



HEXAGON

Release guide
2022.0

Release guide

LuciadLightspeed 2022.0

8 July 2022

Contents

About this release	3
Benefits of the new features	4
Support for Building Information Models (BIM) in the IFC format.....	4
Sample code to get you started	5
Extended OGC SE styling capabilities	5
Sample code to get you started	6
Area calculation for complex polygons with holes	6
Sample code to get you started	7
Improvements for customers in the aviation domain	7
Apply constructive geometry to AIS shapes.....	7
DAFIFT support for Minimum Sector Altitude data.....	7
Other improvements	8

About this release

With this 2022.0 release, LuciadLightspeed is ready for GeoBIM. Data in the IFC format is now directly supported. Furthermore, we added an important set of improvements and enhancements that were high on our customers' wish lists.

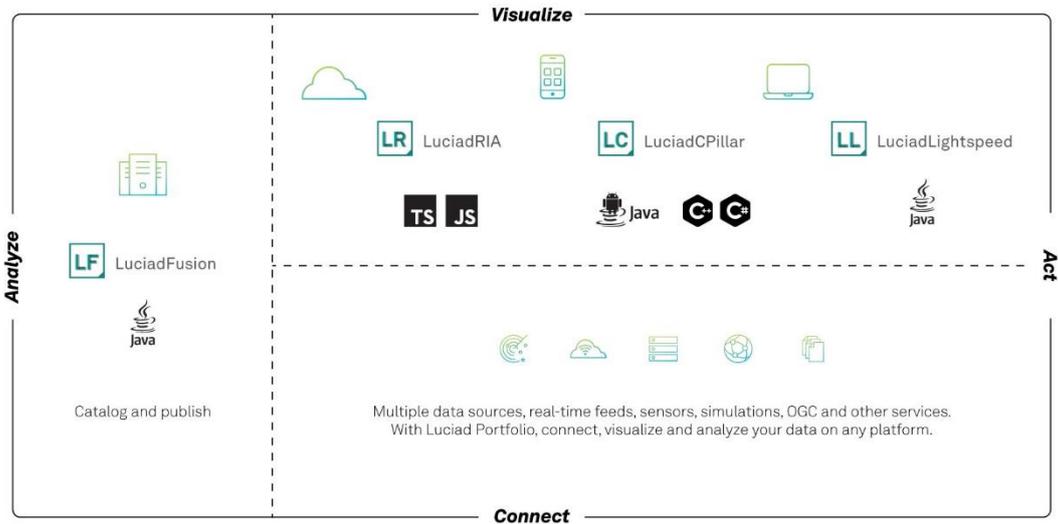


Figure 1: The Luciad Product Portfolio.

Benefits of the new features

Support for Building Information Models (BIM) in the IFC format

The Industry Foundation Classes (IFC) format is an open file format used by Building Information Modeling (BIM) programs. It contains a model of a building or facility, including spatial elements, materials, and shapes. In recent years, GeoBIM has become necessary to bring situational awareness into infrastructure projects, and vice versa.

This 2022.0 release of LuciadLightspeed brings support for IFC. The IFC models can be decoded and are then converted into OGC 3D Tiles for efficient visualization. This conversion can be done on the fly, resulting in “drag and drop” of IFC data. Depending on the size of the IFC model, this may take a while. Therefore, LuciadLightspeed also offers the capability to pre-compute the 3D tiles dataset once. Visualization will be instantaneous afterwards. Multiple IFC models can be combined into one 3D Tiles dataset, if required.

IFC models contain geometries as well as metadata. LuciadLightspeed allows you to correlate between the OGC 3D Tiles data and the properties inside the IFC. These properties can then be used to style, filter, or select elements from the IFC model.

For easy access to the metadata, LuciadLightspeed offers a tool to convert the IFC dataset into the GeoJSON format. This conversion maintains the properties stored inside the IFC dataset, together with a bounding box for each item. The unique identifier stored inside the 3D Tiles data is also present in the GeoJSON data. You can perform this conversion to GeoJSON programmatically, or you can run a convenient IFC data conversion script from the command line.

Support for data in the IFC format has also been added to Lucy, the LuciadLightspeed high-level application framework.

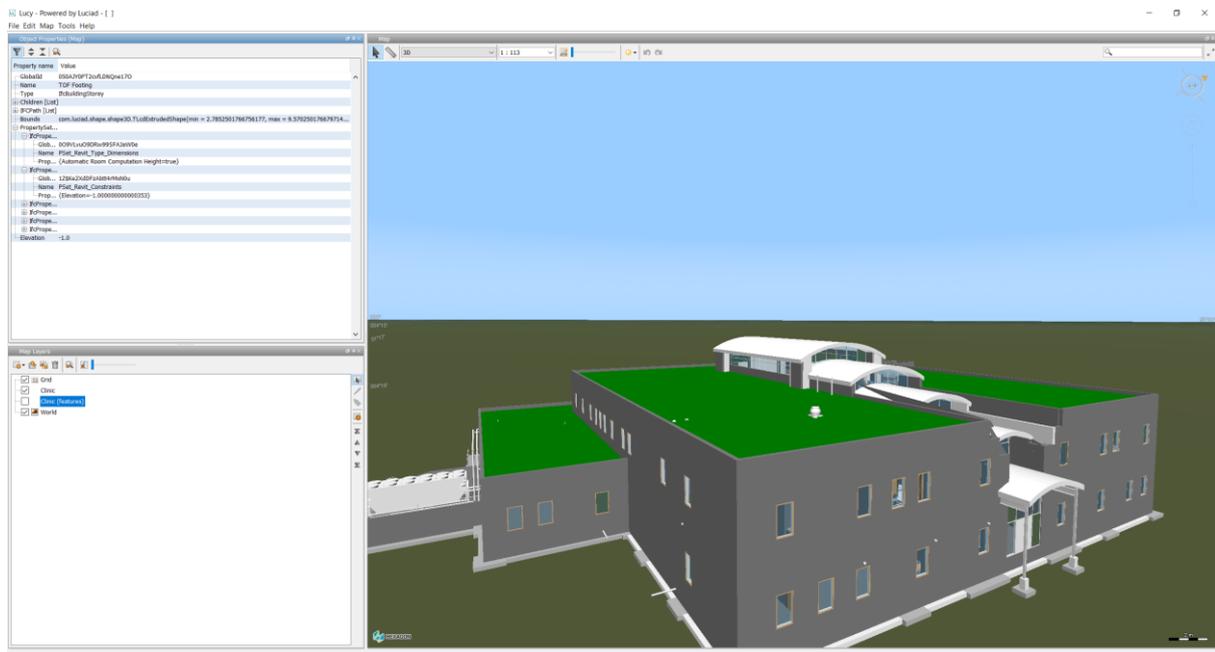


Figure 2: IFC data visualized in Lucy. The object properties can be explored via the standard properties panel.

Sample code to get you started

The decoder sample is the main access point for testing LuciadLightspeed IFC support. Furthermore, several articles have been added to complete the product documentation with information about the IFC format and how to handle it. These articles are easily accessible via the link to the documentation page “Data Formats: IFC.”

Extended OGC SE styling capabilities

OGC Symbology Encoding (SE), previously called Styled Layer Descriptor (SLD), is a standard for cross-platform and cross-vendor style definition. It mainly focuses on vector data, but also includes some parameters for defining the appearance of raster data.

OGC SE is widely used. Nevertheless, its expressive power is limited with respect to label styling options. This is one of the primary reasons that the industry introduced the concept of vendor options. Vendor options are key/value pairs that can be set on a symbolizer to customize settings that are not available in OGC SE.

For labeling, this mechanism has already been used within the Luciad Portfolio products. A typical use case is street labeling. Now we have used the concept of vendor options to support the label box styling settings.

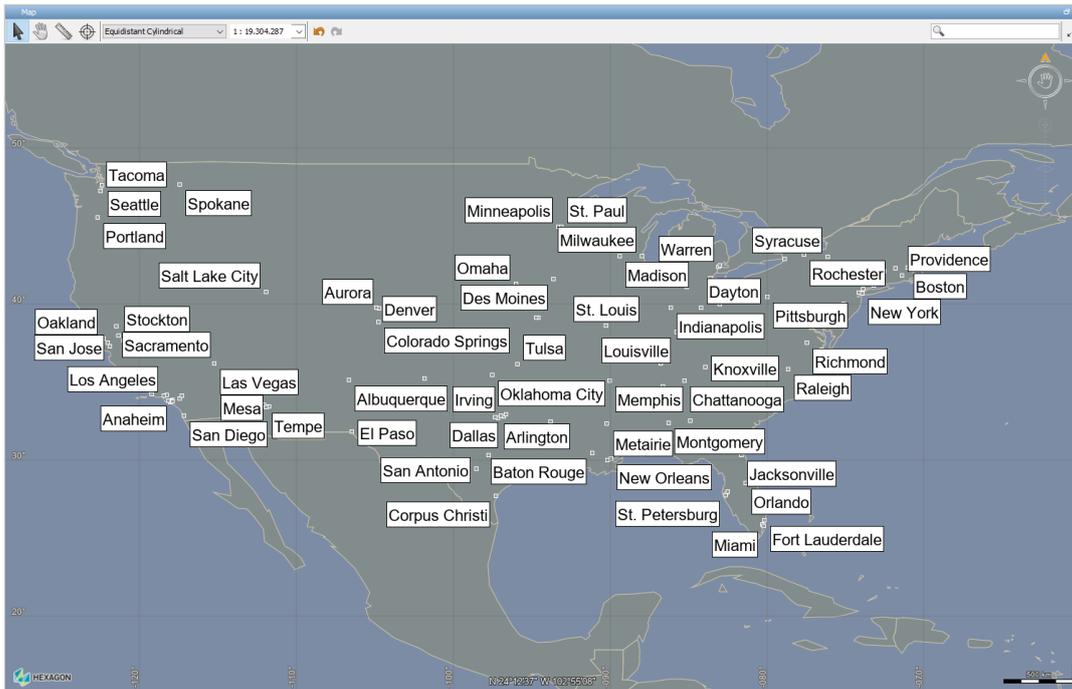


Figure 3: A set of vendor options to support the label box styling settings is now available in LuciadLightspeed.

Other improvements related to OGC SE support in LuciadLightspeed:

- You can now style the points of a line-based shape. By using a PointSymbolizer with the Geometry function “vertices,” the defined point style is applied to all points of the encountered shape. An example use case is the styling of waypoints along an ATS route.
- You can now use the geometry function “interiorPoint” to style a shape using a PointSymbolizer. This function takes a point on the shape border itself (the middle) if it is open, or inside the shape if it is closed.

- You can now adjust the anchor point of icons in OGC SE by using the AnchorPoint property on a PointSymbolizer graphic. An example use case is the alignment of the tip of an arrow icon with the end of a line segment.

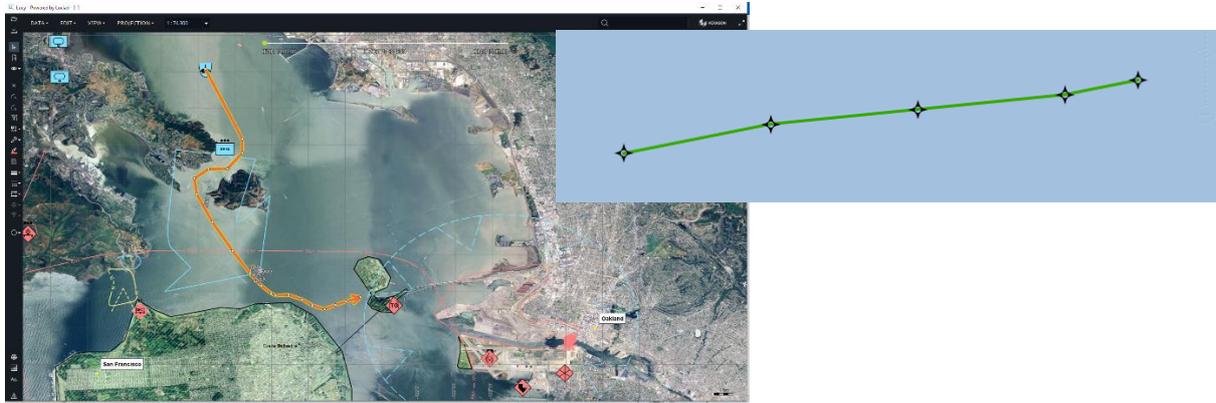


Figure 4: Using the PointSymbolizer in LuciadLightspeed.

Sample code to get you started

The existing OGC SE samples have been extended. For the label box styling, a how-to article has been added: "How to draw a box around labels."

Area calculation for complex polygons with holes

You can calculate the area of a surface with one of these three methods:

- `TLcdEllipsoidUtil.geodesicArea(ILcdShape, ILcdEllipsoid)` for shapes with longitude/latitude coordinates
- `TLcdSphereUtil.geodesicArea(ILcdShape, double)` for shapes with longitude/latitude coordinates
- `TLcdCartesian.area(ILcdShape)` for shapes with Cartesian (X/Y) coordinates

All these functions now support complex polygons, including islands and holes.



Figure 5: An example of the area of Italy, of which the country borders make up a complex polygon.

Sample code to get you started

A new how-to article has been added: “How to calculate the area of a complex polygon.”

Improvements for customers in the aviation domain

Apply constructive geometry to AIS shapes

Since early versions, LuciadLightspeed has been capable of applying topological checks and constructive geometry operations. This capability has now been extended for aeronautical objects that are decoded as so-called “AIS shapes” by the LuciadLightspeed API. It is particularly relevant to all polyline- and polygon-like objects.

Note that the Lucy Drawing capability already supported constructive geometry operations on aeronautical shapes. This capability remains unchanged.

Sample code to get you started

You can load AIS data into the constructive geometry sample of LuciadLightspeed.

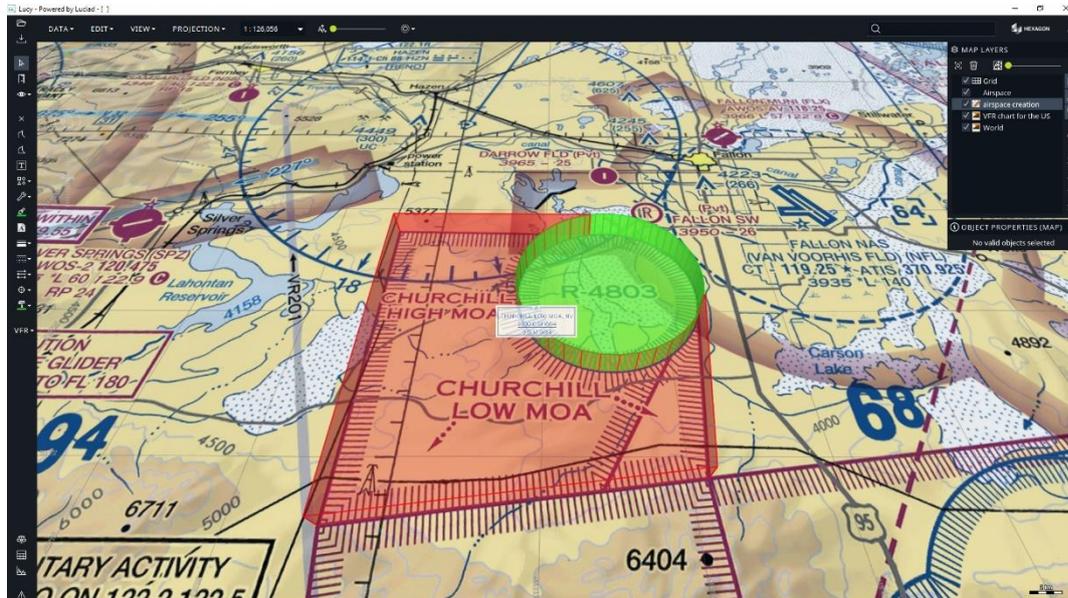


Figure 6 Through a custom Lucy add-on, AIS airspace shapes and constructive geometry operations are combined to create the Churchill Low Military Operations Area (MOA) in Nevada. The MOA consists of a polygonal airspace volume from which a circular airspace volume is subtracted.

DAFIFT support for Minimum Sector Altitude data

The decoder for the DAFIFT aviation format now supports decoding and visualization of Minimum Sector Altitude data. This data defines the lowest altitude that provides a minimum clearance of 1000 feet above all objects located within a circle sector (for example, around a navigational aid).

Other improvements

- Scale locking: A Lightspeed layer can optionally have scale ranges to automatically adjust its visibility based on the view scale. For additional flexibility, it is now possible to adjust the scale value to be considered independent of the view scale. This allows users to “lock” on a scale and keep a layer visible regardless of the current view scale. The article “How to lock scale-based styles to a certain zoom level” provides more information and sample code.
- Support for Draco compression: To reduce the tile size and increase streaming speed, 3D Tiles containing meshes can have their geometries compressed using the Draco library. LuciadLightspeed now supports decoding and visualization of Draco-compressed 3D Tiles. Draco compression can also be applied for point cloud data.
- Java 17 support has been further improved.
 - This release removes a series of occurrences of packages that were split over different jar files. Please consult the “Upgrade considerations” page of the documentation to see the details.
 - The sample code has been adapted; there are no more deprecation warnings when using Java 17.
 - There were some changes in third-party libraries to improve compatibility with Java 17. For example, the samples now depend on the HikariCP third-party library. It is used to illustrate how the database model decoders can use a database connection pooling framework. Also, the version of Ehcache was updated from 3.2.0 to 3.10.0. Again, such changes are documented as “Upgrade considerations.”



About Hexagon

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

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

Hexagon's Safety, Infrastructure & Geospatial division improves the resilience and sustainability of the world's critical services and infrastructure. Our solutions turn complex data about people, places and assets into meaningful information and capabilities for better, faster decision-making in public safety, utilities, defense, transportation and government.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 22,000 employees in 50 countries and net sales of approximately 4.3bn EUR. Learn more at [hexagon.com](https://www.hexagon.com) and follow us [@HexagonAB](https://twitter.com/HexagonAB).

Copyright

© 2022 Hexagon AB and/or its subsidiaries and affiliates. All rights reserved

Warning: The product made the subject of this documentation, including the computer program, icons, graphical symbols, file formats, audio-visual displays and documentation (including this documentation) (collectively, the "Subject Product") may be used only as permitted under the applicable software license agreement, and subject to all limitations and terms applicable to use of the Subject Product therein. The Subject Product contains confidential and proprietary information of Intergraph Corporation, a member of the Hexagon Group of companies ("Hexagon"), its affiliates, and/or third parties. As such, the Subject Product is protected by patent, trademark, copyright and/or trade secret law and may not be transferred, assigned, provided, or otherwise made available to any third party in violation of applicable terms and conditions cited further below.

Terms of Use

By installing, copying, downloading, accessing, viewing, or otherwise using the Subject Product, you agree to be bound by the terms of the EULA found here:

https://www.hexagonsafetyinfrastructure.com/-/media/Legal/Hexagon/SI/Licenses/EULA_SA_SIG-Eng_062021.pdf.

Disclaimers

Hexagon and its suppliers believe the information in this publication is accurate as of its publication date. Hexagon is not responsible for any error that may appear in this document. The information and the software discussed in this document are subject to change without notice.

Language Translation Disclaimer: The official version of the Documentation is in English. Any translation of this document into a language other than English is not an official version and has been provided for convenience only. Some portions of a translation may have been created using machine translation. Any translation is provided "as is." Any discrepancies or differences occurring in a translation versus the official English version are not binding and have no legal effect for compliance or enforcement purposes. Hexagon disclaims any and all warranties, whether express or implied, as to the accuracy of any translation.

Reasonable efforts have been made to provide an accurate translation; however, no translation, whether automated or provided by human translators is perfect. If any questions arise related to the accuracy of the information contained in a translated version of Documentation, please refer to its



official English version. Additionally, some text, graphics, PDF documents, and/or other accompanying material may not have been translated.

Links To Third Party Websites

This Document may provide links to third party websites for your convenience and information. Third party websites will be governed by their own terms and conditions. Hexagon does not endorse companies or products to which it links.

Third party websites are owned and operated by independent parties over which Hexagon has no control. Hexagon shall not have any liability resulting from your use of the third party website. Any link you make to or from the third party website will be at your own risk and any information you share with the third party website will be subject to the terms of the third party website, including those relating to confidentiality, data privacy, and security.

Hexagon provides access to Hexagon international data and, therefore, may contain references or cross references to Hexagon products, programs and services that are not announced in your country. These references do not imply that Hexagon intends to announce such products, programs or services in your country.

Revisions

Hexagon reserves the right to revise these Terms at any time. You are responsible for regularly reviewing these Terms. Your continued use of this Document after the effective date of such changes constitutes your acceptance of and agreement to such changes.

Questions

[Contact us](#) with any questions regarding these Terms.