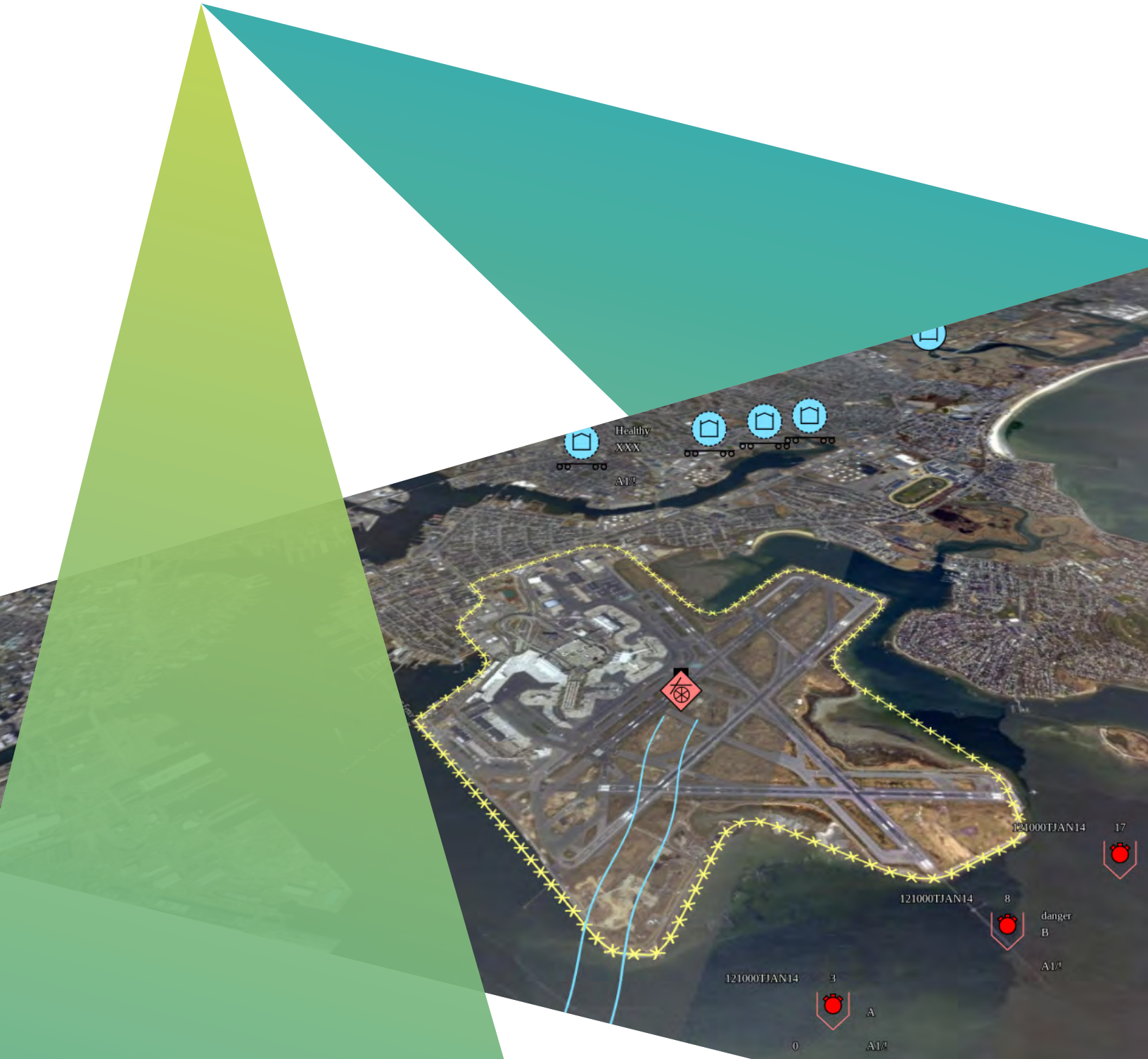
HEXAGON

Brochure

LuciadCPillar

A powerful set of cross-platform APIs to support mission-critical solutions



LuciadCPillar is Hexagon's answer to the growing demand for a mission-critical desktop API for the C++/C#/ Android developer community. LuciadCPillar is a modular and extensible cross-platform solution for geospatial situational awareness. Users can bring a variety of data sources together in a common operational picture (COP).

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 cross-platform 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 need to build a touch-based Android application specifically designed for situational awareness in the field, including disconnected environments
- You work with tactical plans, including MS2525 and APP6 and need support for display and on-map creation of 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) without going through the extract-transform-load (ETL) process
- You need to prepare your mission data and transfer data packages to Android devices

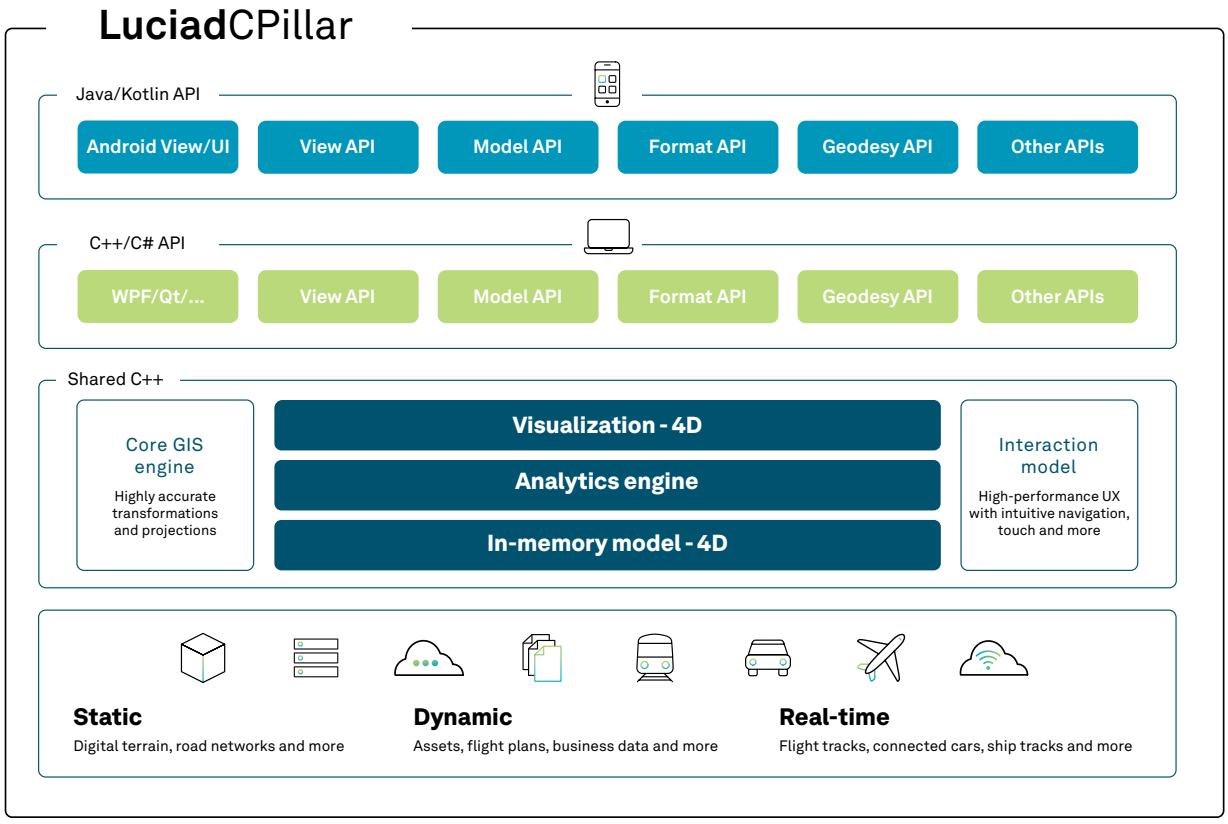


Figure 1 - LuciadCPillar is a modular and extensible cross-platform solution for geospatial situational awareness.

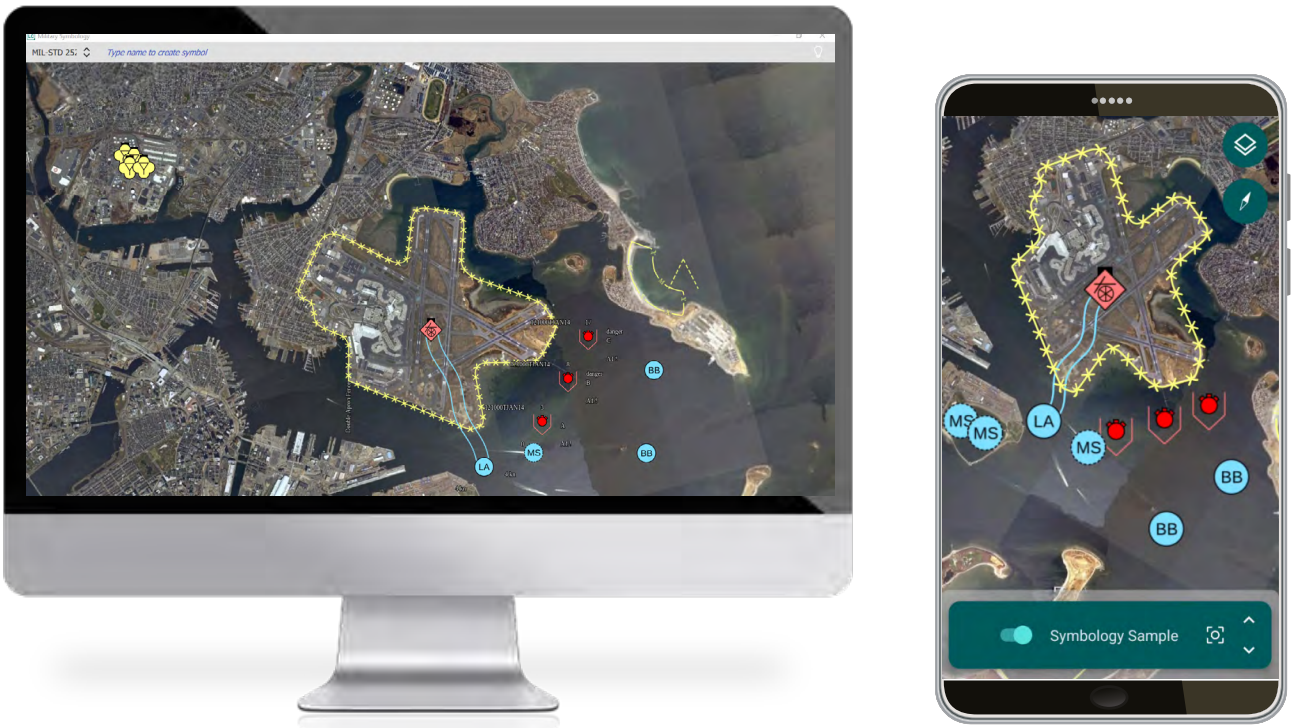


Figure 2 - A LuciadCPillar-based desktop and mobile Common Operational Picture (COP) including aerial imagery, tactical information and dynamic tracks

Key benefits

Best-in-class performance	Provides 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	Allows you to deploy your application on Windows Linux and Android. Choose the C++ API in combination with Qt, the C# API in combination with WPF or integrate your own cross-platform UI toolkit. The Android API allows you to develop in Java or Kotlin in combination with Android Views or Jetpack Compose.
Flexibility	Optimizes the customizability and interoperability of your applications and offers one single API for 2D and 3D visualization
Ease of use and lowest total cost of ownership	Creates 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 functionality listed in the table below.
All programing languages and platforms are supported with the same LuciadCPillar developer license.

Legend

✓ Feature included

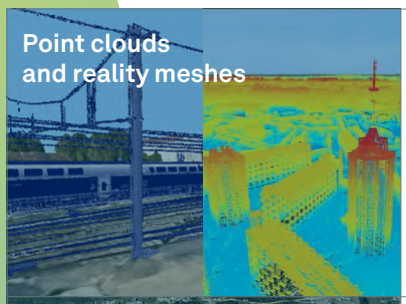
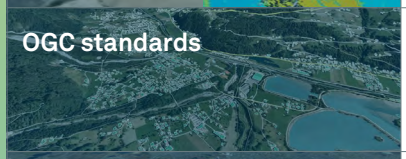
Functionality	Pro
Core GIS engine	✓
Projected and 3D coordinate reference systems	✓
Transformation and projection engine	✓
4D cartesian and geodesic geometry model	✓
GPU 2D/3D visualization engine	✓
Unified data model	✓
2D/3D/4D interaction model	✓
Vector connectors	✓
Raster connectors	✓
Point clouds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

Functional specification

Below is a high-level, non-exhaustive overview of the components available in LuciadCPillar. You can 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 and projected) • Perform advanced geodetic calculations and transformations
4D cartesian and geodesic geometry model **Unified data model**	• Model any data, represent all object geometries and their metadata and apply any data filter • Gain support for complex geometries like composite curves, arcs, arc bands and more • 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 using the same code and support HiDPI displays • Apply flexible styling (icons, line styles, fill styles and 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 • Integrate high-performance imagery rendering with multi-leveling and tiling techniques in the view • Render elevation data as terrain in the view and drape other data over the terrain, including raster data, vector data and dynamic data • Display thousands of moving tracks dynamically
2D/3D/4D interaction model	• Use controller functionality out of the box, including standard controls (zoom, pan and select), on-map drawing and editing in 2D and 3D and benefit from touch-based interaction • Create other custom interaction controllers easily • Fine-tune navigation using the configurable 3D camera

Vector connector
Raster connectors
	• Apply multi-leveling and tiling to both raster and vector data
	• Gain out-of-the-box native support for:
	  • Raster data: OGC GeoTIFF, WMTS, WMS, GeoPackage image and elevation tiles
	  • Vector data: GeoPackage features, SHP
	• Add support for new, custom data formats easily

	• Connect to and visualize unlimited point clouds and reality meshes • Load 3D tiles smartly and apply visual effects for more realism • Style and filter point clouds based on expressions • Combine 3D data with terrain, other geodata and annotations • Add HSPC and 3D tiles, including Draco compression • Stream additional data formats as 3D tiles via LuciadFusion: OSGB, LAS, LAZ, Binz, IFC
	• Connect to OGC WMTS and WMS services and data in the OGC GeoPackage format

	• Adhere to the latest military symbology standards in 2D and 3D
	  • Lookup, creation and visualization of military symbols
	  • 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:

- Configurable documentation for the supported languages and platforms; documentation is available for Desktop C++/C# and Android Java
- Code samples for all main features
- Developer guides with clear explanations and description of best practices
- API reference offering detailed descriptions of all interfaces and classes
- Release notes to see what is new
- Technical notes that describe technical requirements

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 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. Learn more at hexagon.com and follow us @HexagonAB.