif, .itiff), ERDAS Imagine (.img), MrSID (.sid), ER-Mapper JPEG2000 (.jp2, .j2k, .jpc), Oracle Spatial Database, ECW Image Web Server, ArcSDE Raster Server (.sde)



Robust Tools for Manipulating Your Data

TerraBuilder provides a range of editing tools with which to manipulate the imported raster files, enabling maximum precision in the 3D terrain database result. Possible manipulations include cropping, resizing, moving, feathering, adjustment of geographic coordinates, and more.



Scalability and Elasticity

Share the workload of massive 3D database creation between several computers and processors on your local network.

On-Demand, Server-Side Terrain Generator

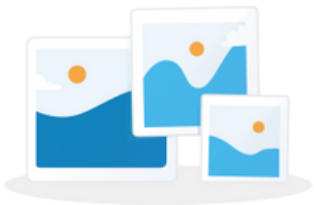
For projects whose source data is constantly being updated or modified, terrain databases defined by the TerraBuilder project file (TBP) can be served to TerraExplorer clients and any application that reads the standard OGC WMS/WMTS protocol, using SkylineGlobe Server's DirectConnect Service.

Streamlined Workflow

Upload and publish geospatial layers to the cloud server directly from TerraBuilder. The published MPT is available for use by TerraExplorer desktop, mobile and web clients and standard geospatial clients such as WMS/WMTS, or as layers for a TerraBuilder project.

High Performance

Multi-core and multi-computer processing are supported to accelerate massive data set publishing. Use of network fusers dramatically reduces processing time.



Resolution Pyramids for Rapid Display

TerraBuilder creates a series of increasingly reduced resolution representations (pyramid), for each raster layer, to enable rapid display of the raster at various resolutions. When zoomed out of the layer, a reduced resolution is displayed that draws faster. When zoomed in, levels with finer resolutions are drawn but performance is maintained because successively smaller areas are being drawn.

SkylineGlobe Server

The SkylineGlobe Server private cloud solution provides a comprehensive set of web services for publishing, storing, managing and streaming 2D and 3D geospatial content. All your GIS layer types are supported: 3D mesh , imagery, elevation, feature and point cloud. SkylineGlobe Server makes it easy for you to share your data by converting and exposing your content in multiple formats.

SkylineGlobe Server streams data in the format your client needs

Skyline

- 3D mesh as I3S/SLPK
- Imagery and elevation using WMS or WMTS protocol
- Feature layers using WFS protocol

Esri

- 3D mesh as I3S/SLPK
- Imagery and elevation using WMS or WMTS protocol
- Feature layers using WFS protocol

Cesium, QGIS, OGC

- 3D mesh as 3D Tiles
- Imagery and elevation using WMS/WMTS protocol
- Point cloud as 3D Tiles
- Feature layers using WFS/WFS-T

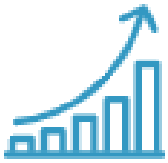
Data Security

Keep data safe with virtual private, geospatial servers, custom authentication, and user permissions. SkylineGlobe Server supports the hosting of multiple virtual servers (“sites”) on a single server. These virtual sites provide complete separation between customer layers and allow management and administration of the sites by the customer’s admin users. SGS also provides the option for full customization of your server’s authentication and authorization system, as well as an out-of-the-box custom authentication implementation.

Cloud Ready

For greater scalability, redundancy, and security, SkylineGlobe Server can use any cloud platform (AWS/Google Cloud/Azure, etc.) that provides virtual machines that meet Skyline’s system requirements. Skyline also offers SkylineCloud, a fully managed Skyline service based on SkylineGlobe Server, for uploading, storing, converting and streaming 2D and 3D spatial data, to help you optimize your geospatial data production.

Scalability and Elasticity



Add and adjust storage and compute capacity in real-time to accommodate increased or spikes in usage, as well as redundancy and failover, using dynamically clustered compute power. All servers in a cluster share a single floating license that can be passed from server to server. Cluster servers also share the maximum number of concurrent active end users defined in the license, with the load balancer determining the distribution of server traffic between the servers.

Streamlined Workflow

Upload and publish individual geospatial layers and complete projects to the cloud server directly from TerraExplorer Pro. Through a single publishing operation, data is made ready for consumption by all TerraExplorer clients: Desktop, Web and Mobile, as well as other 2D and 3D geospatial applications.

Interoperability

SkylineGlobe Server enables your enterprise to realize the full potential of 3D data, or make data available to other clients, including Esri, QGIS and Cesium-based viewers. SkylineGlobe Server can convert and expose data in a range of formats, while storing only the original data formats on the server.

Convenient Centralized Web Management

Manage and control all services, servers, users, and layers from a centralized web management interface. The server’s built-in complete user access control system allows easy management of users, groups, and administrative roles controlling the server-side storage, and client-side read/write permissions, giving you ultimate control over how your data is used.

TerraExplorer for Desktop

A cutting-edge 3D GIS desktop viewer and creator that provides powerful tools and a high resolution 3D environment in which to view, query, analyze and present geospatial data. With TerraExplorer's robust and extensive capabilities and ever-increasing interoperability, stunningly realistic 3D visualizations can be created by overlaying the terrain with unlimited data layers, 3D models, virtual objects and more.

Visualize

Overlay terrain with imagery and elevation, 3D mesh, BIM, CAD, Lidar point cloud, and feature (vector) layers, and your own custom data. TerraExplorer enables you to create a breathtaking, digital twin that can be used to optimize asset management and tracking.

Create

Add or edit point, polyline, and polygon features by digitizing on the terrain, point cloud or 3D mesh model. Create strikingly accurate 3D visualizations of engineering and surveying sites that provide critical topographical and geographical information.

Analyze

Powerful measurement, terrain analysis, line of sight, change detection/comparison and spatial analysis tools make it easy to extract vital intelligence from your geospatial data. This drives smarter decisions in mission planning, urban planning, inspection, and more...

Inspect

View and inspect your PhotoMesh 3D models (tower, bridge, construction site, etc.) from within TerraExplorer, together with the source photos used to produce them. You can also create inspection feature layers in which you mark and measure areas (e.g., that require retouching).

TerraExplorer Desktop is available in three versions, offering increasing levels of functionality

TerraExplorer Viewer

Users can navigate through high resolution 3D world environments created by fusing aerial and satellite photography, terrain elevation data and other 2D and 3D information layers

TerraExplorer Plus

Adds loading of all 2D and 3D offline formats, feature layer editing and querying, advanced objects and drawing tools, a set of tools for professional usage, and the advanced Pro API interfaces

TerraExplorer Pro

Adds publishing capabilities, conversion tools, optimization of model files for improved display performance, and uploading of data to SkylineGlobe cloud

Use with Your Existing Technology

TerraExplorer is designed with interoperability and flexibility at its core, allowing you to build and share geospatial projects quickly and easily. TerraExplorer supports a wide range of read and write formats including:

- Imagery/elevation layers in Tiff, JPEG, OGC WMS/WMTS, MrSID, ECW, IMG...
- 3D mesh layers in 3DML, 3D Tiles, OSGB and I3S/SLPK
- Point cloud layers in LAS/LAZ
- Feature layers in OGC WFS/WFS-T, Shapefile, KML, SQLite, GeoPackage, ArcGIS Server, Oracle database and other local and online
- CAD in DWG or DXF; BIM in FBX/IFC

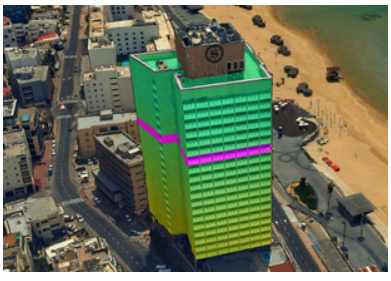
Analyze the 3D World

Increase understanding and improve decision making with a complete set of powerful tools for all forms of 3D World measurement and analysis

Distance	Flood	Terrain Profile	Line of Sight
Area	Volume	Shadow Queries	Viewshed
Contour	Mesh Comparison	Cross Section	Viewshed on Route
Slope	Image Comparison	Elevation Difference	Threat Dome

Share Your Data

Easily share your 3D visualizations by creating presentations with customized flight routes and exporting them to video files. Use the Collaboration tool for remotely guided tours. View your complex 3D content by stereo monitors or VR devices and publish and extract projects to web, desktop, and mobile devices.



Query and Editing Tools

Robust feature layer viewing and editing is supported, including geometry editing, spatial queries, addition and deletion of features, attribute-based styling, and spatial operations such as merging, clipping and exploding features and exporting of selected features to a new file.

Advanced Drawing Tools

Versatile and configurable drawing tools bring to life your 3D GIS visualizations and simulations, with roads, traffic lights, powerlines, pipelines, fences, walls, and more. Advanced particle system engine enables you to create vibrant visual effects that realistically simulate weather elements, light, water, and fire effects. Powerful mesh editing tools.

TerraExplorer for Web and Mobile

TerraExplorer for Web and Mobile is a powerful 3D GIS viewer that enables you to view and analyze high-resolution, stunningly realistic 3D content in your web browser on on Android and Apple iOS devices. The employment of HTML5/ WebGL standards allows TerraExplorer for Web to provide support for multiple platforms and browsers. Built on the powerful Cesium open source library, TerraExplorer for Web further extends the core functionality with additional capabilities and enhanced performance.
Based on TerraExplorer for Web, the mobile app offers the functionality of the web app in a mobile-optimized GUI. TerraExplorer for Mobile can display most of your spatial databases including 3D city layers and feature layers, and it provides powerful tools to query, analyze and present your data on the go.

3D Visualization

View terrain overlaid with imagery and elevation, 3D mesh, BIM, CAD, Lidar point cloud, and feature (vector) layers. Use TerraExplorer for Mobile and the rest of the SkylineGlobe 3D platform to share geoportals with advanced visual and graphical information that improves understanding and allows agencies and constituents to collaborate in the decision making process.

Multi-Platform Support

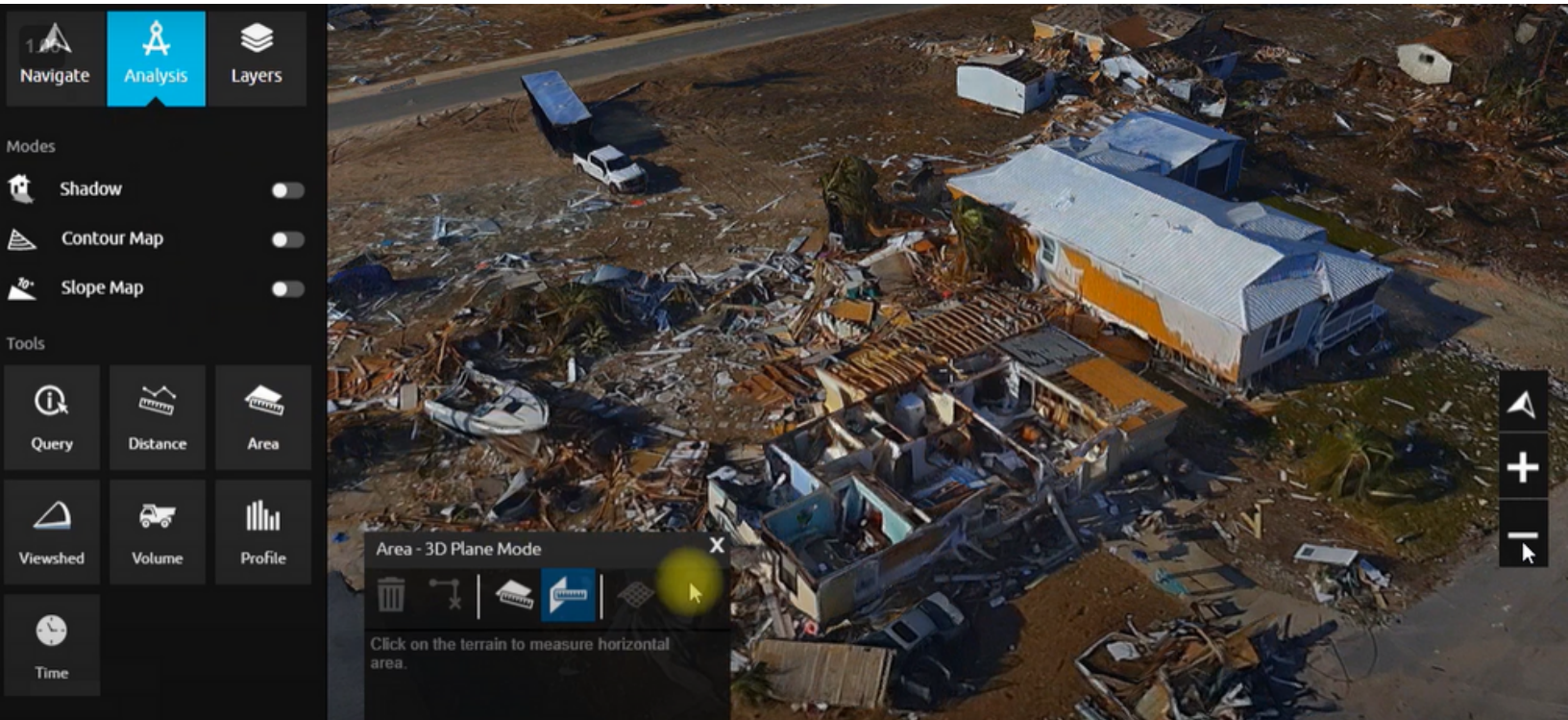
Based on HTML5/WebGL standards, the TerraExplorer web app provides support for multiple platforms and browsers: Windows, Mac, Linux, and selected mobile devices, Chrome, Firefox, Edge, Internet Explorer and more. This enables military forces using diverse equipment and platforms to effectively collaborate in mission planning and execution.

Broad Mobile Support

TerraExplorer for Mobile leverages broad compatibility with Android and iOS devices for convenient on-the-go access from smartphones and tablets.

Powerful Analysis

Robust measurement, terrain analysis, and line of sight tools make it easy to extract vital intelligence from your geospatial data.



Work Seamlessly with Data Created in TerraExplorer Pro

Consume data that was created and directly published from TerraExplorer Pro to Skyline Globe Server. No additional programming or processing is needed to load a project or layer into TerraExplorer for Web.

Data Security

Layer access can easily be restricted to the users, groups, and sites that you want, by setting desired view and access in SkylineGlobe Server. Users will only see and be able to load from SkylineGlobe Server the layers that are available to them, based on their login.

Analyze the 3D World

Increase understanding and improve decision making with a set of powerful tools for 3D World measurement and analysis

- Distance
- Contour
- Volume
- Terrain Profile
- Area
- Slope
- Viewshed
- Shadow Queries

Customize and Integrate

Leverage the TerraExplorer for Web (TE4W) app framework and functionality and its underlying Cesium API to reduce the amount of programming required for your customized solution: create custom configurations, localize GUI texts, customize and expand TE4W capabilities with JS tools, or create a custom HTML with the TE4W window embedded inside.

For Developers

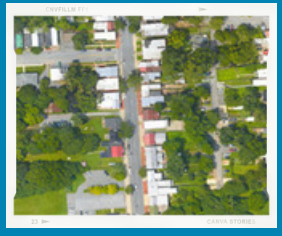
TerraExplorer's rich application programming interface (API) allows you to easily develop powerful, customized 3D applications or integrate TerraExplorer capabilities in OEM applications.

Load Geospatial Data of All Types from SkylineGlobe Server

All data is cataloged and referenced so you can can easily find the layer you need

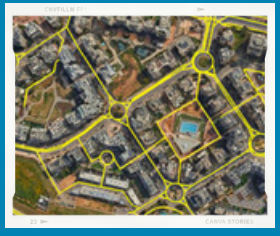
3D Mesh

Point Cloud



Imagery

Elevation



Features

SkylineCloud Services

SkylineCloud provides a set of software, production, infrastructure, data and billing services to help you optimize your 2D and 3D geospatial data production and hosting. With SkylineCloud, users can easily subscribe to packages that include all or parts of these services to start enjoying the Skyline suite of products. SkylineCloud is built on top of the Amazon Web Services (AWS) infrastructure to provide reliable and fully scalable computing, storage and streaming resources.

Production

Fully automated service to run PhotoMesh projects can produce 2D, 3D and multi-spectral outputs. Generate dense point clouds with detailed color information, true orthophotos, and 3D mesh models in range of formats.

Hosting

Based on SkylineGlobe Server, SkylineCloud Hosting provides a fully managed service to upload, store, convert and stream nearly unlimited 2D and 3D spatial data.

Skyline Atlas

Ready-to-use collection of high resolution data layers in selected geographic areas, in cooperation with local data partners. Integrate Skyline Atlas's premium data with your own proprietary data to create immersible, high-resolution 3D maps.

Subscription

Based on a secured commercial billing system, this service significantly shortens the product development cycle & makes it easy to create a tailored online store for your customers, offering production, hosting, and data packages.

Production Services

Automated

Fully automated service to run PhotoMesh projects, using REST API to manage PhotoMesh production. Input data is read from and then pushed back to customer cloud storage (AWS/Google Cloud/Azure etc.).

High Quality

Generates high resolution multi-band orthophotos, DSM/DTM, point clouds, & 3D mesh models that faithfully reproduce even small-scale details such as cars, trees, fences, and walls - all with advanced color balancing, edge & surface enhancement, & high-quality texturing. Wide range of output formats supported...

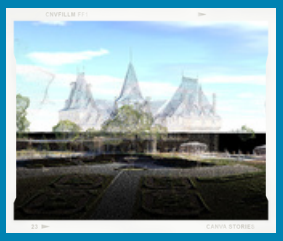
Scalable and Fast

Custom packages are available with up to thousands of fuser machines. Packages can easily be upgraded, extended or disabled, so production capabilities match processing requirements, ensuring fast production even for demanding projects, without paying more than you need.

Range of Output Formats Supported

Ensures maximum interoperability with other 2D/3D GIS solutions


3D Mesh

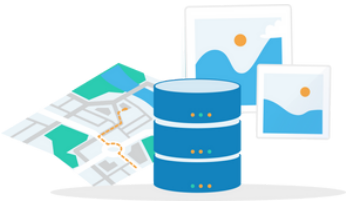

Point Cloud


Orthophoto


DSM


DTM

Hosting Services



Store & Secure

Customers can store masses of 2D and 3D geospatial data for their end users in a secure, access-controlled environment. Each customer has a private virtual site that completely isolates their users' data and allows management/administration of the data layers and site users.

Reliable & Scalable

SkylineCloud is built on top of the Amazon Web Services (AWS) infrastructure to provide reliable and fully scalable computing, storage and streaming resources. SkylineCloud offers global coverage using AWS's Global Accelerator and smart caching mechanism to speed up streaming performance.

Supported Formats

TerraExplorer Pro

Features	Shapefile, SQLite, GeoPackage, KML/KMZ, File Geodatabase, MapInfo, DGN, DXF, GeoJson, VRT, S-57, TXT, XLS, CSV, Geospatial PDF, SGS, WFS/WFS-T, Oracle Spatial, SQL Spatial, ESRI REST, PostgreSQL
Imagery & Elevation	Tiff, JPEG, NITF, IMG, GeoPackage, Webp, Cib, ER-Mapper, CIB/ADRG, TLT, MPT, DEM, DMED, TRI, ADF, SGS, WMS/WMTS, Oracle Spatial, ECW, ArcSDE Raster
Terrain	MPT, TBP
3D Mesh	3DML, 3D Tiles, OSGB, DAE
Point Cloud	CPT, LAS, E57
BIM	FBX, IFC, DWG, DXF

Convert and publish to SGS

SkylineGlobe Server

Uploaded and scanned formats

Imagery, Elevation & Terrain	MPT, TBP
Feature	Shapefile, GPKG, TAB, MIF, MID, DGN, DXF, MDB, SQLite, KML/KMZ
Project	FLY
Mesh	3DML
Point Cloud	CPT

Databases

Oracle, PostgreSQL, Microsoft SQL, ArcSDE

Streaming protocols

Imagery & Elevation	WMS, WMTS
Terrain	MPT
Feature	WFS, WFS-T
Mesh	3DML, 3D Tiles, I3S/SLPK
Point Cloud	CPT, 3D Tiles
Project	TerraExplorer Desktop, TerraExplorer for Web, TerraExplorer for Mobile

Streaming services

Clients

Skyline	TerraExplorer Desktop, TerraExplorer for Web, TerraExplorer for Mobile – all data types
ESRI	ArcGIS Earth, ArcGIS Pro, ArcGIS Online – imagery, elevation, feature, 3D mesh
Cesium	Imagery, elevation, 3D mesh, point cloud
QGIS	Imagery, elevation, feature
OGC Clients	WMS, WMTS – imagery and elevation. WFS, WFS-T – feature

Software/Hardware Requirements

TerraExplorer for Desktop

- **Operating System**: Windows® 8 / 10 / 11 – 64-bit
- **System Memory**: 2 GB RAM (4 GB or more recommended). For 4K render mode - 4 GB of RAM (8 GB or more recommended).
- **Processor**: 4 cores (8 cores recommended)
- **Video Card**: 1GB of video memory (2 GB or more recommended).Pixel and vertex shader v3.0. For 4K render mode - 2 GB of video memory (4 GB or more recommended).
- **Browser**: Microsoft Internet Explorer 11 or higher

TerraExplorer for Web and Mobile

- **Operating System**: Windows/Linux/Mac OS/Android/iOS. Android 9.0 or higher or iOS 13 or higher required for mobile app.
- **System Memory**: 2 GB RAM (4 GB or more recommended)
- **Processor**: 4 cores (8 cores recommended)
- **Browser**: Windows: Chrome, Firefox; MacOS: Chrome, Safari; Linux: Chrome; Android: Chrome; iOS: Safari

TerraBuilder

- **Operating System:** Windows® 8 / 10 / 11 – 64-bit
- **System Memory:** 4 GB RAM (8 GB or more recommended)
- **Processor:** 4 cores (8 cores recommended)
- **Video Card:** 256 MB of video memory (1 GB or more recommended)
- **Browser:** Microsoft Internet Explorer 9 or higher

PhotoMesh

- **Operating System:** Windows® 8 / 10 / 11, Windows® Server 2012 R2 / 2016 / 2019 – 64-bit. Ubuntu 18.04 and Debian 10.0 – 64-bit (Only for PhotoMesh fusers)
- **System Memory:** 16 GB RAM (32 GB recommended)
- **Processor:** 4 cores (8 cores recommended)
- **Video Card:** 1 GB of video memory (2 GB or more recommended). Pixel and vertex shader v3.0

SkylineGlobe Server

- **Operating System:** Windows® Server 2008 R2 / 2012 R2/ 2016 / 2019 - 64 bit
- **System Memory:** 4 GB RAM (8 GB or more recommended)
- **Processor:** Dual-Core (4 or 8 cores recommended)
- **Browser:** Microsoft Internet Explorer 11 or higher, Edge Legacy, Chromium Edge, Mozilla Firefox, and Google Chrome
- **Additional Software:** Microsoft Internet Information Services IIS7.5, IIS8.5, IIS10 with .Net 4.8 & ASP.Net

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