BROCHURE

Octave Alto Universal

Powerful set of cross-platform APIs to support mission-critical solutions

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

Alto Universal 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 Alto Universal API. This configurable SDK 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 2D or 3D depending on the map view configuration.

Who needs the Alto Universal cross-platform solution?

These are just a few examples of why users turn to Alto Universal 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

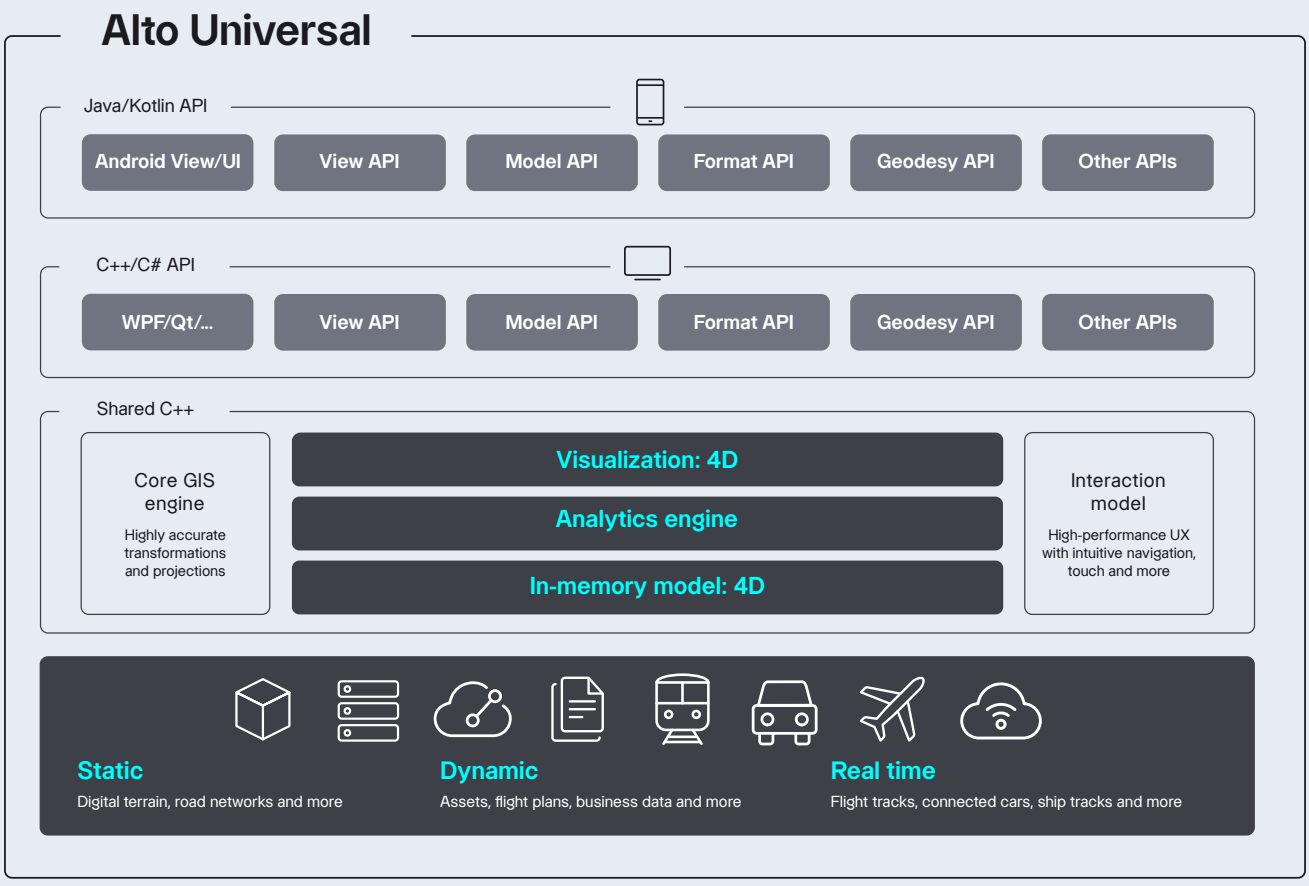


Figure 1: Alto Universal is a modular and extensible cross-platform solution for geospatial situational awareness.

Figure 2: An Alto Universal-based desktop and mobile 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 WinUI 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 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

Alto Universal 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 Alto Universal developer license.

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	✓
Customizable styling	✓
Unified data model	✓
2D/3D/4D interaction model	✓
Vector connectors	✓
Raster connectors	✓
Point clouds and reality meshes	✓
OGC standards	✓
Defense symbology	✓

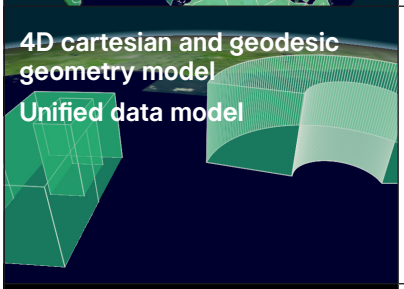
Legend

✓ Feature included

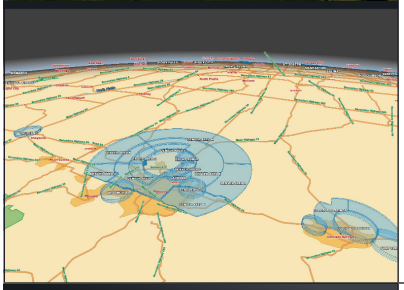
Functional specification

Below is a high-level, non-exhaustive overview of the components available in Alto Universal. You can use the functionality of these components out of the box or extend them to meet your advanced requirements.

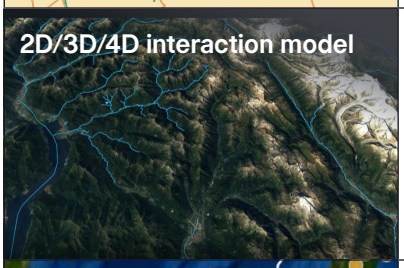
- Access and represent data in any coordinate reference system (geodetic, geocentric and projected)
- Perform advanced geodetic calculations and transformations



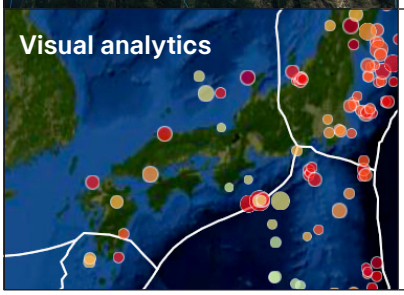
- Model any data, represent all object geometries and their metadata and apply any data filter
- Gain support for complex geometries like composite curves, arcs, arc bands and more
- Accurately visualize 3D volumes
- Boost performance with support for concurrent data access and asynchronous painting



- Visualize data in a multilayered 2D or 3D view using the same code and support HiDPI displays
- Benefit from a modern and high-performance rendering engine powered by WebGPU
- Apply flexible styling (icons, line styles, fill styles and transparency) to your data and customize it using the API; this includes configuration of complex line strokes and use of 3D models as icons
- Add labels to augment the visual information on the geometries of the data with information from data attributes
- Integrate high-performance imagery rendering with multileveling 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 and generate interactive and dynamic heat maps

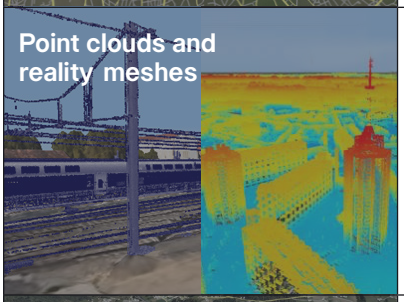


- Use controller functionality out of the box, including standard controls (zoom, pan and select), on-map drawing and editing in 2D and 3D and benefit from touch-based interaction
- Create other custom interaction controllers easily
- Fine-tune navigation using the configurable 3D camera
- Retrieve terrain elevation at a given location



- Rapidly gain a thorough understanding of your geospatial data using advanced visual analytics tools
- Analyze vector (point, line and area) information by applying filters and parameterized styles, or interactively and visually explore them simulated over time
- Create heat maps based on static and dynamic data
- Interactive viewshed calculation for a given observer position, height and visibility range, based on the elevation data available in the view

	• 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, ECW, JPEG2000, GeoPackage image and MBTiles raster
	  • Elevation data: DTED/DMED, OGC GeoTIFF, Alto Tile Service and GeoPackage elevation
	  • Vector data: GeoPackage features, SHP, OGC GML and MBTiles vector
	• 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 OGC 3D Tiles, including Draco compression • Stream additional data formats as OGC 3D Tiles Alto Server (formerly LuciadFusion): OSGB, LAS, LAZ, Binz and IFC
	• Connect to OCG WMS, WMTS and WFS services and data in the OGC GeoPackage format • Retrieve 3D content as OGC 3D Tiles service

	• 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 and MS2525d
	  • Military grids: MGRS

Figure 3: Alto Universal's visualization and analysis capabilities are data agnostic, so it is complementary with any data format.

More information

Alto Universal 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, available for all supported programming languages
- 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's new
- Technical notes that describe technical requirements

To learn more or schedule a demo, contact us.

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

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.