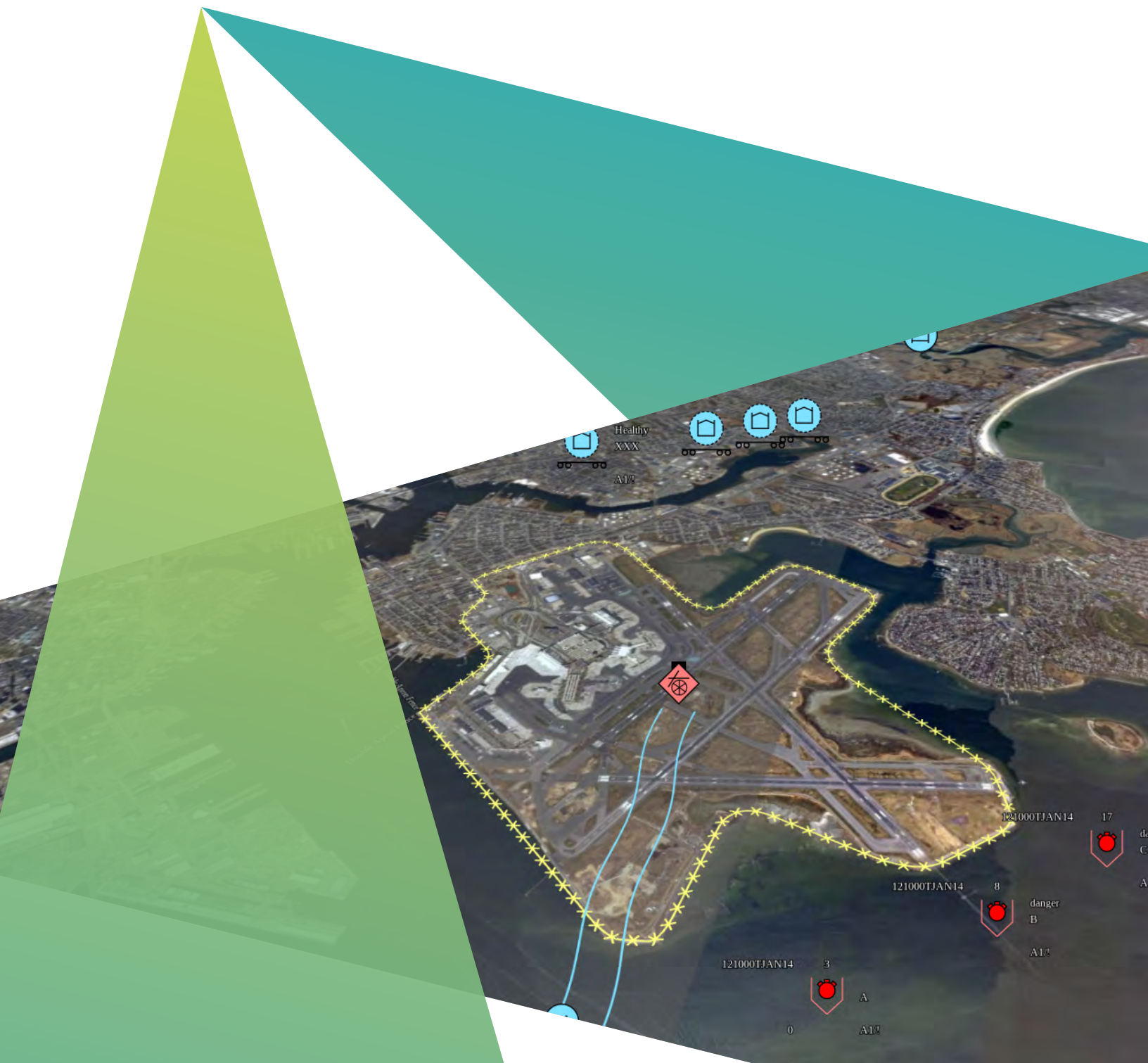# LuciadCPillar

A powerful desktop and onboard API for C++ and C# developers to support mission-critical solutions

LuciadCPillar is Hexagon's answer to the growing demand for a mission-critical desktop API for the C++/C# developer community. LuciadCPillar is a modular and extensible desktop and onboard 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. Developers can create high-performance C2 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.

Who needs the LuciadCPillar desktop and onboard solution?

These are just a few examples of why users turn to LuciadCPillar for their geospatial data challenges:

- You need to build a C++ or C# mission-critical desktop-based solution that handles geospatial data with the accuracy required for mission planning

- You work with tactical plans, including MS2525 and APP6 and need support for display and on-map creation of both unit symbols and tactical graphics

- You are faced with real-time dynamic data, such as flights, vessels, or people with tens of thousands of moving assets

- You work with data and maps in different projections (including 3D, but also 2D projections) without going through the process of extract-transform-load (ETL)
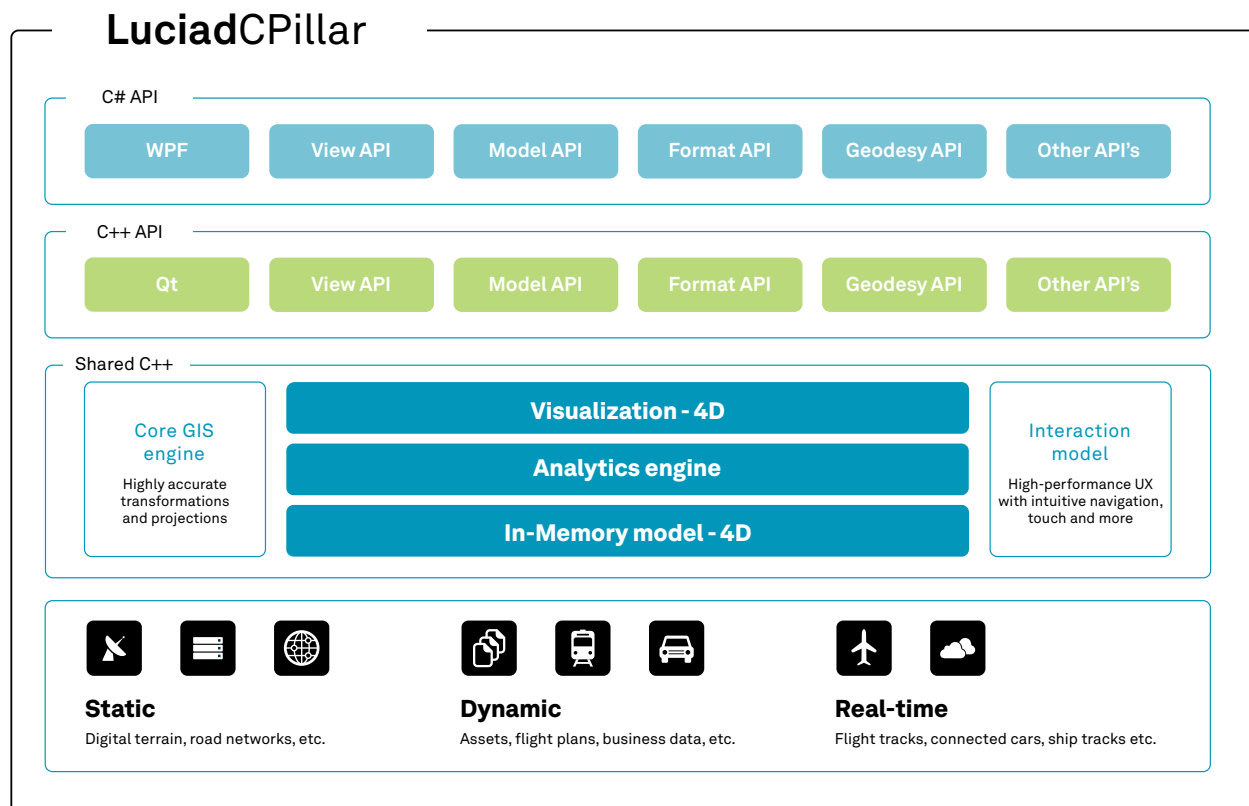

Figure 1 - LuciadCPillar is a modular and extensible desktop and onboard solution for geospatial situational awareness
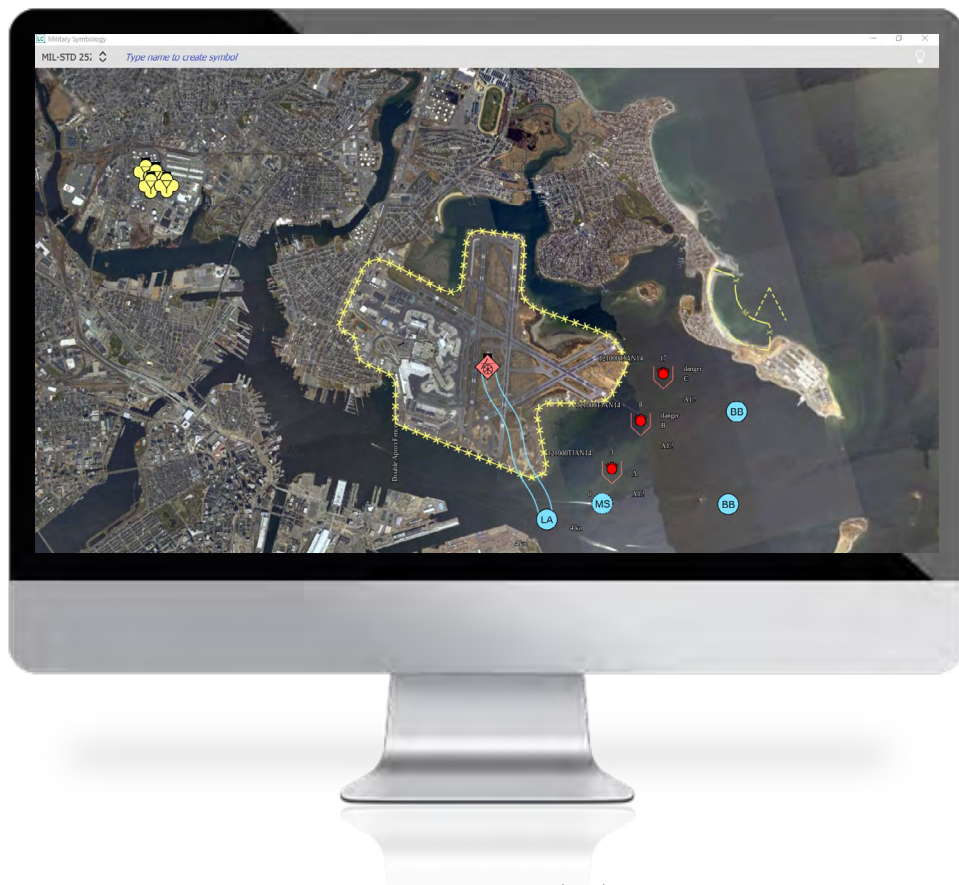
Figure 2 - A LuciadCPillar based Common Operational Picture (COP) including aerial imagery, tactical information and dynamic tracks

Key benefits

Best-in-class performance	Unprecedented user experience with hundreds of thousands of track updates per second and real-time data access without pre-processing.
Retained geospatial positioning accuracy	Ensures precision on a worldwide scale for visualization, transformation, and calculation of any data.
Cross-platform	Develop your application once and deploy on both Windows and Linux. Choose the C++ API in combination with Qt, the C# API in combination with WPF, or integrate your own cross-platform UI toolkit.
Flexibility	Designed to optimize the customizability and interoperability of your applications. Offers one single API for 2D and 3D visualization.
Ease of use and lowest total cost of ownership	Makes for efficient and sustainable applications by enabling rapid development and customization, ensuring source code compatibility.

Overview

LuciadCPillar is offered in the Pro Product Tier and includes all of the functionality listed in the table below.

Legend

✓ Feature included

Functionality	Pro
Core GIS engine	✓
Projected and 3D coordinate reference systems	✓
Transformation and projection engine	✓
4D cartesian and geodesic geometry model	✓
GPU 2D/3D visualization engine	✓
Unified data model	✓
2D/3D/4D interaction model	✓
OGC standards	✓
Vector connectors	✓
Raster connectors	✓
Defense symbology	✓

Functional specification

Below is a high-level, non-exhaustive overview of the components available in LuciadCPillar. You can either use the functionality of these components out-of-the-box or extend them to meet your advanced requirements.
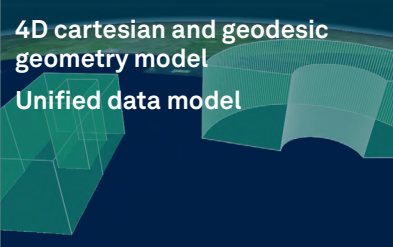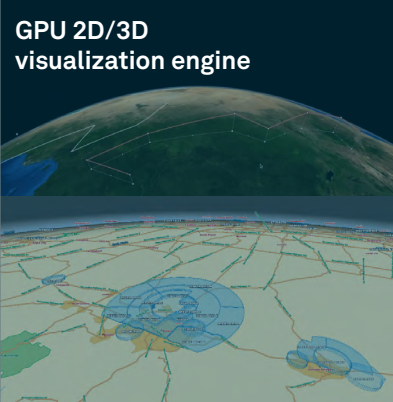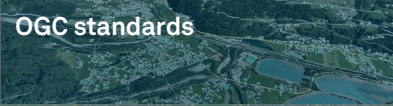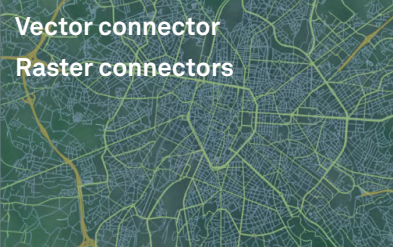
Core GIS engine **Projected and 3D coordinate reference systems** **Transformation and projection engine**	• Access and represent data in any coordinate reference system (geodetic, geocentric, projected). • Perform advanced geodetic calculations and transformations.
4D cartesian and geodesic geometry model **Unified data model**	• Model any data format, represent all object geometries and their metadata, and apply any data filter. • Includes support for complex geometries like composite curves, arcs, arc bands, and so on. • Accurately visualize 3D volumes. • Boost performance with support for concurrent data access and asynchronous painting.
GPU 2D/3D visualization engine	• Visualize data in a multi-layered 2D or 3D view. The same code can be used for both 2D and 3D visualization. • Apply flexible styling (icons, line styles, fill styles, transparency) to your data and customize it using the API. • Add labels to augment the visual information on the geometries of the data with information from data attributes. • High-performance imagery rendering, using multi-leveling and tiling techniques, is integrated in the view. • Terrain rendering is integrated in the view. If elevation data is present, all data, including vector data and dynamic data, can be draped automatically over the terrain. • Dynamically display thousands of moving tracks.
2D/3D/4D interaction model	• Ready-to-use controller functionality includes standard controls (zoom, pan, select), on-map drawing and editing (2D and 3D). • You can easily create other controllers for custom interaction. • Fine-tune navigation using the configurable 3D camera.
OGC standards	• Connect to OGC WMTS and WMS services and data in the OGC GeoPackage format.

Vector connector
 	
Raster connectors
	• Apply multi-leveling and tiling to both raster and vector data.
	• Out-of-the-box native support for:
	  • Raster data: OGC GeoTIFF, WMTS, WMS, GeoPackage image and elevation tiles
	  • Vector data: GeoPackage features, SHP
	• LuciadCPillar's 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.

Defense symbology	• Full support for symbols of the latest military symbology standards, in 2D and 3D. • This support encompasses the lookup, creation, and visualization of military symbols. • Support for unit symbols as well as tactical graphics. • Symbology standards/formats: • APP-6A, APP-6B, APP-6C, APP-6D, MS2525b, MS2525c, MS2525d.

Figure 3 - LuciadCPillar's visualization and analysis capabilities are data-agnostic, so it is complementary with any data format

More information

LuciadCPillar comes with:

- Code samples for all components

- Developer guides with clear explanations and description of best practices

- API reference offering detailed description of all interfaces and classes

- Release notes to see what is new

- Technical notes that describe technical requirementss

To learn more or schedule a demo, contact us at **info.luciad.gsp@hexagon.com**.

For developer guides, code snippets, technical articles, videos and more, visit the **Luciad Developer Platform**.

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 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 21,000 employees in 50 countries and net sales of approximately 3.8bn EUR. Learn more at **hexagon.com** and follow us @HexagonAB.