Release Guide

LuciadLightspeed 2020.0

2 March 2020

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About This Release

The 2020.0 release of LuciadLightspeed focuses on integration — integration of libraries, data, and processing. With this release, developers have introduced a new set of capabilities to better serve customers in need of desktop solutions in the defense, aviation, infrastructure, and Smart Cities application domains.

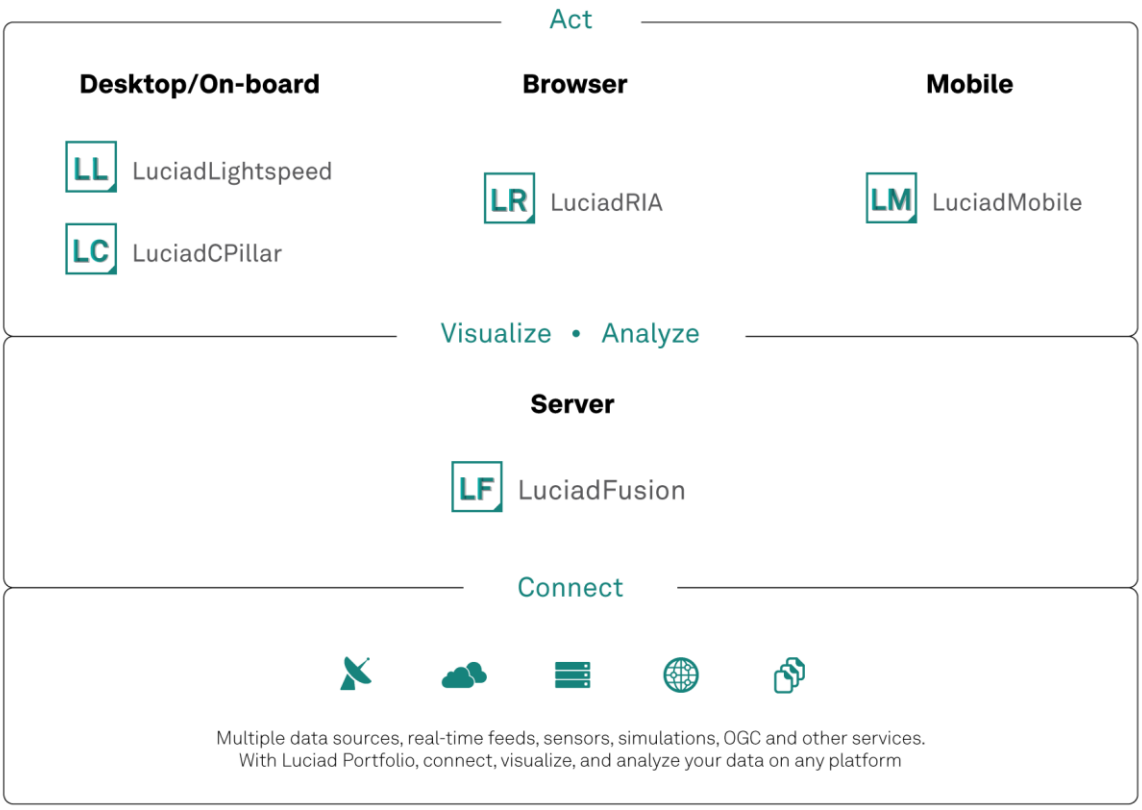

Figure 1: The Luciad product portfolio.

Benefits of the New Features

Smoothly Integrate LuciadLightspeed into JavaFX-Based Applications

JavaFX is a library for creating rich desktop client applications. It is intended to be the successor of Swing.

LuciadLightspeed 2020.0 features a dedicated LuciadLightspeed view for JavaFX. This replaces the existing hybrid approach, where a Swing-based view could be embedded into a JavaFX application.

The new FX view can be plugged in easily and is accompanied by controllers, editors, and UI elements to optimize the development experience. Just like with the existing Lightspeed view implementations, you have hybrid 2D/3D hardware-accelerated rendering, high frame rate, and interaction with the content of the map view.

LuciadLightspeed supports JavaFX as well as OpenJFX. This new view component is supported on Windows, Linux, and MacOs. The feature is supported by a set of new samples and documentation.

Together with the support for Java 11 and later and the choice between Oracle JDL and OpenJDK, support for JavaFX in LuciadLightspeed ensures that your projects are future proof.

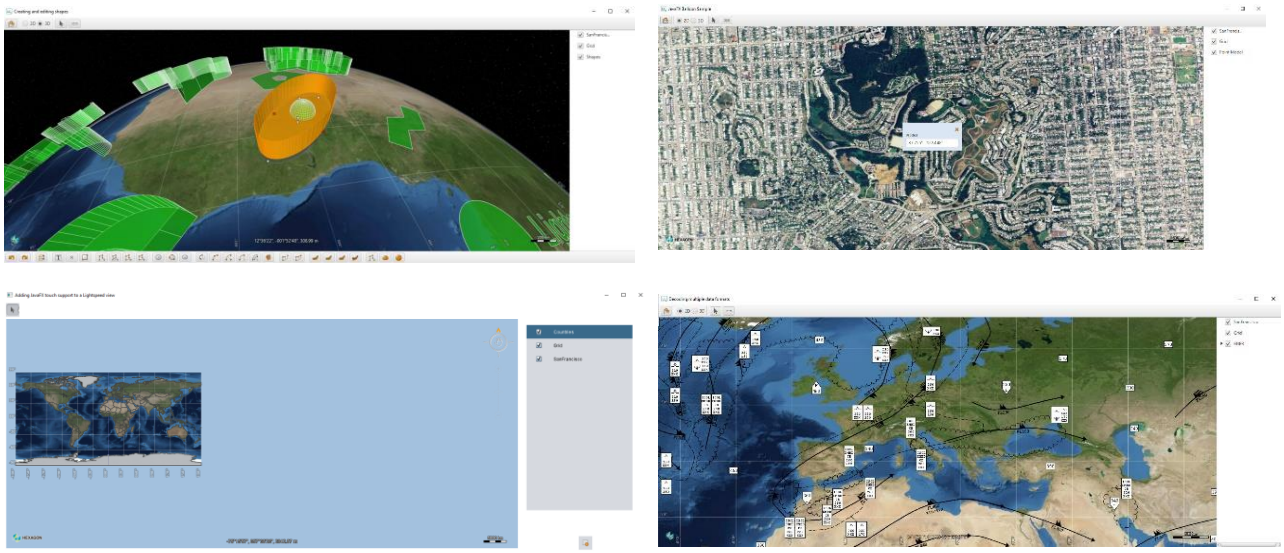

Figure 2: Dedicated JavaFX samples illustrate the use of the new view and controllers.

HEXAGON

New Data Connectors

Add Significant Weather Data Encoded as BUFR

During flight planning, weather forecasts are an important factor. Significant weather (SIGWX) offers a high-level forecast for the presence of clouds, storms, volcano eruptions, turbulence, etc. New information is provided four times a day by one of the official World Aviation Forecast Centers.

LuciadLightspeed now supports SIGWX information encoded using the BUFR data format. This support includes visualization of various weather elements applying the standardized symbology. SIGWX data can be visualized on both the GXY and the hardware-accelerated LuciadLightspeed view. The format is also integrated in Lucy.

BUFR stands for Binary Universal Form for the Representation of meteorological data. It is a standard developed by the World Meteorological Organization.

Note that the format is also supported in LuciadFusion. This means that LuciadLightspeed can also consume SIGWX data via OGC services like Web Map Service (WMS) or Web Map Tiling Service (WMTS).

This feature is available as part of the Weather and Environment option of LuciadLightspeed.

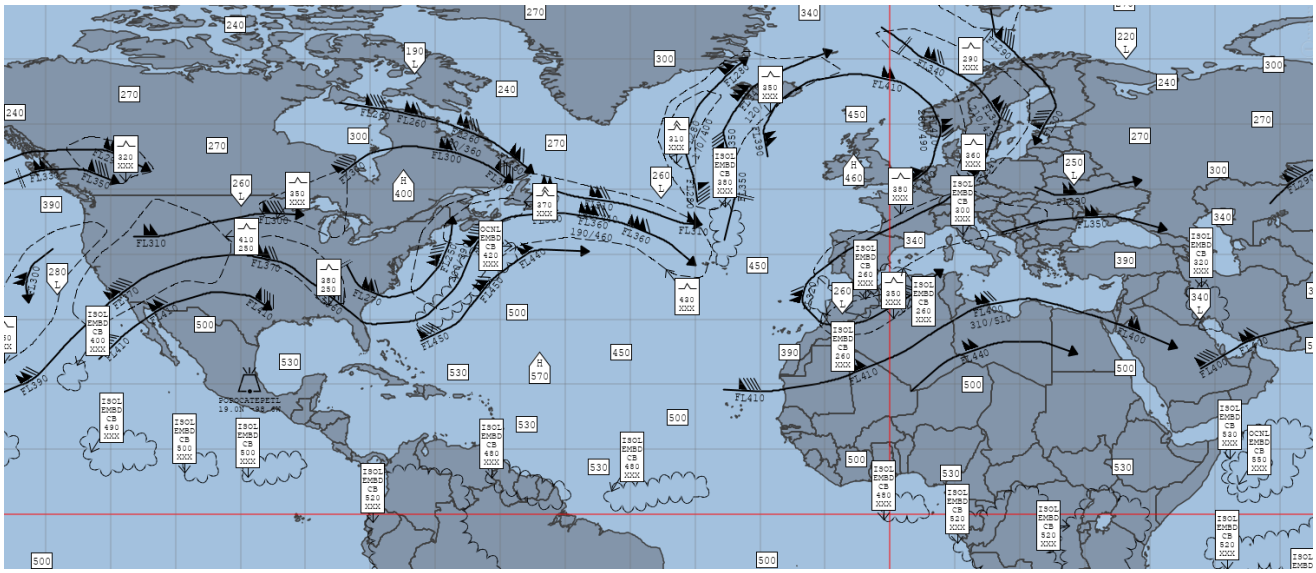

Figure 3: SIGWX data displayed in the GXY view.

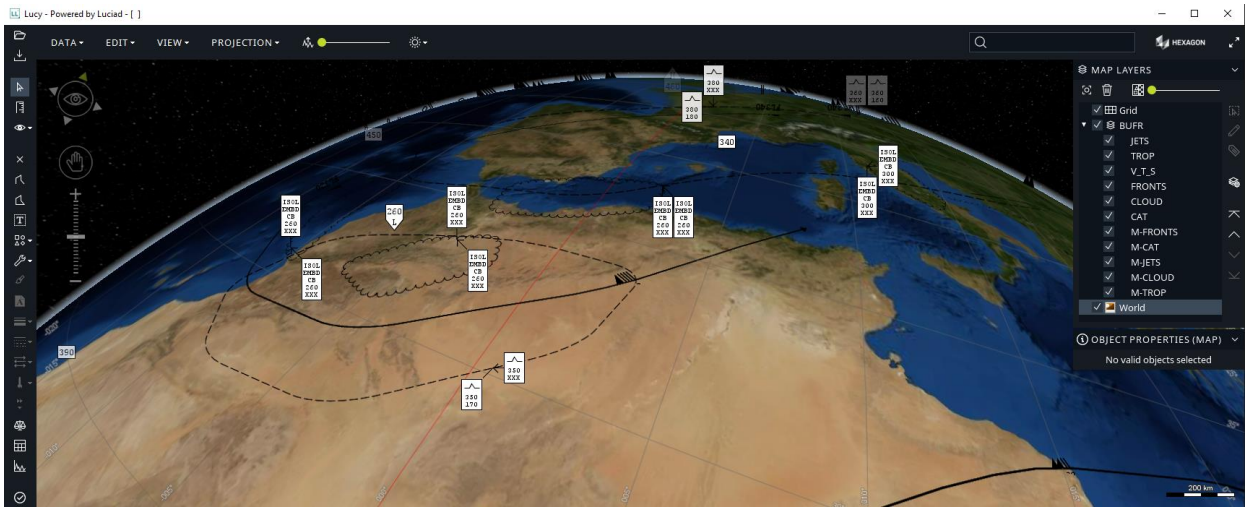

Figure 4: SIGWX data support in Lucy.

Add Topographic Maps from the Multinational Geospatial Co-production Program (MGCP)

The Multinational Geospatial Co-Production Program (MGCP) is a data production initiative. It is a DGIWG[1] standard, designated to be the successor of the military VPF (Vector Product Format). The data contains topographic maps optimized for specific viewing scales (1:50,000 or 1:100,000).

MGCP data is stored in a simple vector format, like SHP, and the visualization is specified by MGCP portrayal rules. The data is organized in various information layers.

LuciadLightspeed now supports MGCP data. The maps can be visualized on both the GXY and the hardware-accelerated Lightspeed view. The format is also integrated in Lucy.

Note that the format is also supported in LuciadFusion. This means that LuciadLightspeed can also consume MGCP data via OGC services like WMS or WMTS.

This feature is available as part of the Defense Standards option of LuciadLightspeed.

Figure 5: MGCP data viewed in Lucy.

[1] dgiwg.org/dgiwg/

Add CAD Data in the Hexagon Binz Format

LuciadLightspeed now also brings situational awareness to the infrastructure domain. The 2020.0 release offers support for the Hexagon Binz format. This format is used to store 3D infrastructure models and is optimized for progressive rendering of complex 3D structures with lots of visual detail.

Hexagon Binz data can be visualized using the hardware-accelerated Lightspeed view. Offline processing of Binz data sets into OGC 3D Tiles can be set up via the API.

Note that the format is also supported in LuciadFusion. This means that LuciadLightspeed can also consume Binz data via OGC 3D Tiles services. This is the recommended setup, offering the optimal user experience.

This feature is available as part of the Infrastructure Standards option of LuciadLightspeed Pro.

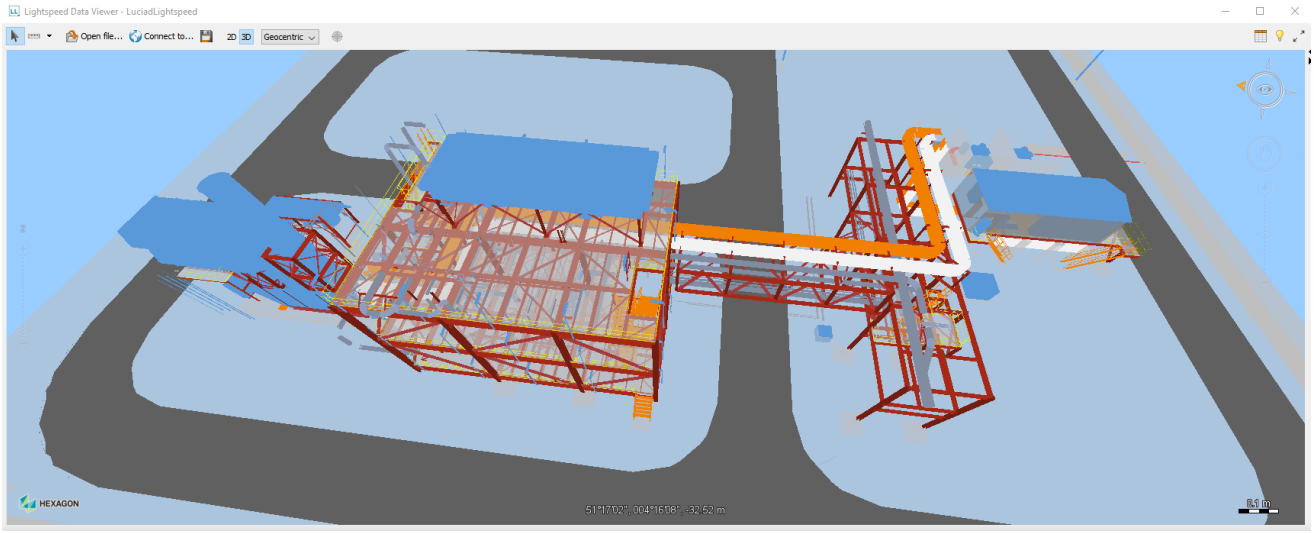

Figure 6: Hexagon Binz data directly consumed by LuciadLightspeed.

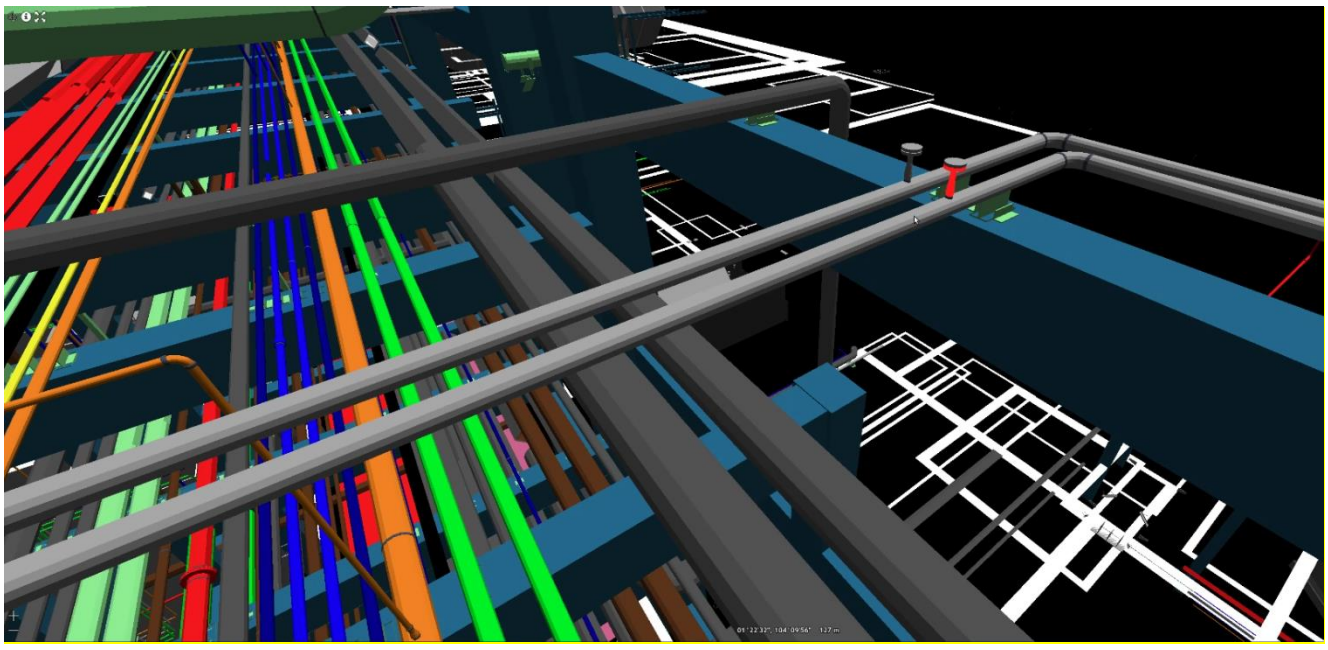

Figure 7: Hexagon Binz data after conversion to OGC 3D tiles.

Prepare Your 3D Meshes for Streaming via Conversion to OGC 3D Tiles

3D models are widely used in a variety of industries, not least in the geospatial world. They are either captured through photographic surveying or created in design modeling tools or via a combination of automated and manual modeling. Highly detailed 3D reality meshes, generated to represent a precise real-world environment such as a building, a bridge, or even an entire city, are becoming increasingly popular sources of 3D models. They are typically massive in size.

For smooth visualization, even when connecting to a remote data source, 3D models are best streamed as a feed of 3D tiles. The Open Geospatial Consortium (OGC) has defined a community standard, OGC 3D Tiles. This is a multi-leveled 3D-tiled format for 3D mesh data. Luciad products already support the OGC 3D Tiles protocol for streaming 3D meshes.

In the ideal scenario, we can serve and consume optimally tiled and multi-leveled 3D tile datasets. In practice, however, datasets often do not meet ideal conditions. Factors influencing the quality are the tile generation process, data format, and data structure. When a non-optimally structured 3D tile dataset is encountered, the visualization performance will be suboptimal.

Various solutions exist on the market, but there is no solution that covers the variety of needs of customers of the Luciad product portfolio. Our customers report the need to handle many different types of data:

- Datasets automatically created from photogrammetry/global matching/LiDAR
- Datasets based on a combination of imagery and cadastral parcel information, optionally combined with manually created 3D models
- CAD/BIM data

LuciadLightspeed 2020.0 addresses this need with a 3D Tiles processing engine that optimizes 3D mesh datasets for streaming.

The new 3D Tiles processing engine takes as input any data in OBJ format. It can handle various types of data, including CAD/BIM data. Plenty of tools exist to convert data into OBJ.

Making no assumptions on the structure of the data, the 3D Tiles processing engine will clean up data structures, split the data into tiles, combine them, and apply simplification to create of levels of detail. Texture atlases are created, and the result is encoded as an OGC 3D Tiles-compliant dataset.

The 3D Tiles processing engine is delivered as API, offering the possibility to set up offline data processing.

Note that this capability is also available in LuciadFusion. This means that LuciadLightspeed can also consume already-processed 3D meshes via OGC 3D Tiles services.

This feature is available as part of the Infrastructure Standards option of LuciadLightspeed Pro.

Figure 8: A typical use case is the optimization of 3D city models.

Improved Visualization and Interaction (Since 2019.1)

LuciadLightspeed supports the eye dome lighting technique to improve depth perception in point cloud datasets. This technique accentuates shapes by shading their outlines.

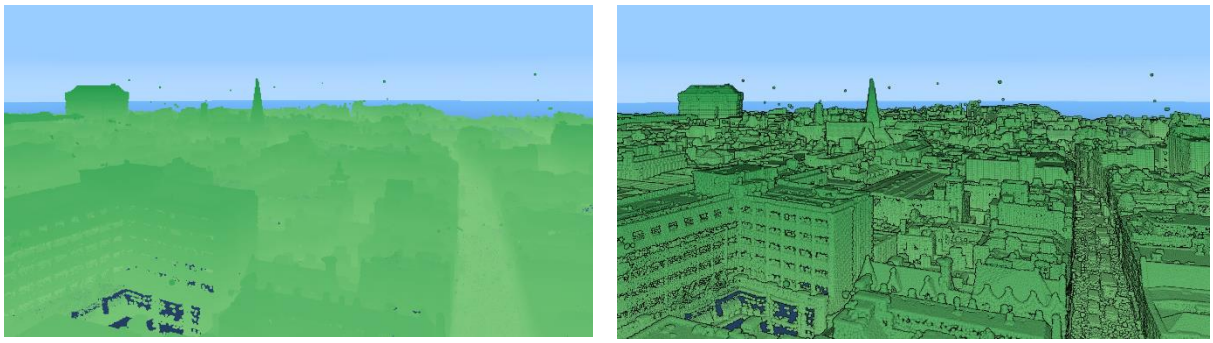

Figure 9: Eye Dome Lighting accentuates the shapes within a point cloud data set.

A new magnifying glass controller completes the Lightspeed view so you can have a closer look at map areas with dense information. This controller locally enlarges the map for all data present in the designated area. The controller is also integrated in Lucy.

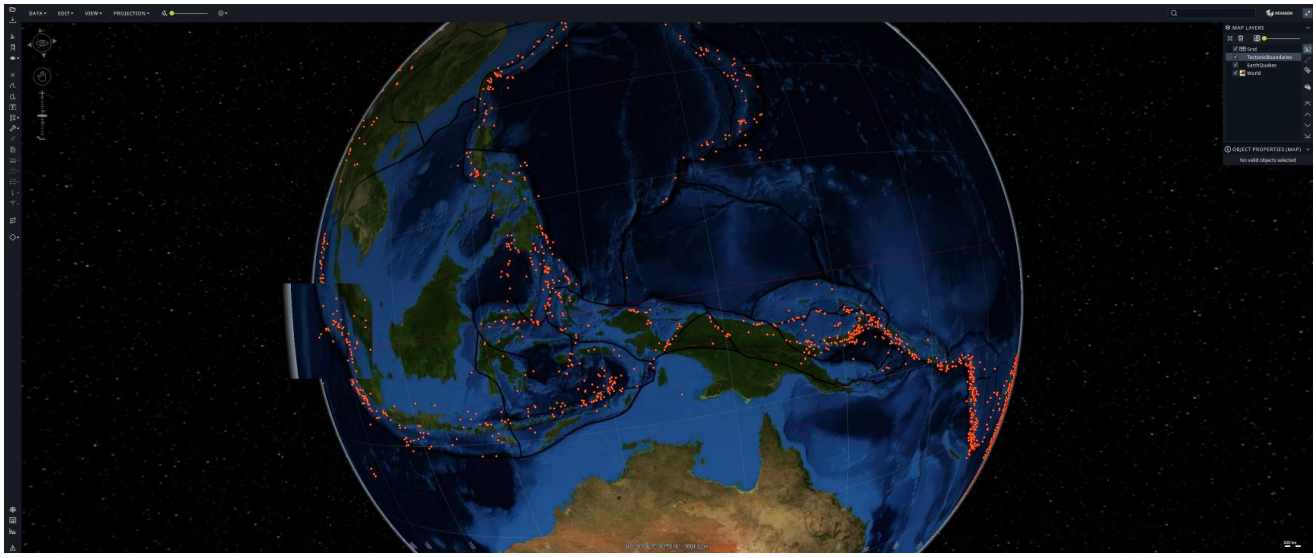

Figure 10: The magnifier controller is available in Lucy.

New Lucy Add-Ons (Since 2019.1)

The Lucy component is enriched with two new add-ons for visibility calculations. There is now out-of-the-box support for line of sight (LOS) calculations based on static or moving observers, and for point-to-shape visibility. Both add-ons are available for the hardware-accelerated map view. Lucy V2019.1 offers intuitive on-map definition of observers and observed objects. A dedicated user interface allows for configuration of the results.

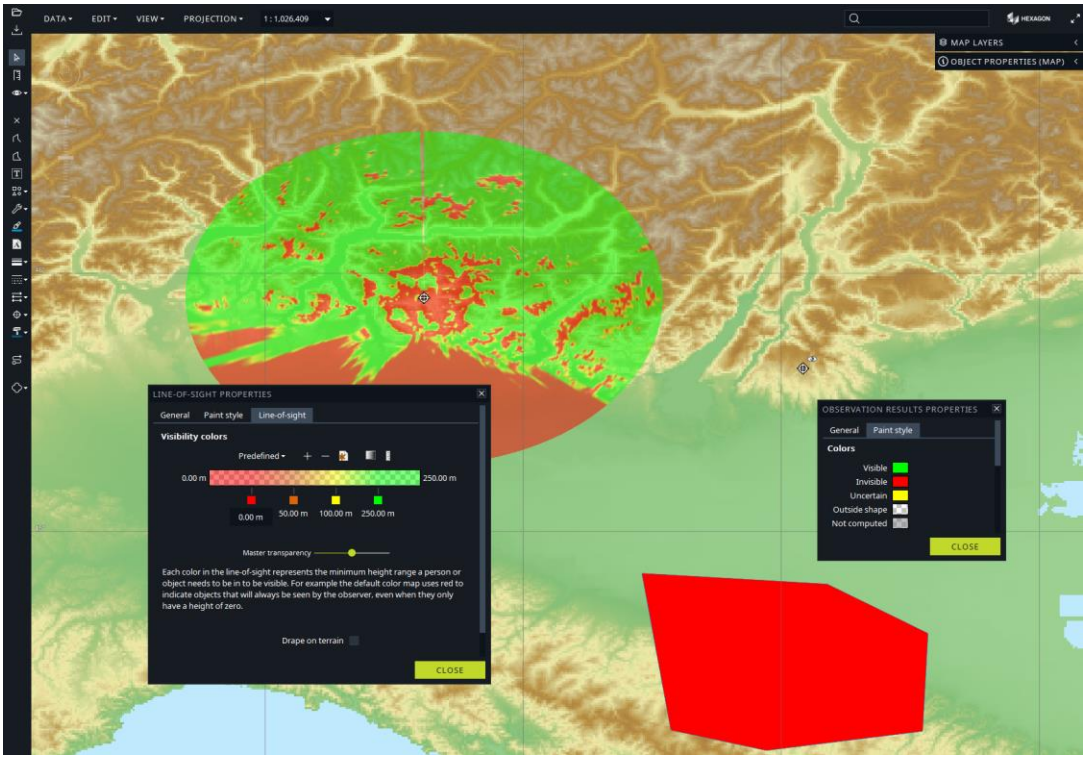

Figure 11: The Lucy add-ons for LOS and point-to-shape visibility.

Additional Improvements

Support for the Krovak Projection

To better support our customers from the Czech Republic, LuciadLightspeed now supports the Krovak projection, a conic projection. With the introduction of this projection, the following additional EPSG codes are available: EPSG:2065, EPSG:5221, EPSG:5513, EPSG:5514, EPSG:8352, and EPSG:8353.

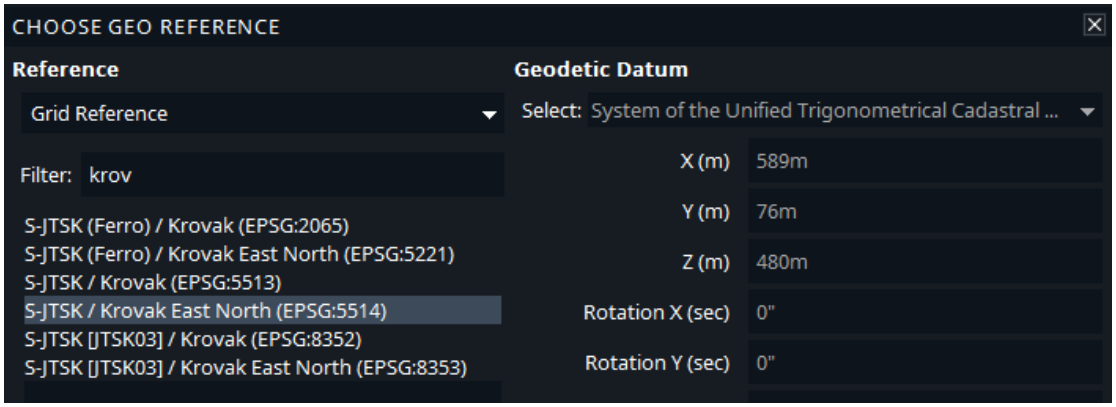

Figure 12: The Krovak projection and related EPSG codes have been added.

SLD/SE

LuciadLightspeed's SLD/SE styling capabilities have been extended on the following aspects:

- You can now use functions inside SLD/SE Geometry and ParameterValue (such as rotation) elements. On top of the existing capability to use property names, this provides additional flexibility to customize styles. Related to this, support has been added for four new vendor-specific functions that operate on a geometry defined by a given property name:
    - StartAngle(PropertyName) and EndAngle(PropertyName): determine respectively the start and end angle of the referred geometry, measured in degrees clockwise from the direction at 12 o'clock.
    - StartPoint(PropertyName) and EndPoint(PropertyName): determine respectively the start and end point of the referred geometry.

  An example use case combining these new capabilities is the configuration of an arrowhead at the end of a polyline. By using a point symbolizer with a geometry defined by the EndPoint of the polyline and a rotation defined by the EndAngle of the polyline, an oriented arrow icon can be drawn at the end of the polyline.

- You can now define a raster colormap using either a Categorize or Interpolate element. In the case of Categorize, a non-interpolated colormap can be defined, whereas the use of the Interpolate element results in an interpolated colormap.

Product Packaging Change

LuciadLightspeed Pro has a new option, Infrastructure Standards, as illustrated in the table below. This option replaces the former CAD Connectors option, available with LuciadLightspeed Advanced and Pro until V2019.1. The Infrastructure Standards option is only available in LuciadLightspeed Pro. It offers the CAD connectors, in addition to support for the Hexagon Binz format and the 3D Tiles processing engine.

When you are ready to upgrade, we will advise you on how your current configuration, including the CAD Connectors option, maps onto the 2020 options and tiers.

✓ Feature Included

○ Optional Feature

Functionality	Essential	Advanced	Pro
Core GIS Engine	✓	✓	✓
Projection, Datum, and Geoid Models	✓	✓	✓
Transformation and Projection Engine	✓	✓	✓
4D Cartesian & Geodesic Geometry Model	✓	✓	✓
Unified Data Model	✓	✓	✓
CPU 2D Visualization Engine	✓	✓	✓
GPU 2D/3D Visualization Engine	✓	✓	✓
Vertical, Profile & Timeline Views	✓	✓	✓
Customizable Symbology	✓	✓	✓
CPU, GPU Image Processing Image	✓	✓	✓
2D/3D/4D Interaction Model	✓	✓	✓
Visual Analytics	✓	✓	✓
High Quality, Large Format Printing	✓	✓	✓
Raster Connectors	✓	✓	✓
Vector Connectors	✓	✓	✓
Point Clouds & Reality Meshes	✓	✓	✓
OGC Standards	✓	✓	✓
Advanced Raster Connectors		✓	✓
Advanced GIS Engine		✓	✓
Real-time Engine		✓	✓
Tiling Engine			✓
Database Connectors		○	✓
Terrain Analysis Engine		○	○
Weather & Environment Standards		○	○
Graph & Routing Engine		○	○
Infrastructure Standards			○
Radar Connectors			○
Aviation Standards			○
Defense Standards			○
Defense Symbology			○
Maritime Standards			○
S-63			○

Figure 13: LuciadLightspeed product tiers and options.

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Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

Hexagon's Geospatial division creates solutions that deliver a 5D smart digital reality with insight into what was, what is, what could be, what should be, and ultimately, what will be.

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