Release Guide

LuciadFusion 2020.0

2 March 2020

Contents

About This Release **3**

Benefits of the New Features **4**

New Data Connectors 4

Add Significant Weather Data Encoded as BUFR 4

Add Topographic Maps from the Multinational Geospatial Co-production Program (MGCP) 4

Add CAD Data in the Hexagon Binz Format 5

Prepare Your 3D Meshes for Streaming via Conversion to OGC 3D Tiles 6

Support for the Krovak Projection 8

SLD/SE 8

Better Integration with Third-Party OGC Clients 9

Product packaging change 9

About Hexagon **11**

Copyright 12

About This Release

The 2020.0 release of LuciadFusion focuses on the integration and processing of data. With this release, developers have a new set of capabilities to better serve their customers in need of data management and dissemination solutions in the defense, aviation, infrastructure, and Smart Cities application domains.

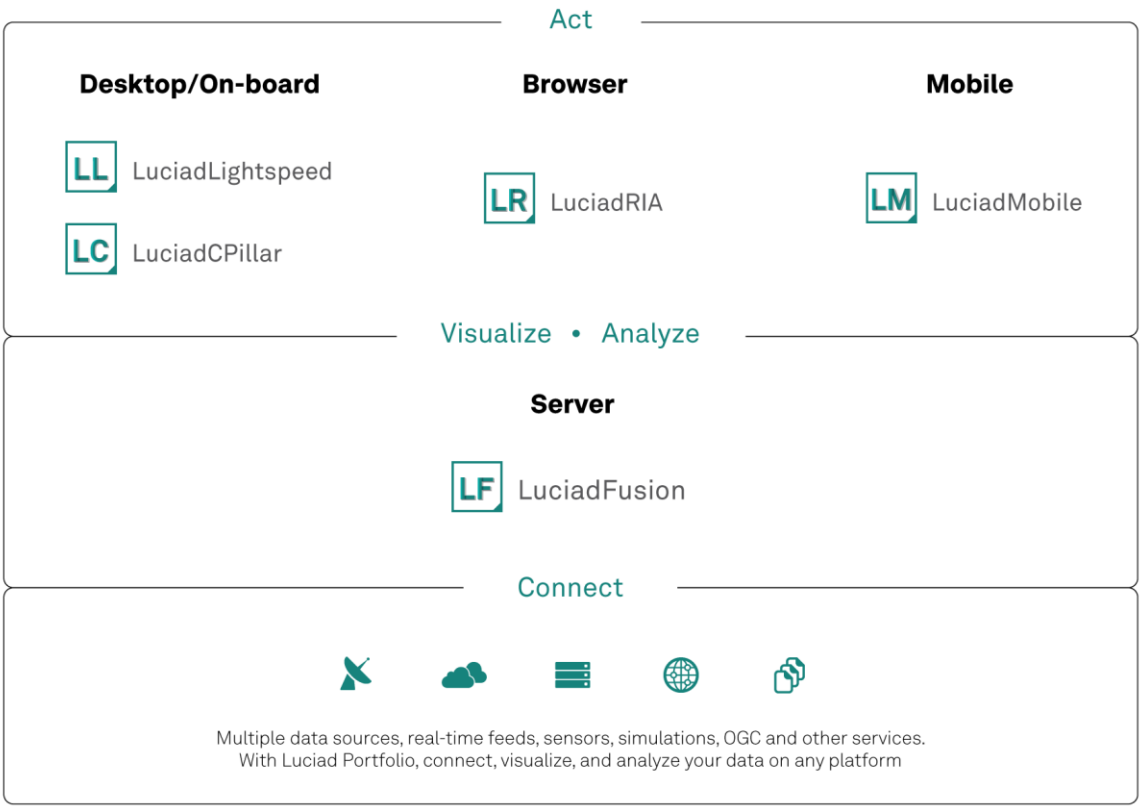

Figure 1: The Luciad product portfolio.

Benefits of the New Features

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 Centres.

LuciadFusion 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 crawled, managed, and served via LuciadFusion Studio. Based on SIGWX data, a data manager can set up OGC Web Map Service (WMS), Web Map Tiling Service (WMTS) and Web Feature Service (WFS).

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

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

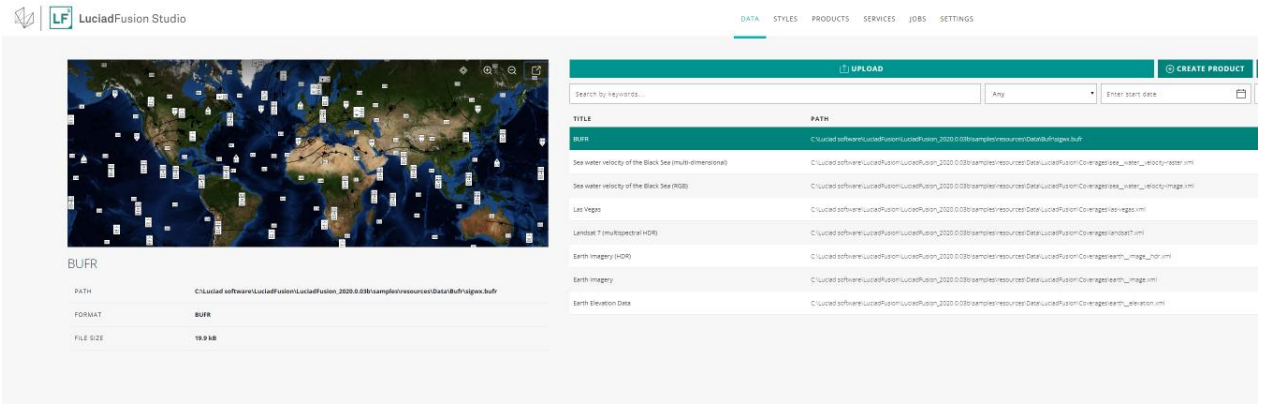

Figure 2: SIGWX data crawled by LuciadFusion.

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.

LuciadFusion now supports MGCP data. The data can be crawled, managed, and served using LuciadFusion Studio. Based on MGCP data, a data manager can set up OGC WMS and WMTS services. The portrayal rules will automatically be applied.

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

[1] dgiwg.org/dgiwg/

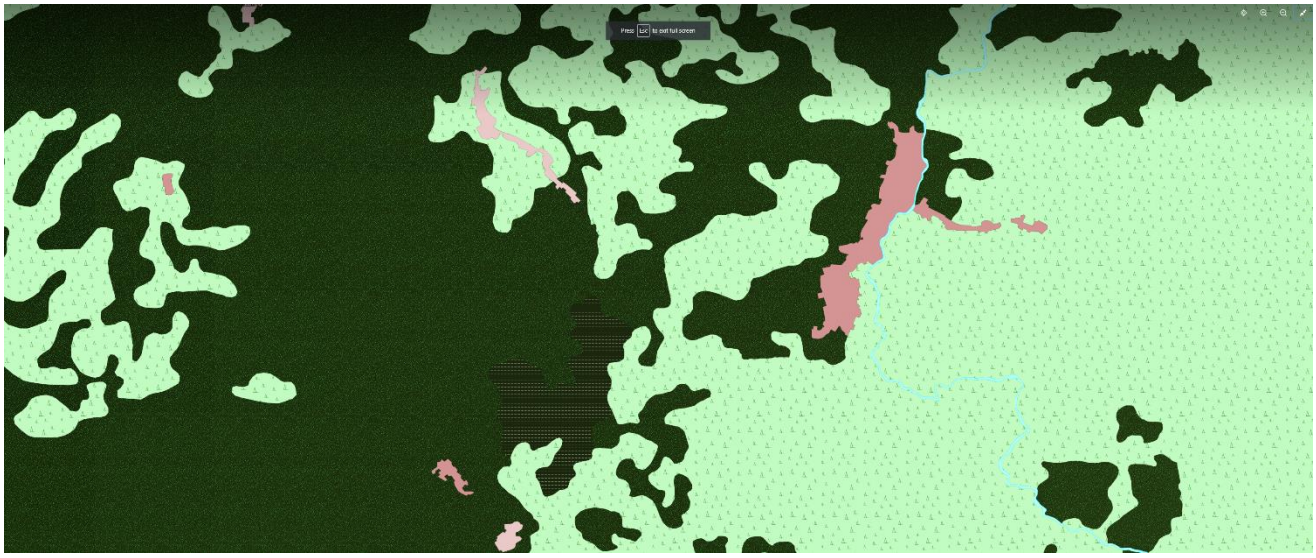

Figure 3: An illustration of MGCP data (LuciadFusion Studio preview).

Add CAD Data in the Hexagon Binz Format

LuciadFusion 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.

The data can be crawled, managed, and served using LuciadFusion Studio. Based on Binz data, a data manager can set up OGC 3D Tiles services. A processing service is included that converts the Binz data into 3D tiles and caches those for optimal streaming performance. Offline processing of Binz data sets into OGC 3D Tiles can be set up via the API.

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

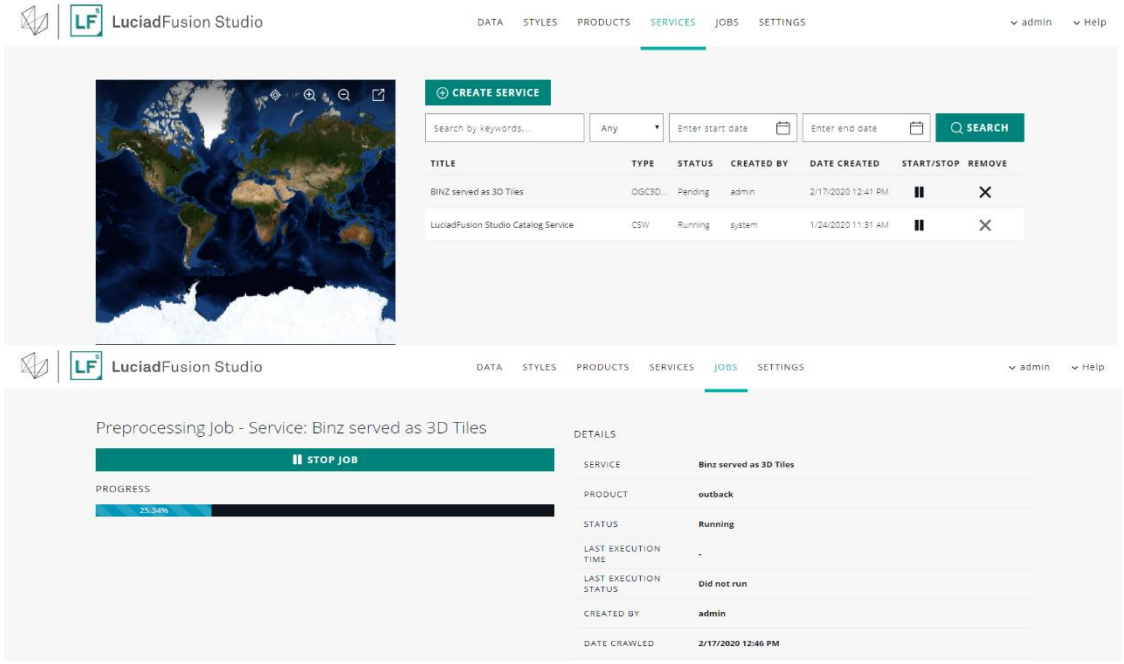

Figure 4: An OGC 3D Tiles service is pending while the Binz data is being processed.

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 reported 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

LuciadFusion 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.

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

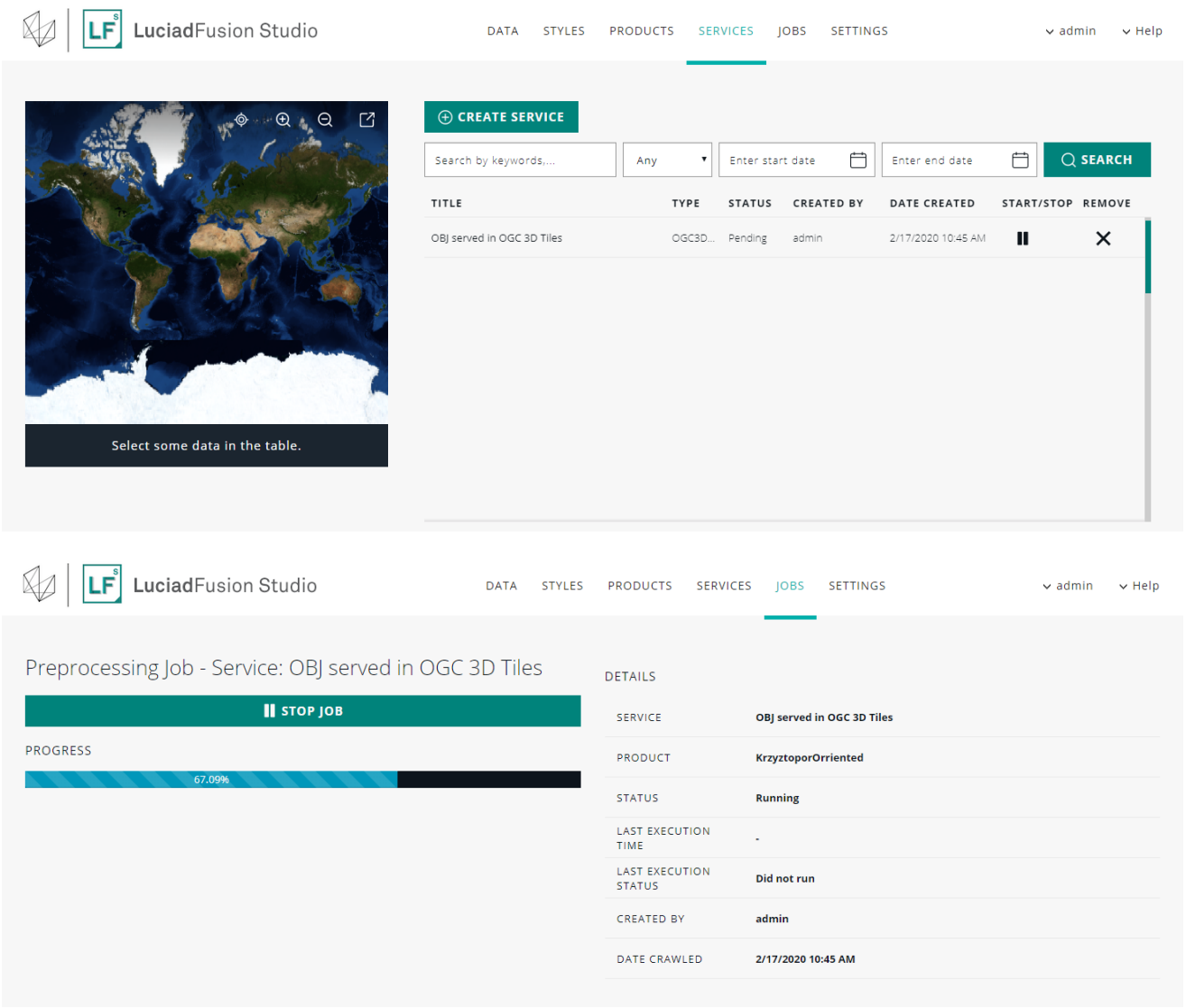

Figure 5: An OGC 3D Tiles service is pending while the 3D data is being processed.

Other Improvements

Support for the Krovak Projection

To better support our customers from the Czech Republic, LuciadFusion 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.

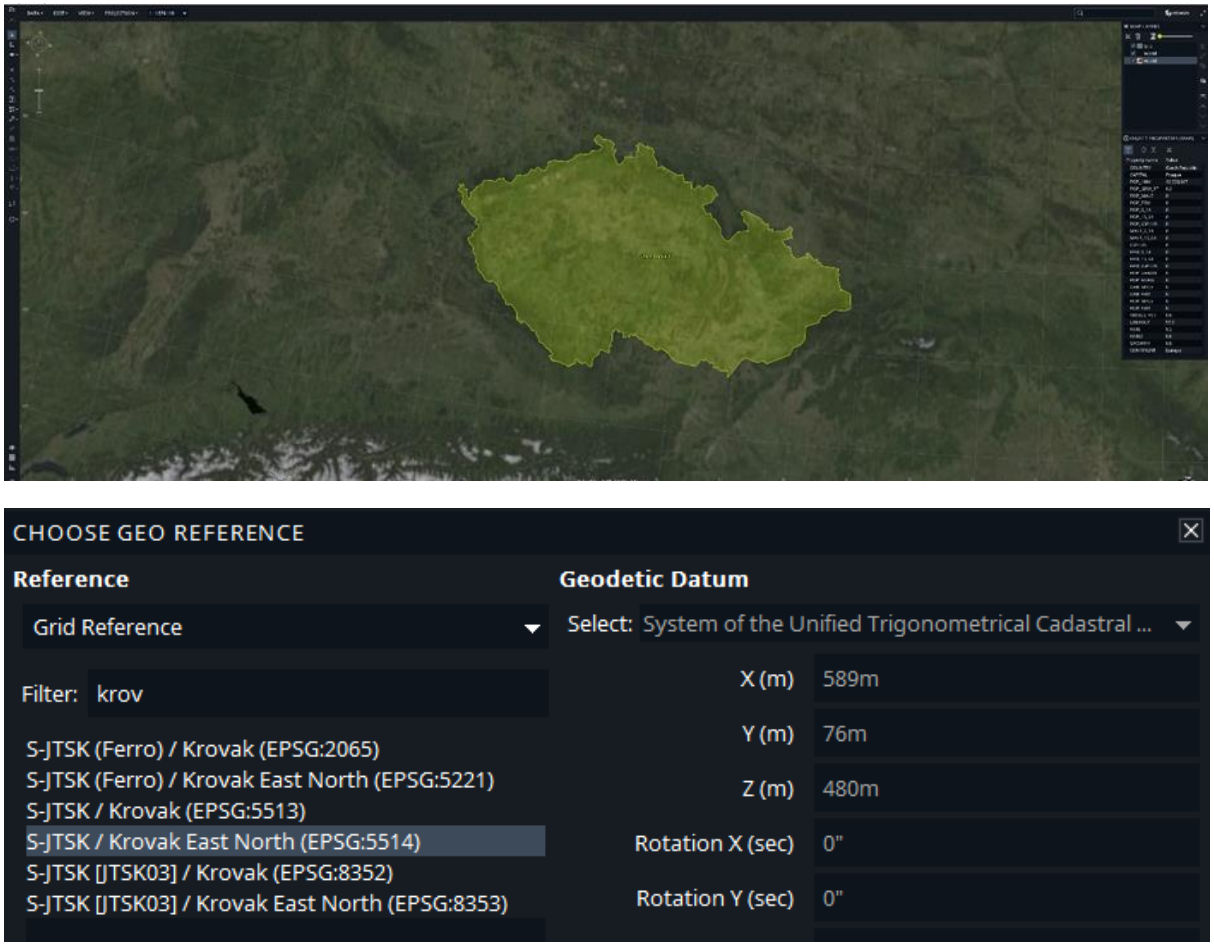

Figure 6: The Krovak projection and related EPSG codes have been added.

SLD/SE

LuciadFusion'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.

Better Integration with Third-Party OGC Clients

LuciadFusion (V2019.1) now offers improved interoperability and added robustness when integrating with third-party OGC clients. This confirms our commitment to interoperability and open standards and is of particular interest to customers using LuciadFusion in combination with GeoMedia (part of the Power Portfolio), QGIS, or ArcGIS.

Product Packaging Change

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

HEXAGON

✓ 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			○

About Hexagon

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.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 20,000 employees in 50 countries and net sales of approximately 4.3bn USD. Learn more at hexagon.com and follow us @HexagonAB.

Copyright

© 2020 Hexagon AB and/or its subsidiaries and affiliates. All rights reserved. Hexagon has registered trademarks in many countries throughout the world. Visit the Trademarks Page http://www.hexagongeospatial.com/legal/trademarks for information about the countries in which the trademarks are registered. See Product Page and Acknowledgments for more information.

Product Documentation Terms of Use

PLEASE READ THESE TERMS CAREFULLY BEFORE USING HEXAGON GEOSPATIAL'S DOCUMENTATION ("DOCUMENT"). USE OF THIS DOCUMENT INDICATES ACCEPTANCE OF THIS AGREEMENT WITHOUT MODIFICATION. IF YOU DO NOT AGREE TO THE TERMS HEREOF ("TERMS"), DO NOT USE THIS DOCUMENT.

Use Of This Document

All materials in this Document are copyrighted and any unauthorized use may violate worldwide copyright, trademark, and other laws. Subject to the terms of this Agreement, Hexagon Geospatial (a Division of Intergraph Corporation) and Intergraph's subsidiaries ("Intergraph") hereby authorize you to reproduce this Document solely for your personal, non-commercial use. In consideration of this authorization, you agree to retain all copyright and other proprietary notices contained therein. You may not modify the Materials in any way or reproduce or publicly display, perform, or distribute or otherwise use them for any public or commercial purpose, except as specifically authorized in a separate agreement with Hexagon Geospatial.

The foregoing authorization specifically excludes content or material bearing a copyright notice or attribution of rights of a third party. Except as expressly provided above, nothing contained herein shall be construed as conferring by implication, estoppel or otherwise any license or right under any copyright, patent or trademark of Hexagon Geospatial or Intergraph or any third party.

If you breach any of these Terms, your authorization to use this Document automatically terminates. Upon termination, you will immediately destroy any downloaded or printed Materials in your possession or control.

Disclaimers

ALL MATERIALS SUPPLIED HEREUNDER ARE PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. Hexagon Geospatial does not warrant that the content of this Document will be error-free, that defects will be corrected, or that any Hexagon Geospatial Website or the services that make Materials available are free of viruses or other harmful components.

Hexagon Geospatial does not warrant the accuracy and completeness of this Document. Hexagon Geospatial may make changes to this Document at any time without notice.

Limitation Of Liability

IN NO EVENT SHALL HEXAGON GEOSPATIAL BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, OR DAMAGES FOR LOSS OF PROFITS, REVENUE, DATA OR USE, INCURRED BY YOU OR ANY THIRD PARTY, WHETHER IN AN ACTION IN CONTRACT OR TORT, ARISING FROM YOUR ACCESS TO, OR USE OF, THIS DOCUMENT.

Indemnification

You agree to defend, indemnify, and hold harmless Hexagon Geospatial, its officers, directors, employees, and agents from and against any and all claims, liabilities, damages, losses or expense, including reasonable attorneys' fees and costs, arising out of or in any way connected with your access to or use of this Document.

Use Of Software

Use of software described in this Document is subject to the terms of the end user license agreement that accompanies the software, if any. You may not download or install any software that is accompanied by or includes an end user license agreement unless you have read and accepted the terms of such license agreement. Any such software is the copyrighted work of Hexagon Geospatial, Intergraph or its licensors. Portions of the user interface copyright 2012- Telerik AD.

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 Geospatial does not endorse companies or products to which it links.

Third party websites are owned and operated by independent parties over which Hexagon Geospatial has no control. Hexagon Geospatial 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.

Trademarks

The trademarks, logos and service marks ("Marks") displayed in this Document are the property of Hexagon Geospatial, Intergraph or other third parties. Users are not permitted to use Marks without the prior written consent of Hexagon Geospatial, Intergraph or the third party that owns the Mark. "Intergraph" is a registered trademark of Intergraph Corporation in the United States and in other countries. Other brands and product names are trademarks of their respective owners.

Find additional trademark information http://www.hexagongeospatial.com/legal/trademarks.

Procedure For Making Claims Of Copyright Infringement

Notifications of claimed copyright infringement should be sent to Hexagon Geospatial by mail at the following address: Intergraph Corporation, Attn: Intergraph Legal Department, P.O. Box 240000, Huntsville, Alabama 35824.

US Government Restricted Right

Materials are provided with "RESTRICTED RIGHTS." Use, duplication, or disclosure of Materials by the U.S. Government is subject to restrictions as set forth in FAR 52.227-14 and DFARS 252.227-7013 et seq. or successor provisions thereto. Use of Materials by the Government constitutes acknowledgment of Hexagon Geospatial or Intergraph’s proprietary rights therein.

International Use

You may not use or export Materials in violation of U.S. export laws and regulations. Hexagon Geospatial makes no representation that Materials are appropriate or available for use in every country, and access to them from territories where their content is illegal is prohibited.

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

The Materials are subject to U.S. export control and economic sanctions laws and regulations and you agree to comply strictly with all such laws and regulations. In addition, you represent and warrant that you are not a national of, or otherwise located within, a country subject to U.S. economic sanctions (including without

limitation Iran, Syria, Sudan, Cuba, and North Korea) and that you are not otherwise prohibited from receiving or accessing the Materials under U.S. export control and economic sanctions laws and regulations. Hexagon Geospatial makes no representation that the Materials are appropriate or available for use in every country, and access to them from territories where their content is illegal is prohibited. All rights to use the Materials are granted on condition that such rights are forfeited if you fail to comply with the terms of this agreement.

Revisions

Hexagon Geospatial 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.

Applicable Law

This Document is created and controlled by Hexagon Geospatial in the State of Alabama. As such, the laws of the State of Alabama will govern these Terms, without giving effect to any principles of conflicts of law. You hereby irrevocably and unconditionally consent to submit to the exclusive jurisdiction of the United States District Court for the Northern District of Alabama, Northeastern Division, or the Circuit Court for Madison County, Alabama for any litigation arising out of or relating to use of this Document (and agree not to commence any litigation relating thereto except in such courts), waive any objection to the laying of venue of any such litigation in such Courts and agree not to plead or claim in any such Courts that such litigation brought therein has been brought in an inconvenient forum. Some jurisdictions do not allow the exclusions or limitations set forth in these Terms. Such exclusions or limitations shall apply in all jurisdictions to the maximum extent allowed by applicable law.

Questions

Contact us https://www.hexagongeospatial.com/about-us/our-company/contact-us with any questions regarding these Terms.