



LUCY Accelerated application design with
LUCIAD **LIGHTSPEED**

APPLICATION DATA SHEET

PRODUCT OVERVIEW

Lucy is a LuciadLightspeed application component that offers a framework for high-level, faster development. As a full-fledged geospatial application, it provides easy access to the capabilities of LuciadLightspeed. At its most basic level, Lucy assists you with the visualization of geospatial data by giving the LuciadLightspeed development environment a graphical user interface. Lucy realizes its full potential, however, by serving as a springboard for your own application: simply plug into Lucy's modular framework, and build an instantly functional geospatial application that integrates all of LuciadLightspeed's powerful features while meeting all your development project requirements.

The Lucy component consists of a wide range of add-ons, organized in an application framework that is managed by a versatile back-end and visualized in a flexible front-end. The Lucy API is built on top of the LuciadLightspeed API. The entire Lucy component framework is focused on smooth data connection, instant visualization, and result-driven analysis of geospatial data with impeccable performance and accuracy.

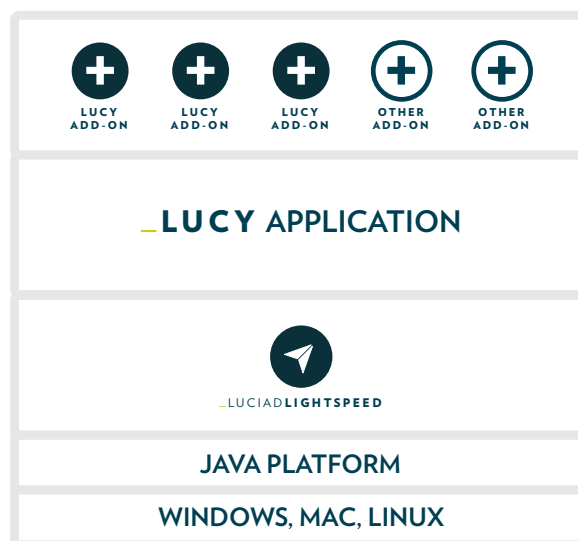
You can build anything from a lightweight geospatial data viewer to a robust, high-end professional application on top of Lucy. To meet all of your application requirements, you can customize the Lucy add-ons, add on your own, make optimal use of the functionality offered by the back-end, and tweak the front end to suit the needs of your users.

With Lucy, Luciad focuses on the same, demanding domains as it does with LuciadLightspeed. You can use Lucy for the rapid development of C4ISR applications, mission planning systems, common operational picture (COP) applications for defense, Air traffic control (ATC), air traffic management (ATM), aeronautical information services (AIS) and management (AIM) applications for aviation, as well as vehicle traffic control, urban planning, infrastructure asset management applications, and more.

PRACTICAL INFORMATION

Lucy is a development framework for LuciadLightspeed that integrates all capabilities of LuciadLightspeed and other LuciadLightspeed additional components in a customizable and extendable application. An add-on-based mechanism enables easy integration of custom capabilities to adjust to any project requirement.

You can purchase Lucy as an additional LuciadLightspeed component, and integrate it into your LuciadLightspeed configuration. Other optional LuciadLightspeed components instantly plug into Lucy through dedicated Lucy add-ons, without any additional effort on your part. One of those additional components allows you to connect with our data management product, LuciadFusion.



KEY BENEFITS

VISUALIZE & ANALYZE ANY DATA IN A 2-D/3-D HARDWARE-ACCELERATED VIEW

Instantly visualize data in one of the many supported formats on a fast 2-D/3-D view and integrate it with other data to create a full situational picture in its geospatial context. Then proceed with visual data analysis. Plug in your own custom format with limited effort.

FLEXIBLE & CONFIGURABLE

Customize each aspect and make it your own.

Plug in your own application components and your own front end. The product is designed to optimize customizability and interoperability, allowing you to meet your project requirements for 100%.

The Lucy back-end has been designed for maximum flexibility and integration with commonly used development environments.

CLEAN DESIGN THROUGH MODEL-VIEW-CONTROLLER SEPARATION

Lucy has been designed according to Model-View-Controller separation principles, and separates functionality from the Graphical User interface. It offers maximum GUI flexibility as a result, while guaranteeing permanent and complete access to its functionality. The Lucy application framework has also been designed to achieve high development speed and sustainable applications.

FUNCTIONAL SPECIFICATION

Lucy offers the following application capabilities out of the box:

- Visualization of vector, imagery and sensor data on a hardware-accelerated 2-D/3-D hybrid view, and in vertical, profile and table views
- 3 GUI varieties:
 - 2-D/3-D hybrid views in a tabbed or dockable GUI
 - 2-D/3-D hybrid views in a map-centric GUI
 - 2-D views in a tabbed or dockable GUI
- Easy application debugging and optimizing with a dedicated debug application
- Selection and instant application of projections and coordinate systems
- Visual data styling
- Lighting control
- Elevation support: application-wide color mapping, exaggeration and lighting
- Shape drawing and storage of drawing layers to aid with mission design
- Support for Drag and Drop, Copy and Paste, Undo and Redo functionality
- Search objects and placemarks
- Multi-page printing, image export and PDF document generation
- User preference and Workspace support

Below is a high-level, non-exhaustive overview of the development functionality available in Lucy. You can use the Lucy development components out-of-the-box or extend them to meet your specific requirements.

SEAMLESS API INTERACTION

The Lucy API is built on top of the LuciadLightspeed API, and Lucy add-ons are built on top of the Lucy API. As a result, the LuciadLightspeed API remains accessible up to the level of custom add-ons, and the integration of existing and newly developed functionality becomes effortless.

DATA CONSISTENCY IN VARIOUS VIEW TYPES

Consistently display data in a 2-D and 3-D map view, or in a table view, profile view, or vertical view. Select and edit the data with automatic synchronization across all views.

ADD-ON MANAGEMENT

Lucy offers a number of standard add-ons, each of which provides a specific piece of functionality: read and process a data format, create a map, perform an analysis, and so on. You can also configure add-ons yourself.

SUPPORT FOR OWN ADD-ONS & DATA FORMATS

Lucy's modular design allows you to quickly write your own add-ons. Several helper classes assist you with the creation of add-ons. You can add custom user interface components, or you can plug in a dedicated format add-on by implementing convenient format add-on base classes.

SERVICE SHARING

The Lucy back-end provides a service mechanism that prevents hard dependencies between objects, and allows for easy sharing of functionality.

FLEXIBLE UI & FRONT END CUSTOMIZATION

Lucy has a pluggable user interface which offers several graphical interface styles out of the box. All interfaces allow for customization, and allow you complete control over menus, toolbars, panels, and positions. You can also replace the Lucy front-end application entirely with a custom implementation. You can customize the application startup, the add-on loading sequence, and the user interface.

CENTRAL MAP MANAGEMENT

The Lucy map managers keep track of all active and inactive map components in the Lucy application, and distribute change notifications.

**PREFERENCES & WORKSPACE
MANAGEMENT SUPPORT**

Support for storing preferences and preferred workspace configurations, so that these are immediately accessible when Lucy is restarted.

**USER ASSISTANCE &
INTERNATIONALIZATION**

Internationalization of the UI is possible for any language.

OTHERS

Print view snapshots and generate PDF documents in high quality. Visualize data in a vertical/altitude view. Perform density calculations. Slice and filter data dimensions for analysis.

On top of this, Lucy provides add-ons for plugging in LuciadLightspeed optional components:

**AERONAUTICAL
INFORMATION SYSTEM (AIS)**

Adds support for modeling and visualizing aeronautical data such as airspaces, nav aids, procedures, and grid MORAs in accelerated 2-D/3-D views. The visualization support includes options for custom styling.

**DATABASE CONNECTOR
COMPONENTS**

These are multiple components that add support for connecting to a specific spatial database. See below in 'Formats and standards' for a list of supported databases.

**DATA FORMAT
COMPONENTS**

These are multiple components that add support for reading data in a specific data format, and writing data to common open standard formats. See below in 'Formats and standards' for a list of supported data formats.

GEOMETRY

Enables you to calculate binary topological relations (e.g. overlaps, contains) and perform constructive Boolean operations on shapes (e.g. union, intersection).

**LUCIADFUSION DATA
CONNECTOR**

Enables you to connect to the LuciadFusion data management product to retrieve data, using a LuciadFusion specific protocol.

**MILITARY SYMBOLOGY &
NATO VECTOR GRAPHICS
(NVG)**

Add full support for symbols and tactical graphics of the latest military symbology standards, in 2-D and 3-D. NATO Vector Graphics (NVG) support increases interoperability. This support encompasses the lookup, creation, visualization, and editing of military symbols and graphics. See below in 'Formats and standards' for a list of supported standards.

OGC FORMATS

Enables you to decode, visualize and encode vector and raster data in the GeoPackage format, a SpatiaLite format specifically designed by OGC for the distribution of vector and raster data across platforms with varying capabilities.

OGC WEB SERVICES

There is a web client and a web server suite, which you can use to, respectively, connect to an OGC web service to retrieve data or to build an OGC web service and serve data to clients. See below in 'Formats and standards' for a list of supported standards.

REAL-TIME

Offers optimizations for handling and visualizing dynamic data. Enables you to play back simulations in fast or real time. Also includes playback controls and continuous label decluttering.

TERRAIN ELEVATION ANALYSIS (TEA)

This component adds the ability to perform calculations, such as line-of-sight (LOS) or hypsometric calculations, on terrain data, and provides alternative views on the terrain data.

MARITIME ELECTRONIC CHART DISPLAY & INFORMATION SYSTEM (ECDIS)

Allows for the rapid visualization of electronic navigational charts in 2-D and 3-D. Complies with standards defined by the International Maritime Organization (IMO) and the International Hydrographic Organization (IHO). Decodes data in the IHO S-57 and encrypted S-63 formats, and visualizes the charts in compliance with the IHO S-52 visualization standard.

FORMATS & STANDARDS

The Lucy visualization and analysis capabilities are data-agnostic, so it is complementary with any data format. Adding support for new, custom formats is a straightforward, well-documented process, but of course most common data formats are already supported. Native support for specialized formats is optionally available per format, as listed below in 'optionally available'. For the following common data formats out-of-the-box native support is included:

RASTER DATA

BIL, BMP, CADRG, CIB, DTED, ESRI TFW and JGW, ETOPO, GeoTIFF and BigTIFF, GIF, JPEG, JPEG2000, MapInfo TAB, PNG, PPM, USGS DEM

VECTOR DATA

CGM, Collada, ESRI Shape, GeoJSON, MapInfo MIF & MAP, OGC GML, OpenFlight (3-D), SVG, Wavefront OBJ (3-D)

COMMON, OPEN STANDARDS SUPPORTED IN LUCY

- OGC Filter
- OGC Symbology Encoding (SE)
- ISO 19115 metadata

OPTIONALLY AVAILABLE

DATABASE CONNECTORS

DB2, Informix, Oracle, PostGIS, PostgreSQL, SQLServer, SQLite

ADDITIONAL RASTER DATA FORMATS

ADRG, ASRP, BCI, Bing Maps, ECW, ECRG, GeoPDF, GeoSPOT, Google Earth Enterprise (GEE) (Beta), GRIB, JPEG2000 (encoding), MrSID, NetCDF, NITF, NSIF, Spot DIMAP, Swiss DHM, USRP.

GDAL-supported formats including ARC/Info Binary Grid(AIG), BSB Nautical Chart Format, ARC/Info Export E00 GRID, ENVI HDR Labelled Raster, ERDAS Imagine, ERDAS Imagine Raw, ILWIS Raster Map, Intergraph Raster, PCI Geomatics database File, PCRaster, Sentinel 1 SAR SAFE, Sentinel 2, SAR CEOS, SRTM HGT, GDAL Virtual, ASCII Gridded XYZ, and so on.

ADDITIONAL VECTOR DATA FORMATS

AIXM, AIXM5, ARINC424, ASDI, Asterix, Autocad DWG/DXF, DAFIF(T), KML, Lidar, LASer, Microstation DGN, S-57 & S-63, VPF

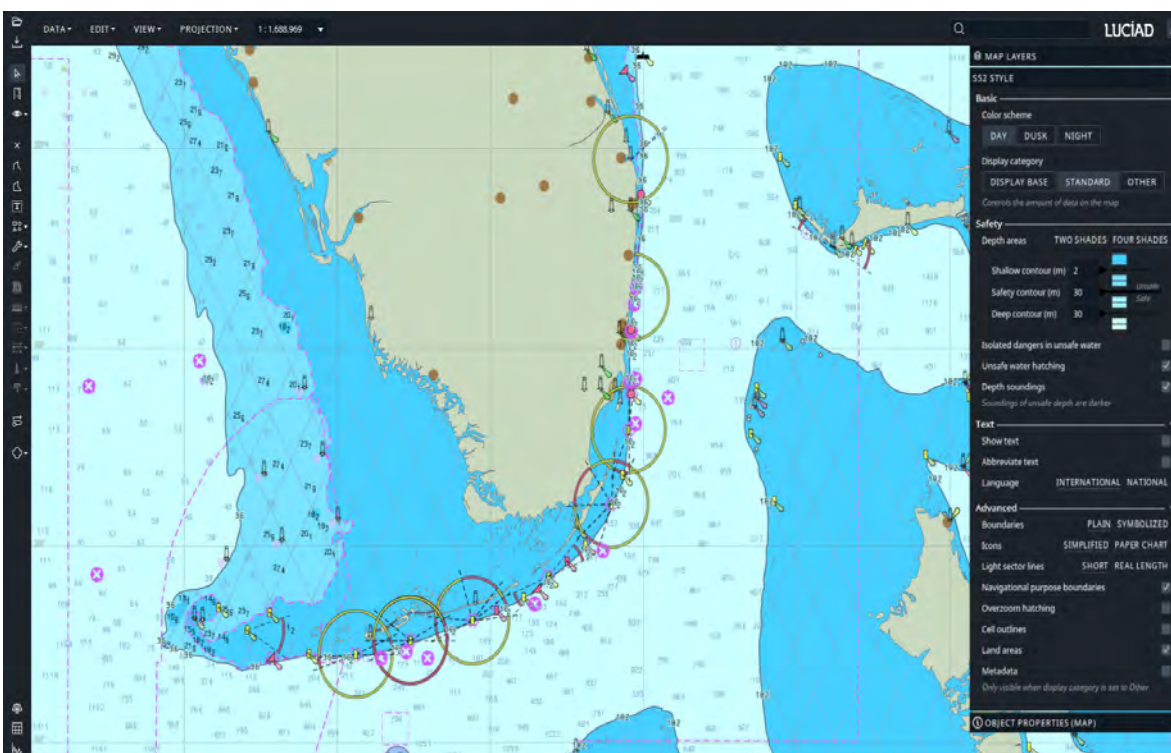
OGC FORMATS & WEB SERVICES

GeoPackage, WMS, WMTS, WFS(-T), WCS

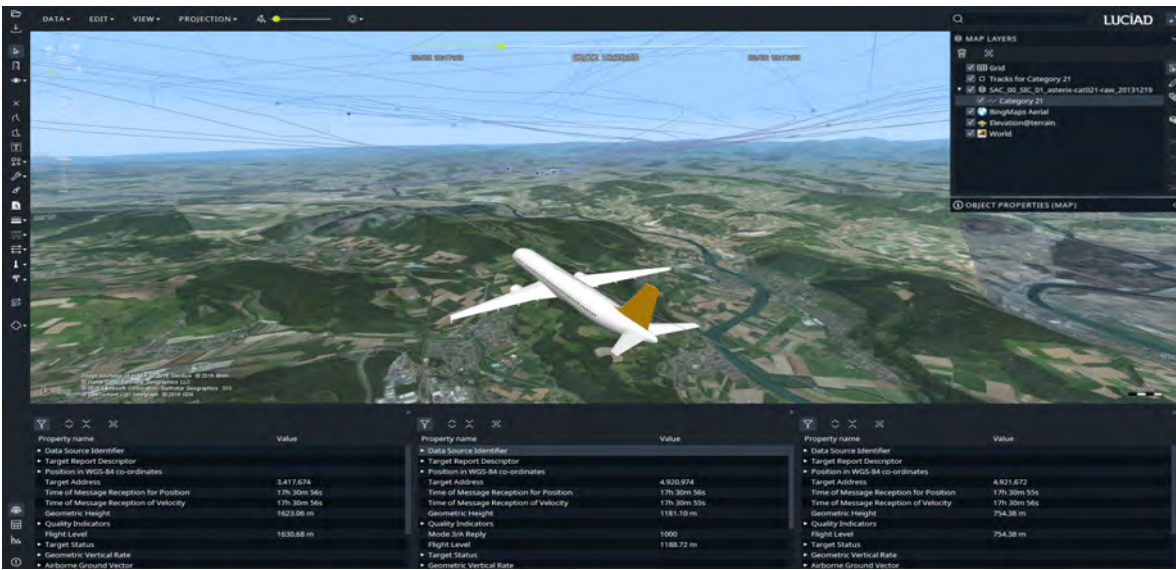
SYMBOLOLOGY

APP-6A, APP-6B, APP-6C, ICAO, MS2525b, MS2525c, NVG, S-52, TTA-106, UKHO AML

APPLICATION FEATURES



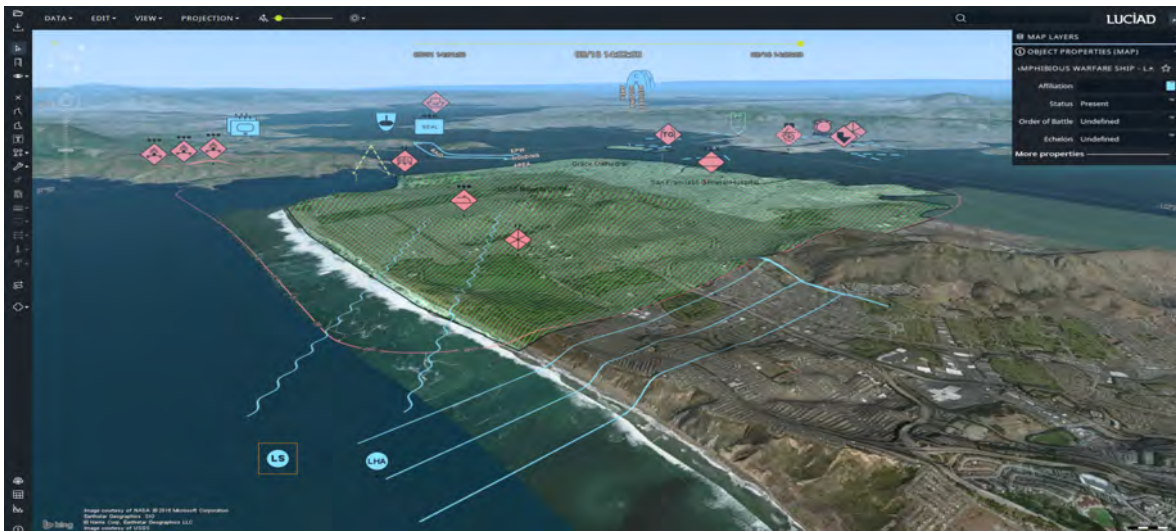
High-quality styling and visualization of maritime charts in Lucy



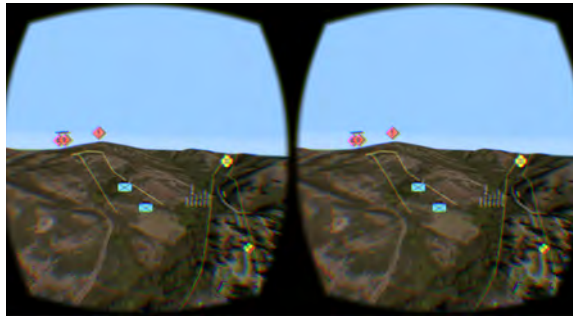
Comparing flight track objects in map-centric Lucy



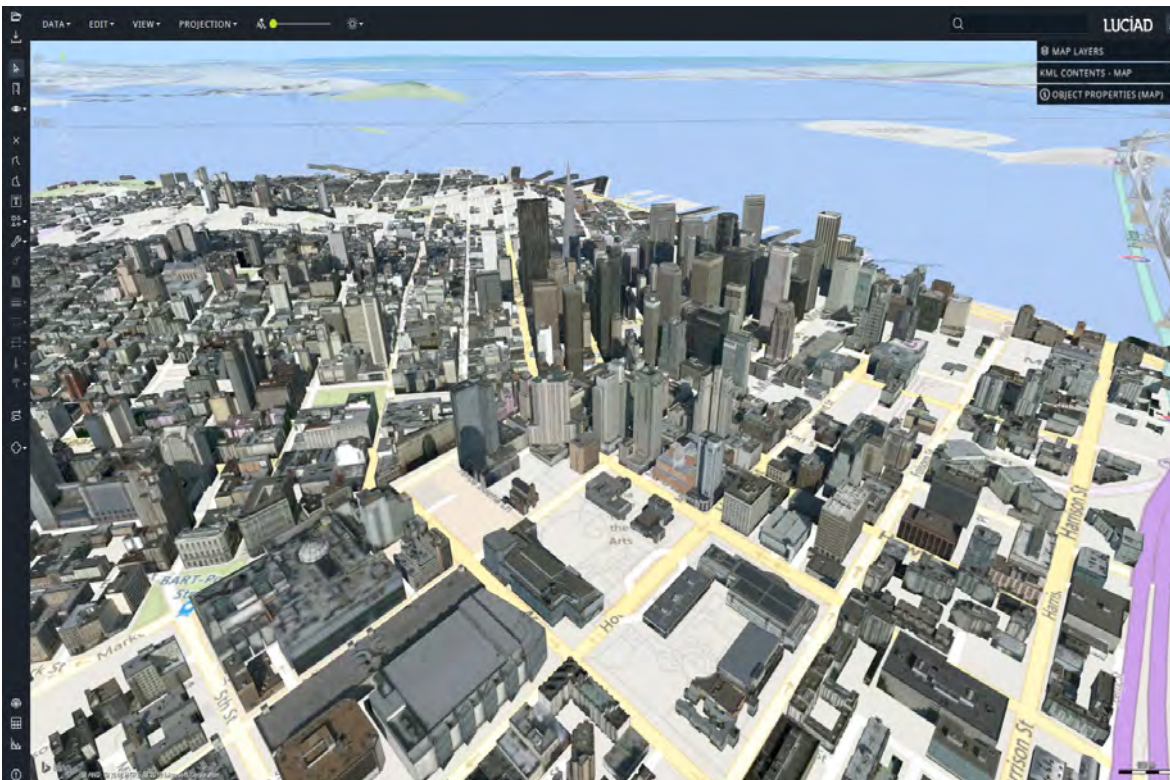
Flight profile preview integrated with AIXM airport infrastructure objects in map-centric Lucy



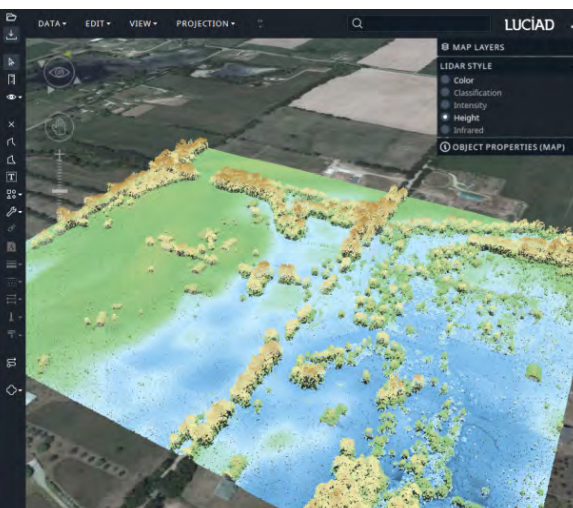
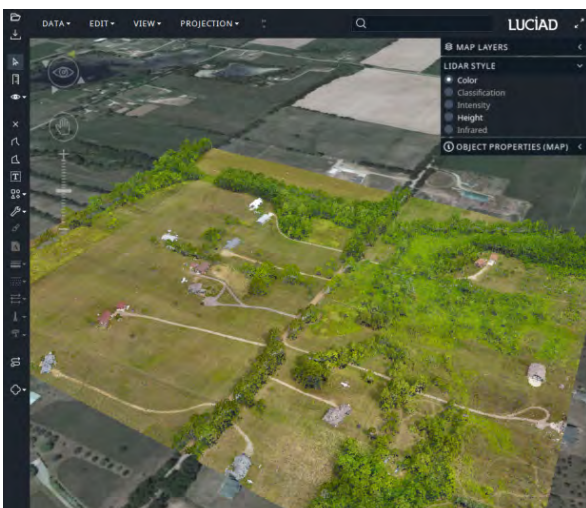
Create and edit military symbols from the latest standards in map-centric Lucy



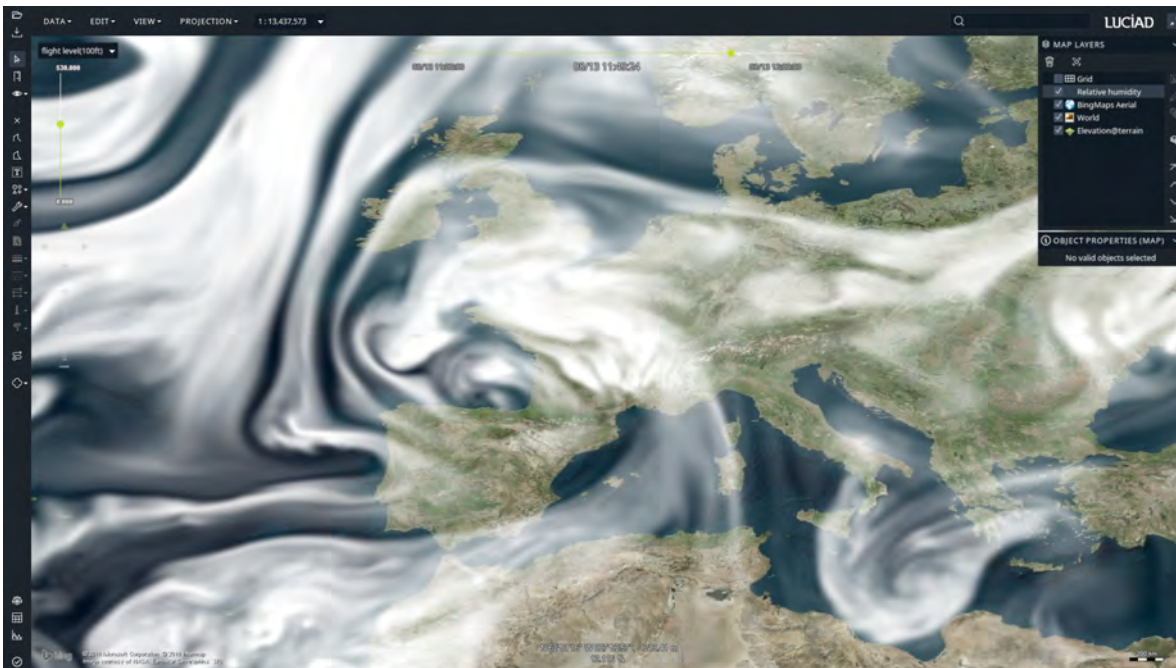
Left, Lucy visualizing a military mission plan. Right, stereoscopic view of the mission situation in an Oculus Rift headset.



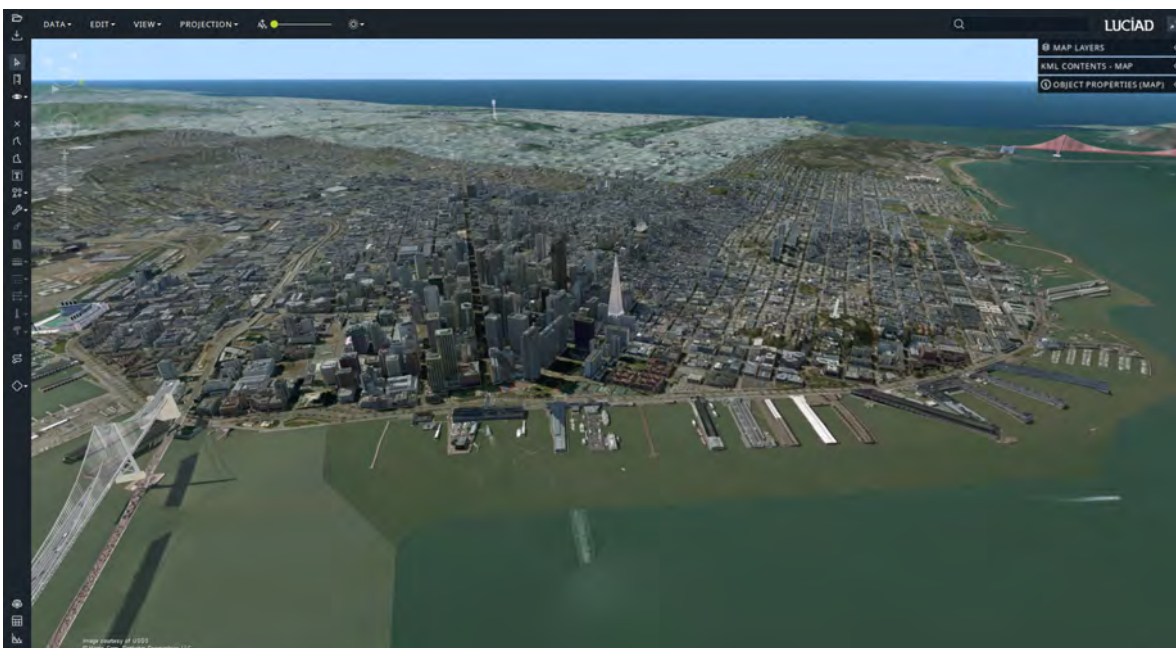
3-D Collada buildings integrated with Bing Maps road data in map-centric Lucy



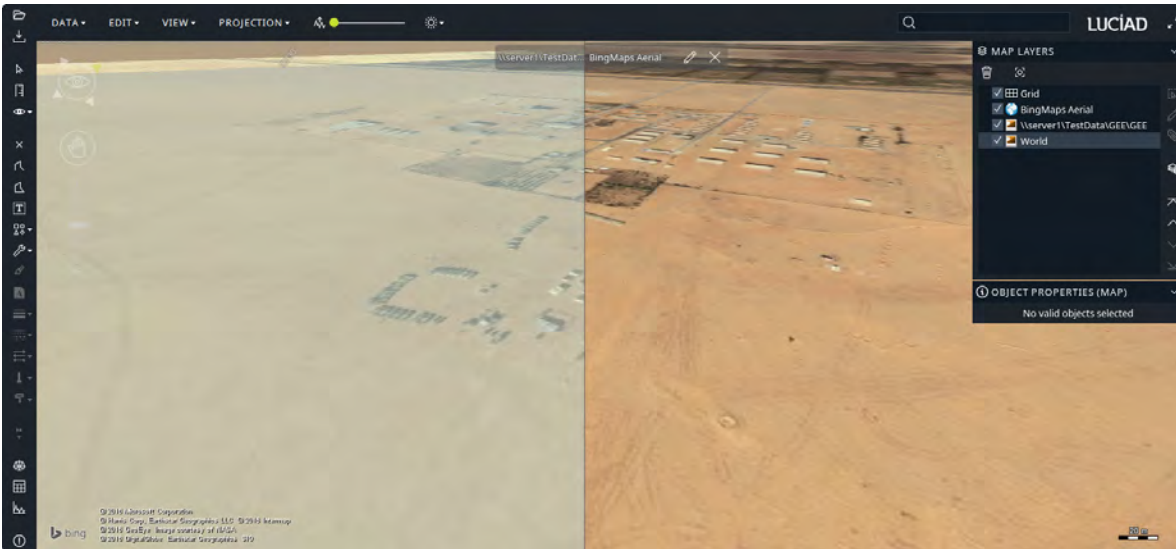
A lidar point cloud visualized in Lucy, with the color attribute selected for visualization on the left, and the height attribute selected on the right



NetCDF scientific data about relative humidity integrated in map-centric Lucy to analyze humidity at various flight levels



Integration of San Francisco aerial imagery and Collada data in map-centric Lucy

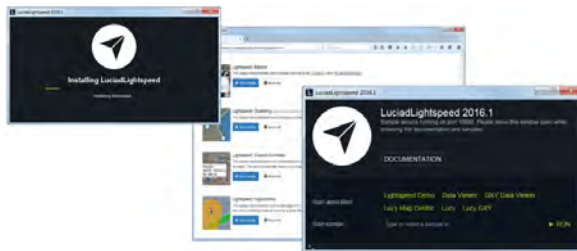


Using a swipe controller to spot the appearance of a tented camp in two sets of imagery captured at the same location at a different time

MORE INFORMATION

Lucy comes with:

- An automated installer and a launcher for applications, samples and documentation
- Code samples for all components
- Developer guides with clear explanations and a demonstration of Lucy fundamentals
- API reference offering detailed description of all interfaces and classes
- User guide with a detailed description of the Graphical User Interface
- Release notes to see what is new
- Technical notes to consult technical requirements



NEW

The Luciad Developer Platform is now live! The platform offers code samples, tips and much more for developers and architects.

dev.luciad.com

For more technical information about this product or to find out more about our other products and services, please contact us:

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