Release Guide

LuciadCPillar 2020.0

4 March 2020

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Introduction

Hexagon's Geospatial division is adding a new product to the Luciad Portfolio: LuciadCPillar. LuciadCPillar is Hexagon's answer to the growing demand for a mission-critical desktop API for the C++/C# community.

LuciadCPillar is a modular and extensible desktop solution for geospatial situational awareness. Users can bring a variety of data sources together on a common operational map.

LuciadCPillar provides the foundation for advanced geospatial applications, focusing on needs within the defense domain. Developers can create high-performance Command and Control and location intelligence applications thanks to the clean design and modular structure of the LuciadCPillar API. This configurable API enables you to integrate a visualization component, add support for custom data or databases, apply your own custom data styling and symbology, or match the user interface and look and feel to your company's unique needs and style. Data can be explored in a 2D or 3D map view.

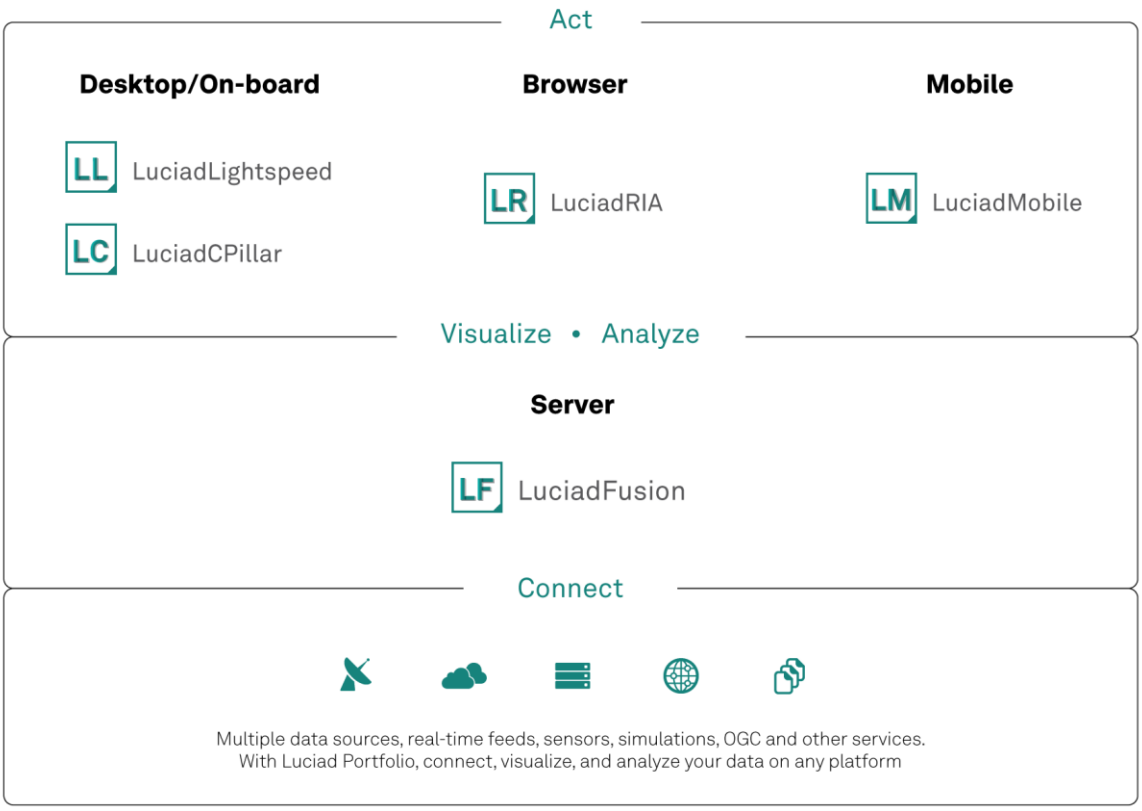


Figure 1 The Luciad Product Portfolio

LuciadCPillar will be released in its Pro Tier first, and the defense symbology option will be included for our initial customers.

Benefits of the New Features

Leverage Your Expertise in C++ And C#

It is now possible to optimally integrate the Luciad Portfolio on yet another level. Being a C++ or C# developer, you can now benefit from the proven efficacy of Hexagon Geospatial's mission-critical software while working in your preferred coding environment and using the language and technology you are most proficient in.

One Product, Two APIs
LuciadCPillar offers both C++ and C# APIs. A range of compilers and Integrated Development Environment (IDE) software is supported. Additional details are provided in the product documentation.

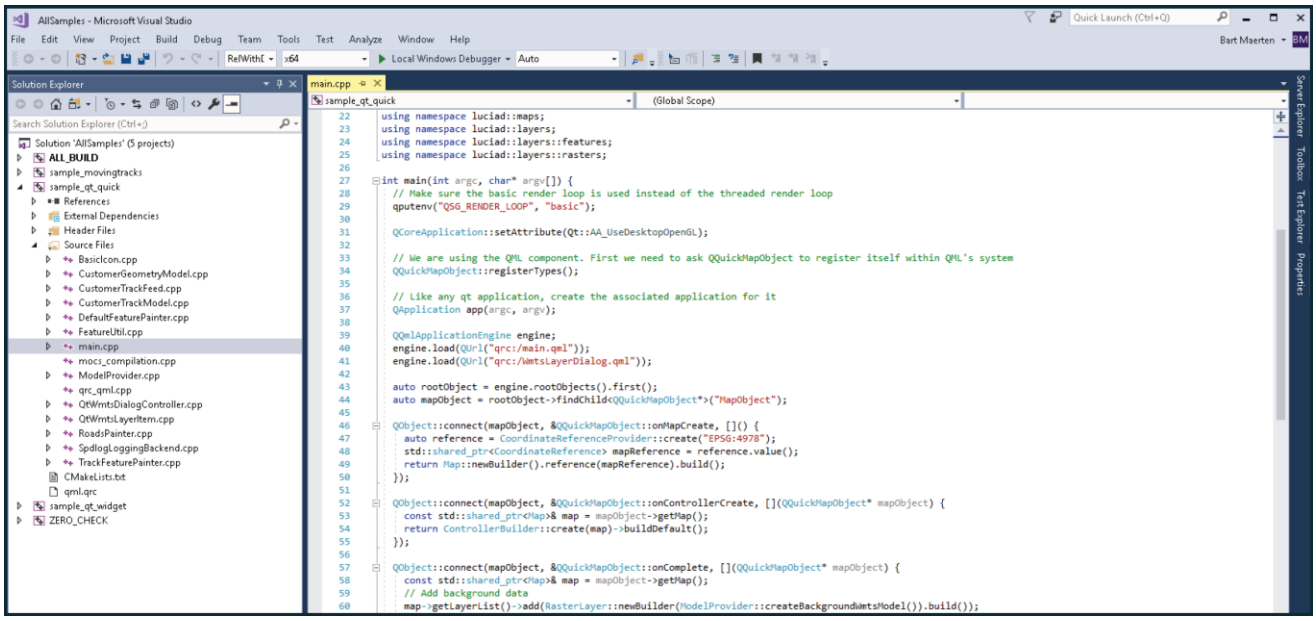


Figure 2: Developers can now create solutions based on the Luciad Portfolio using their preferred coding environment, such as Visual Studio.

Familiar Look and Feel

Using Windows Presentation Foundation (WPF) you can give your application the same traditional look and feel as a Windows desktop solution.

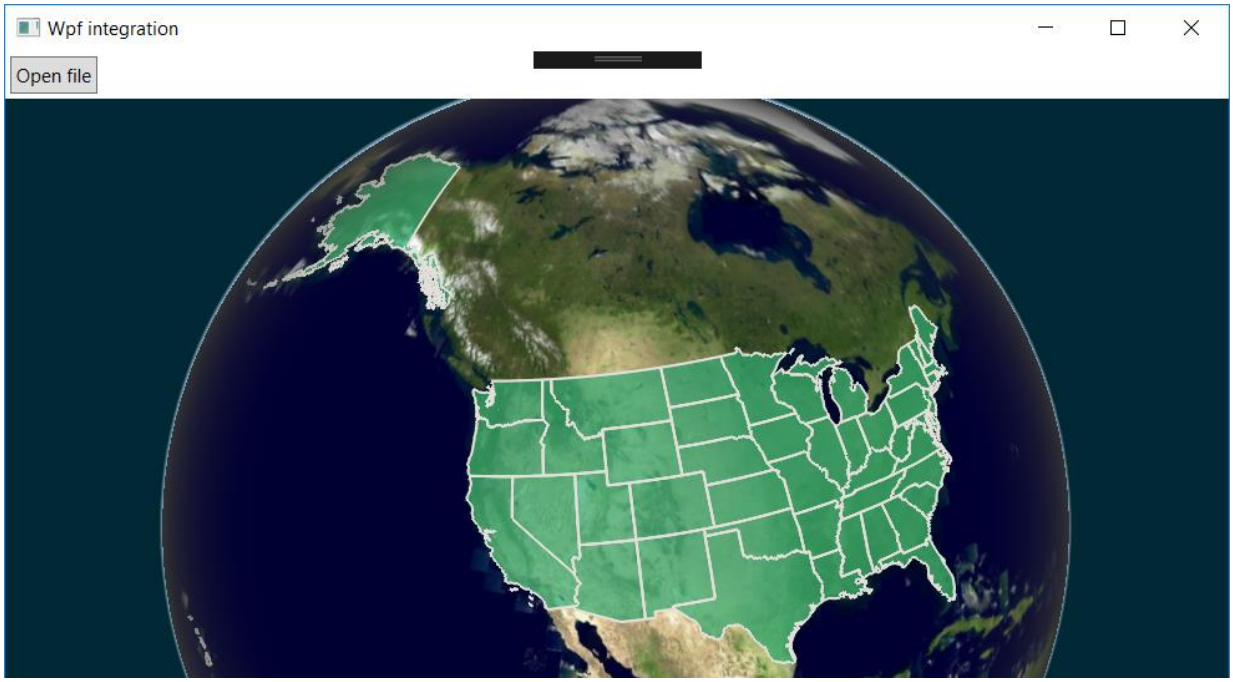


Figure 3: LuciadCPillar pre-integrates with Windows Presentation Foundation.

Using Qt Quick or Qt Widgets, you can create cross-platform applications.

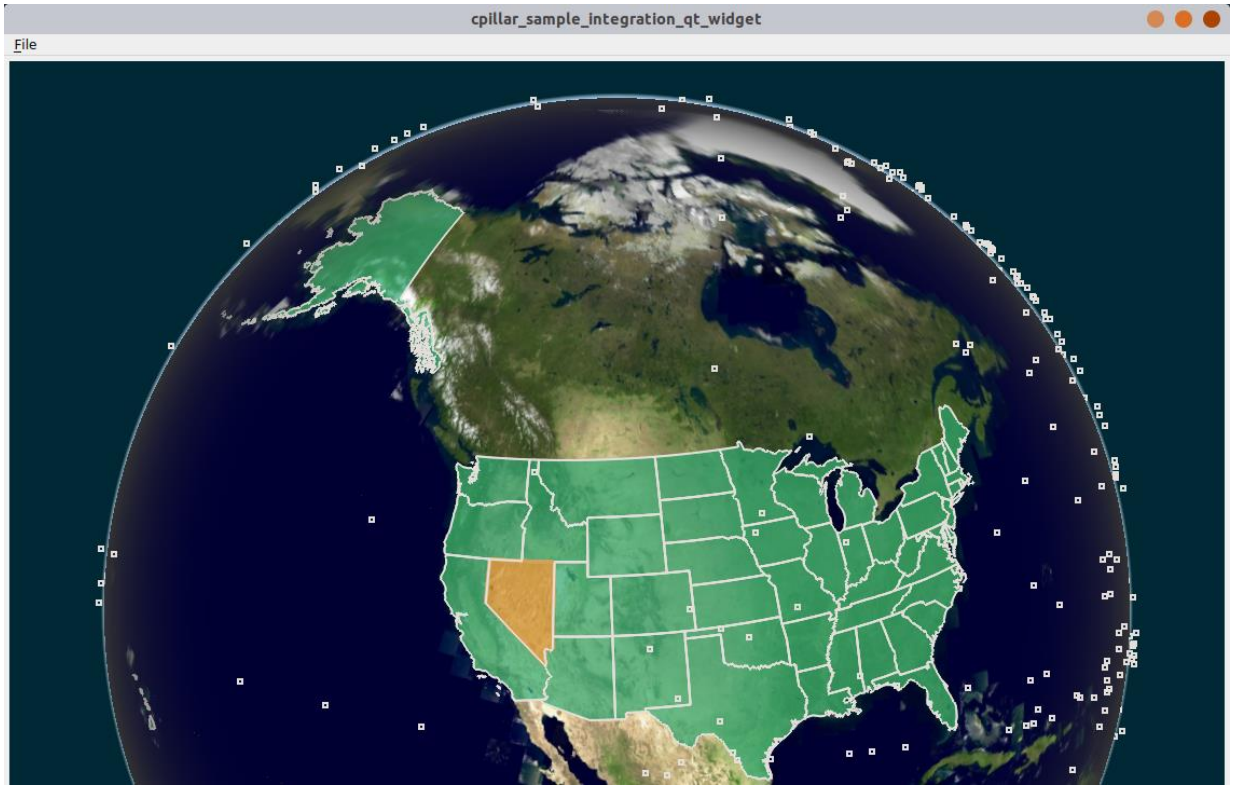


Figure 4: LuciadCPillar pre-integrates with Qt Widgets.

Integration with WPF and Qt is delivered as a product feature. Dedicated map components are provided for Qt Widgets, Qt Quick, and WPF to ensure seamless integration of the LuciadCPillar map into your application. If neither WPF nor Qt is a good fit for your application, you can integrate your favourite UI toolkit yourself.

Bring Your Own Data

For true situational awareness, you will need to combine various datasets, static and dynamic. This can include vector data, imagery, and elevation data. Data connectors for the Open Geospatial Consortium (OGC) standards WMTS (Web Map Tile Service) and GeoPackage are included.

LuciadCPillar can handle business data from your own databases or in a custom format. You can connect to track feeds to present an up-to-date common operating picture.

Next to the common point, line, and polygon geometries, LuciadCPillar also supports circular arc, arc band, bounds, and ellipse geometries as well as geometry collections. 3D geometries can be derived as extruded shapes.

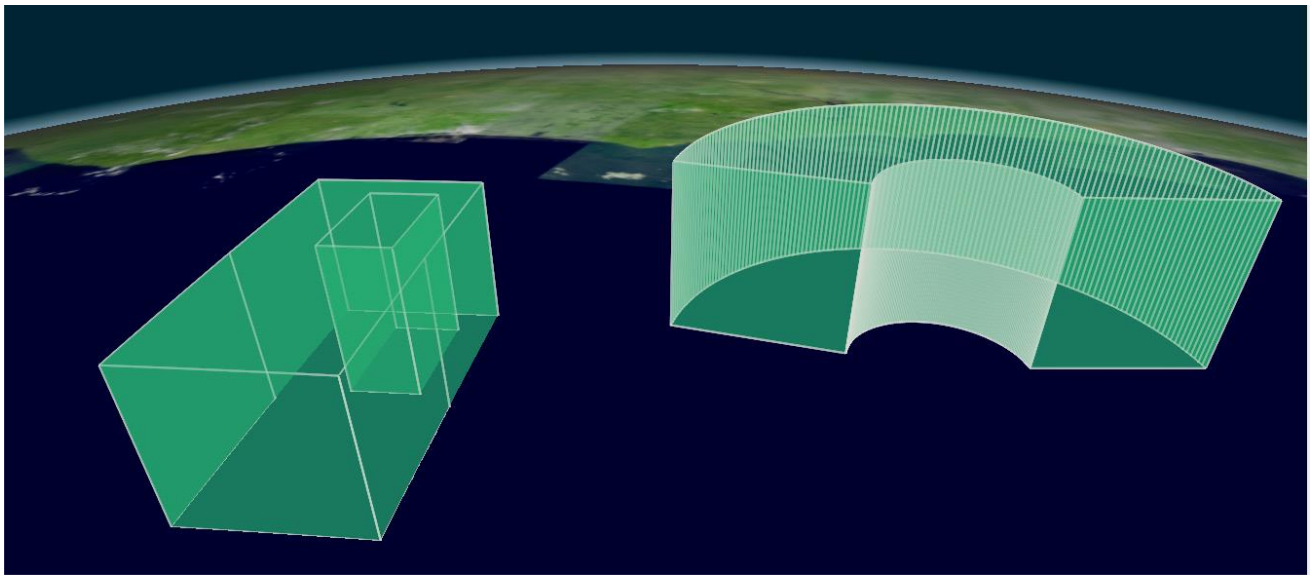


Figure 5: Visualizing extruded shapes in LuciadCPillar.

Expression Framework
The modelling API is designed specifically for efficient big data handling.

Powerful Filtering
LuciadCPillar captures the power of the standardized filter language OGC Filter in its new model API. It now provides access to a wide range of filtering possibilities, going far beyond just spatial queries. Developers can build fine-grain model queries that can filter ID, spatial extent, or a custom property. You also have access to options that can limit the number of features, sort filter results, combine filters, and integrate custom filtering logic.

One of the resulting benefits of these utilities is the ability to filter data at the back end of the model instead of on the client application. A client application can now perform a fine-grained data query on the model. The model can then forward the query to its data back end. This configuration reduces the amount of data queried and stored in memory before you get to the visualization or analysis phase.

Figure 6: Visualization of a large vector data set in LuciadCPillar.

2D and 3D

Full GPU Exploitation
Powerful graphics processing units (GPUs) are now widely available, and the GPU platform has become key in addressing requirements for performance, interactivity, and analytics in light of the big data challenge. Hexagon Geospatial has exploited GPU capabilities for many years in its desktop, browser, and server products. We now bring these capabilities to C++ and C# developers.

2D and 3D View Toggle
The same code can be used for both 2D and 3D visualization with a simple map configuration that can easily be switched.

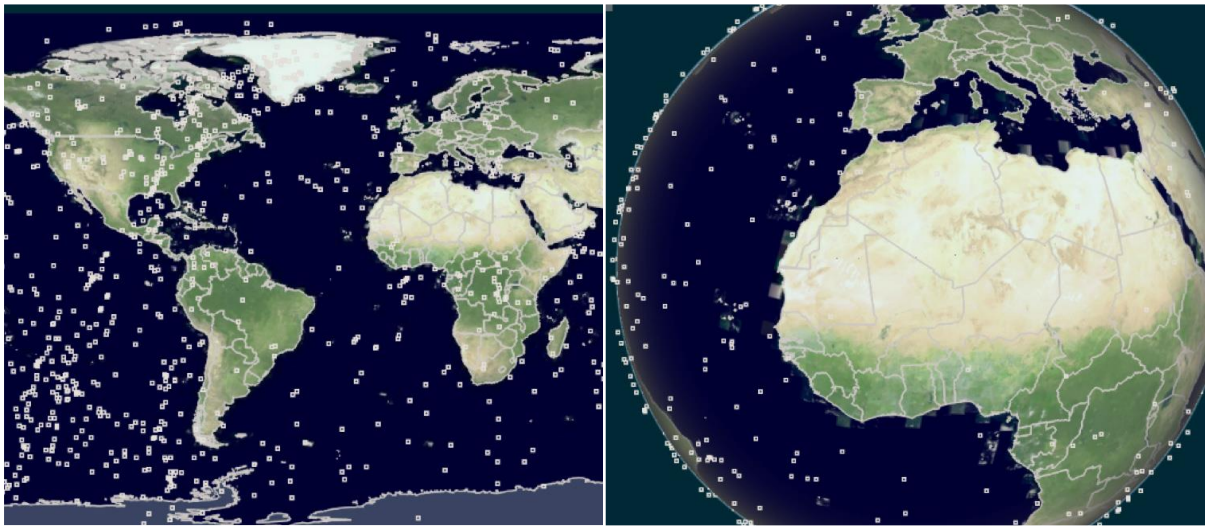


Figure 7: LuciadCPillar supports both 2D and 3D visualization with the same code path.

3D Terrain and Draping
One of the perks of 3D visualization is the ability to render terrain features realistically based on elevation data taken from the area. LuciadCPillar can connect to, visualize, and examine the elevation data in your application. Using the same API as the one used for 2D visualization, the product automatically drapes any data with any style in 3D so that it follows the terrain. LuciadCPillar combines high performance and quality in its visualization of draped data.

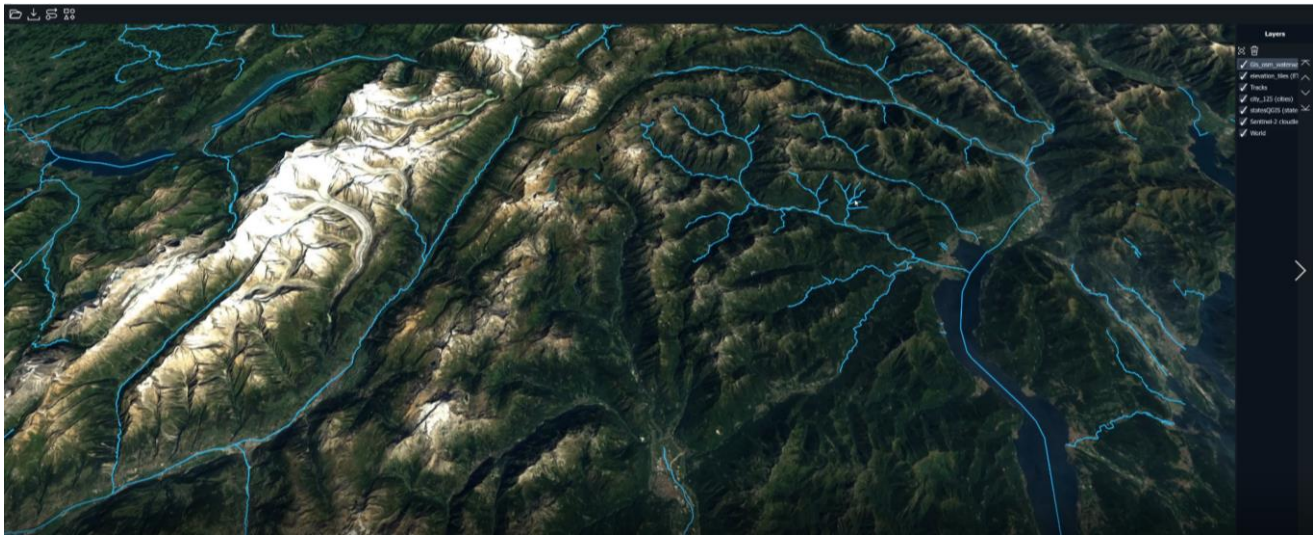


Figure 8: LuciadCPillar automatically drapes any data on 3D terrain.

Track Display

LuciadCPillar is designed specifically to handle information in 4D and beyond. This means that both static and dynamic information can be integrated. The product is specifically suited for the creation of Common Operating Pictures (COP) or Recognized Air Pictures (RAP). A high number of tracks can be visualized and updated in real time or simulated in fast time, based on a recording. This live feed can be combined with background imagery and vector data, either procured locally or provided by an OGC-compliant service.

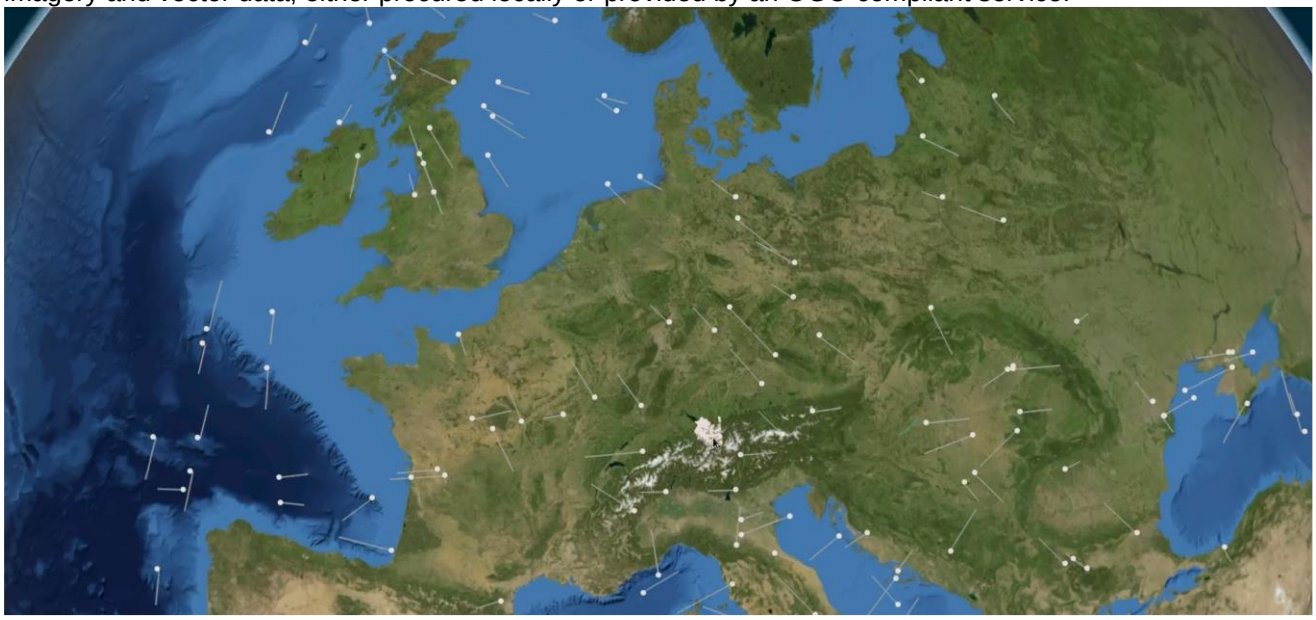


Figure 9: LuciadCPillar is especially suited for track display.

Custom Styling

Multi-Layered Visualization
Apply flexible styling such as icons, line styles, fill styles, and transparency to your data and customize it via the API.

Geodesy Projections

On-the-Fly Map Transformations
LuciadCPillar allows you to transform maps seamlessly within your C++ or C# based desktop application. You can visualize data in any EPSG projection, view accurate geodetic lines, and warp raster data.

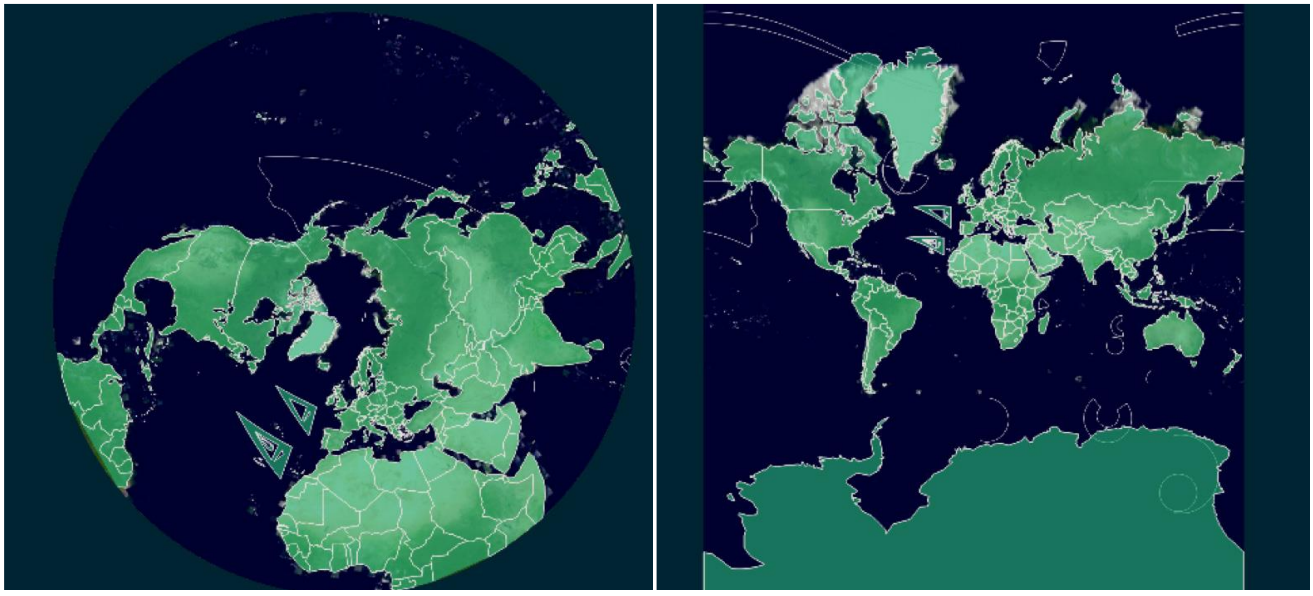


Figure 10: LuciadCPillar represents data in any coordinate reference system and in any projection.

Military Symbology

Military Unit Symbols
LuciadCPillar supports the military unit symbols compliant with the MIL-STD 2525b, 2525c, and 2525d standards developed by the United States Department of Defense and the APP-6A, 6B, 6C, and 6D military standards developed by NATO. The unit symbols are available offline, without the need for a server.

There is dedicated API, including a domain model, that facilitates the handling of the SIDC codes. Tactical graphics will be present in a next release.

Figure 11 Military unit symbol support is illustrated in a dedicated sample

Cross-Platform

Windows and Linux
Develop your application once and deploy on both Windows and Linux. Choose the C++ API in combination with Qt or your own cross-platform UI toolkit.

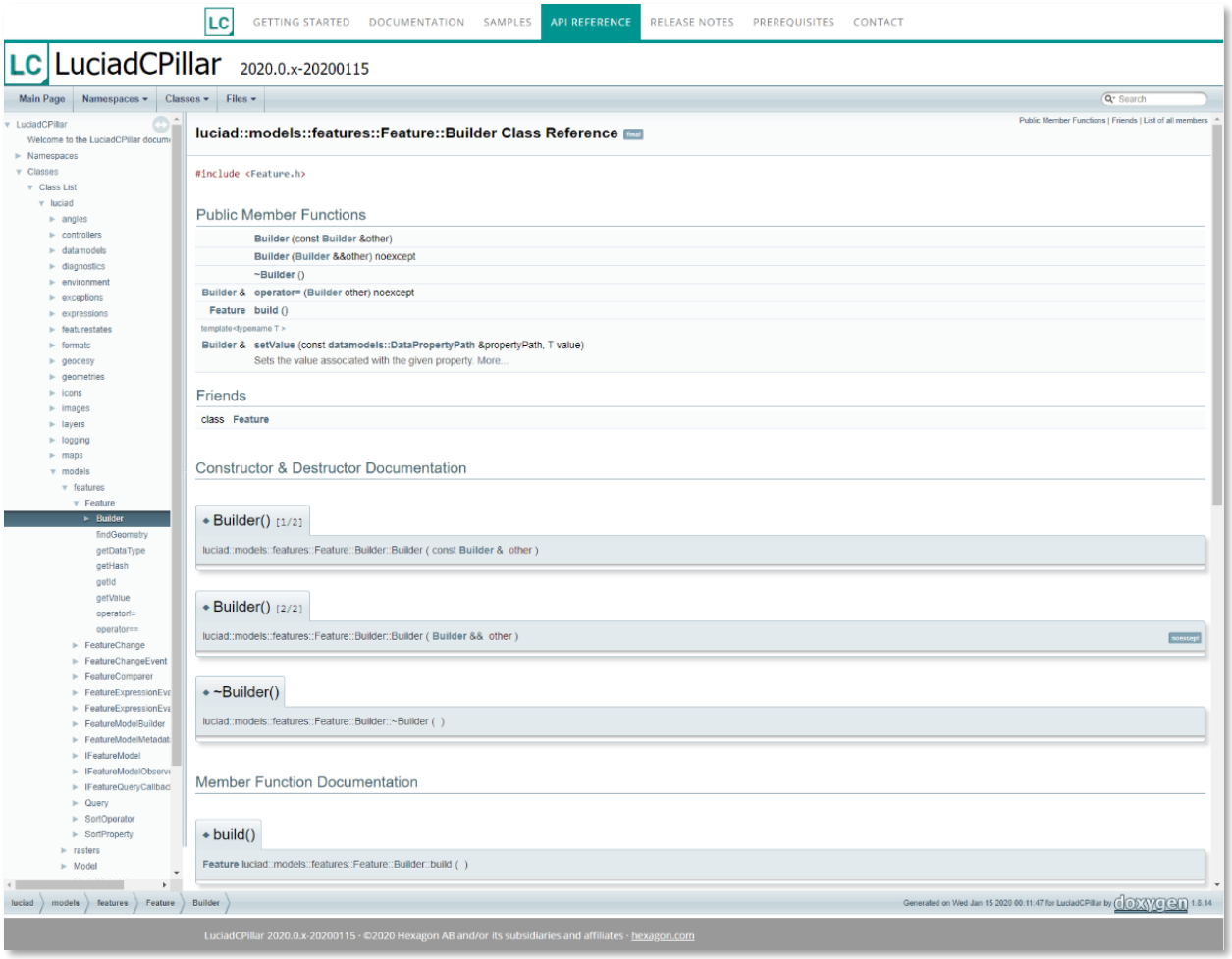
Platform	Version	Operating System Architecture	Supported GPU Vendors
Windows	Windows 10 and later	64-bit	NVIDIA, AMD, Intel HD
Linux	Various distributions	x86-64	NVIDIA, AMD

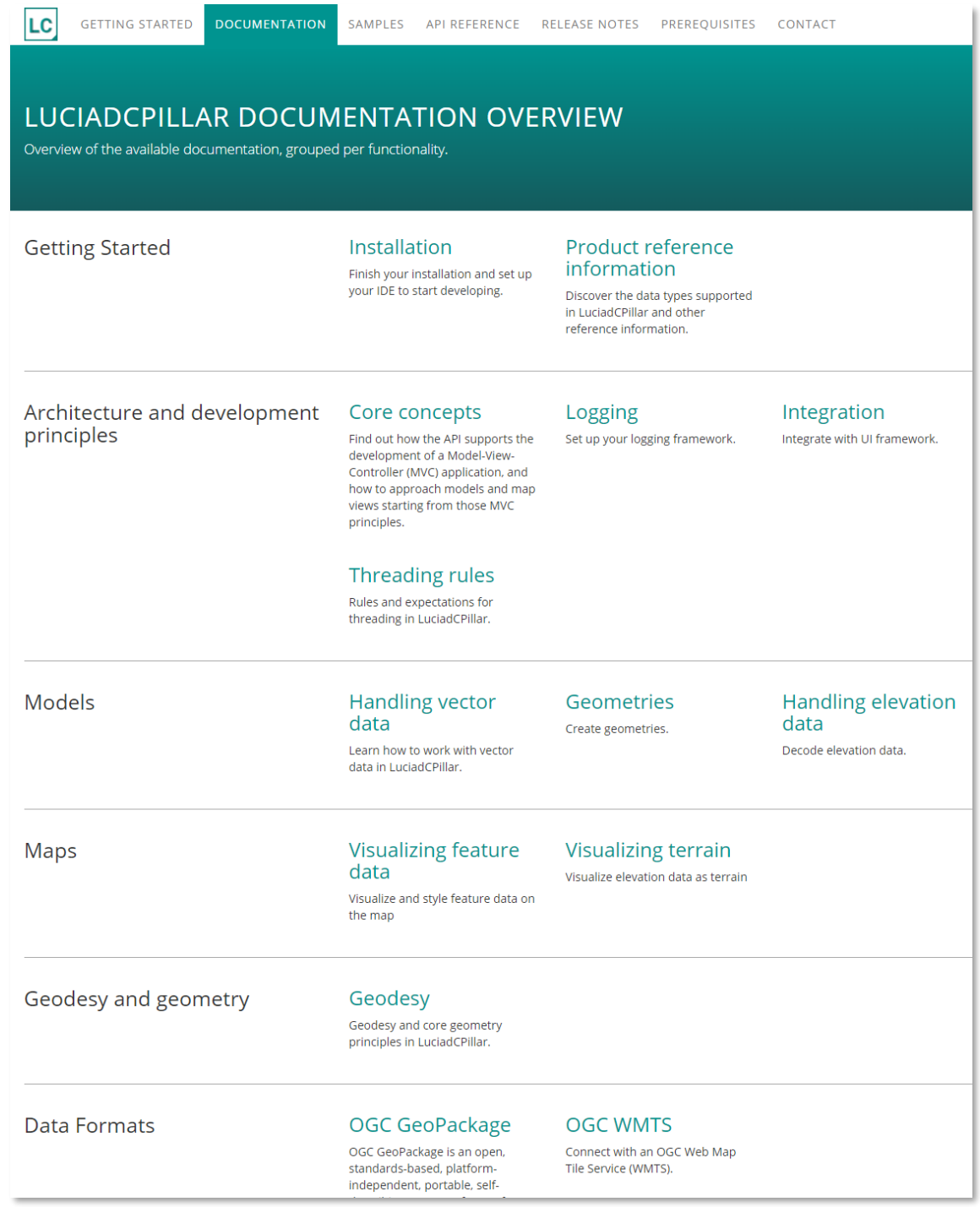
Documentation and Samples

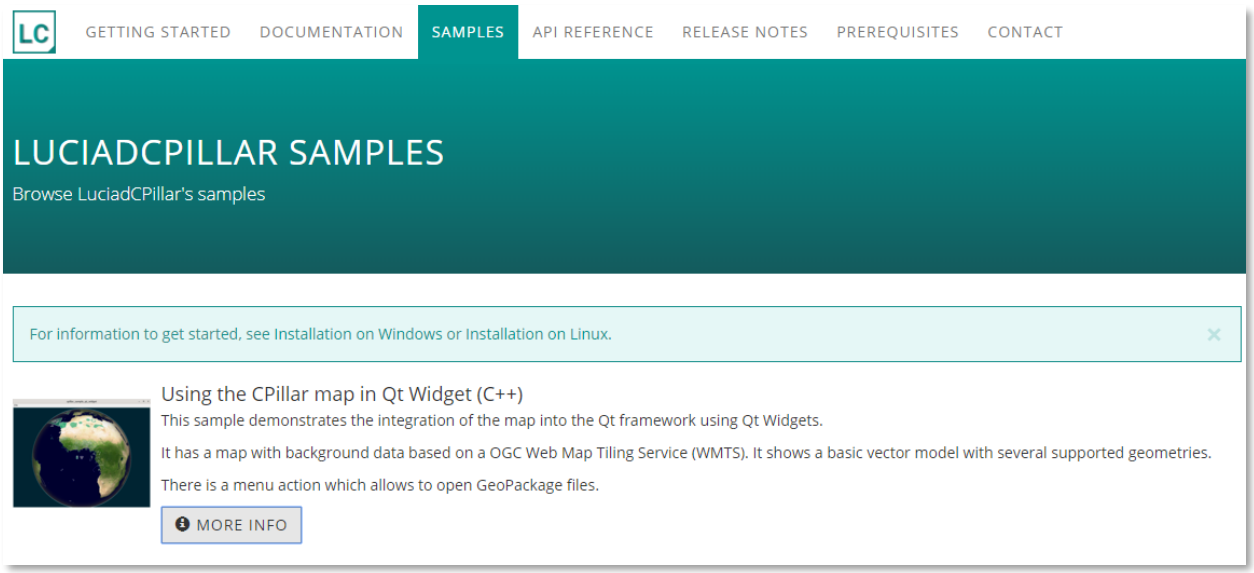
The developer documentation offers component-level descriptions and is accessible online.

All documentation will also be added to the Luciad Developer Platform, the information portal for the users of the Luciad Portfolio.

A range of samples illustrates the best practices for using the LuciadCPillar API.




LC
GETTING STARTED
DOCUMENTATION
SAMPLES
API REFERENCE
RELEASE NOTES
PREREQUISITES
CONTACT
LUCIADCPILLAR DOCUMENTATION OVERVIEW
Overview of the available documentation, grouped per functionality.
Getting Started
Installation
Finish your installation and set up your IDE to start developing.
Product reference information
Discover the data types supported in LuciadCPillar and other reference information.
Architecture and development principles
Core concepts
Find out how the API supports the development of a Model-View-Controller (MVC) application, and how to approach models and map views starting from those MVC principles.
Logging
Set up your logging framework.
Integration
Integrate with UI framework.
Threading rules
Rules and expectations for threading in LuciadCPillar.
Models
Handling vector data
Learn how to work with vector data in LuciadCPillar.
Geometries
Create geometries.
Handling elevation data
Decode elevation data.
Maps
Visualizing feature data
Visualize and style feature data on the map
Visualizing terrain
Visualize elevation data as terrain
Geodesy and geometry
Geodesy
Geodesy and core geometry principles in LuciadCPillar.
Data Formats
OGC GeoPackage
OGC GeoPackage is an open, standards-based, platform-independent, portable, self-
OGC WMTS
Connect with an OGC Web Map Tile Service (WMTS).



Hardware and Software Requirements

Recommended System Requirements
For new hardware purchases, we recommend the following system configuration:

- OpenGL: 4.1 or above
- Dedicated graphics memory: 1 GB or more
- Graphics card: on Windows, and especially on Linux, a recent NVIDIA (or AMD) GPU
    - GeForce GTX 6xx or better
    - Quadro Kxxxx or better
- CPU: quad-core
- Main memory: 4 GB or more

With these system specifications, you can run any LuciadCPillar application with optimal speed and performance.

Software Requirements

- The LuciadCPillar C++ library targets the C++17 standard.

Windows (C++)

- Windows 10
- Visual Studio 2017, vc15.7 or newer
- CMake 3.10 or newer
- Qt5.12.x (LTS) for C++ samples
    - Install using the online installer from https://www.qt.io/download

Windows (C#)

- Windows 10
- Visual Studio 2017, vc15.7 or newer
- CMake 3.10 or newer
- C#, language version 7.0
- NuGet for C# samples

Linux

- gcc 8 or newer
- CMake 3.10 or newer
- Qt5.12.x (LTS) for C++ samples
    - Install using the online installer from https://www.qt.io/download
- Various distributions
    - RHEL 7.4
    - OpenSUSE Leap 15.0
    - Ubuntu 18.04

Interested in These New Features?
If you would like to add any of the new features to your existing application, please contact us:
cpillar-support.luciad.gsp@hexagon.com

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