

# LuciadRIA

Situational awareness in the browser



**LuciadRIA** is the answer to the growing demand for powerful, lightweight applications in the browser. Driven by technologies including Web Assembly, Typescript, WebGL, HTML 5 and Javascript, LuciadRIA delivers desktop-like performance to your web applications.

Developers can create interactive C2 and location intelligence applications thanks to the clean design, modular structure and powerful visual analytics capabilities that can be plugged in. Using its configurable API, you can add support for custom data feeds, add your own symbology or match user interaction and look and feel to your company's needs and style. LuciadRIA offers a single visualization API for 2D and 3D.

With Hexagon's browser solution, you can expect high performance and accurate visualization of all types of 2D information, as well as 3D data and dynamic content, such as tracks. Connect to your data via OGC web services or drag and drop common file formats. Data can be explored in a 2D or 3D map view or vertical intersection view. Combine with a timeline view for 4D analysis.

## Who needs the LuciadRIA browser solution?

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

- Build a mission-critical web-based solution that handles geospatial data with the accuracy required for mission planning
- Build a standards-based, interoperable web-based solution that handles 2D and 3D
- Work with defense symbology, including MS2525 and APP6, in a browser application
- Visually analyze millions of events or locations
- Handle real-time dynamic data, such as flights, vessels or people with tens of thousands of moving assets
- Perform client-side analytics with the interactivity of a desktop solution
- Build a high-performance web solution that exploits the graphics hardware as optimally as possible for 2D and 3D, while also working in software mode in 2D
- Work with data and maps in different projections (including 3D, but also 2D polar projections) without going through the process of extract-transform-load (ETL)

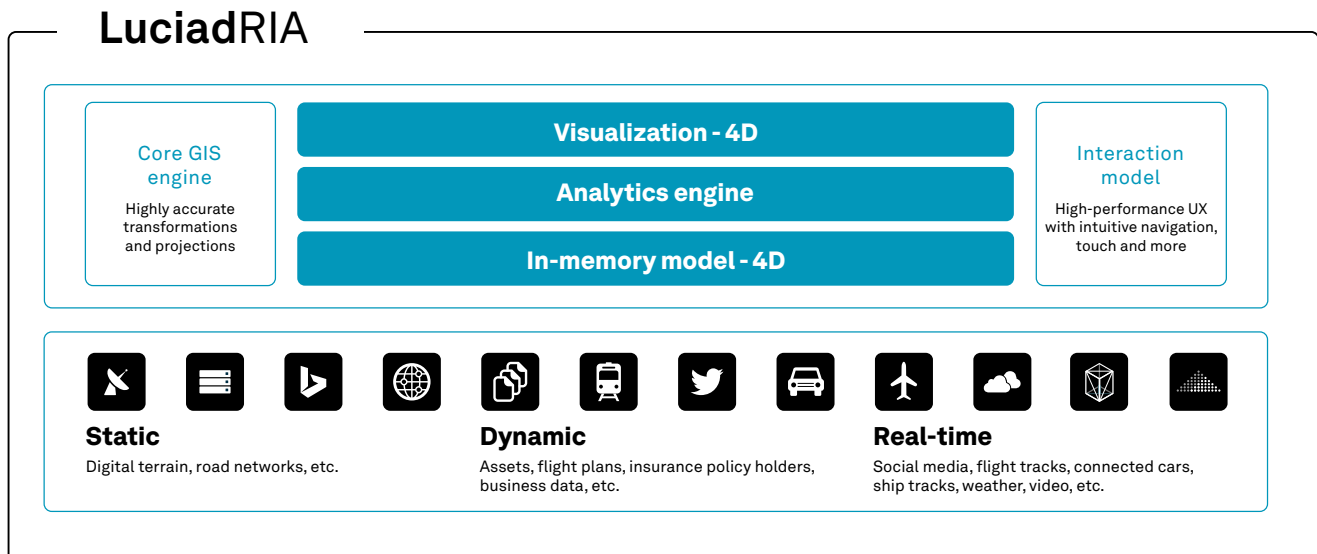


Figure 1 - LuciadRIA can connect to hundreds of data sources. The solution is compatible with HTML5, WebGL, Web Assembly, Typescript and Javascript.



Figure 2 - Add realism to your 3D scene by adding shading and shadow effects to your data. To try it out yourself, take a look at the [LuciadRIA samples](#).

## Key benefits

<b>Best-in-class performance</b>	<p>Offers unprecedented user experience within an HTML 5-equipped browser. If the device supports WebGL and/or Web Assembly, this can be exploited for an even better performance.</p>
<b>High geospatial positioning accuracy</b>	<p>Precision on world scale for visualization of and interaction with data, even after transformation or reprojection. All geodetic calculations are performed on the client side.</p>
<b>Desktop-like experience</b>	<p>Full application running in a browser, enabling desktop-like experience that includes visualization of imagery, feature data, 3D data and dynamic content, such as tracks or annotations.</p>
<b>Builds on web standards</b>	<p>Compatible with any HTML5-capable browser, including mobile browsers. Delivered as EcmaScript6 (ES6) modules.</p>
<b>Customizable</b>	<p>Straightforward development of interactive browser-based user interfaces, including editing of content and map annotations. One single API allows configuration for 2D software rendering and 2D and 3D WebGL-based rendering, depending on the target platform. The product allows you to meet 100% of your requirements. Integrates in any web technology stack.</p>

## Overview

The LuciadRIA components have been organized into product tiers. Depending on the needs of your organization, you can opt for LuciadRIA Essential or Pro. With the Pro tier, you can optionally add support for defense symbology.

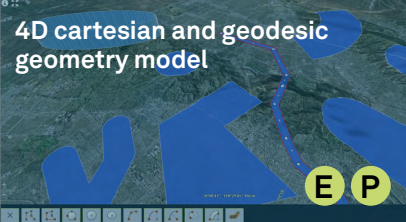
### Legend

- Feature included
- Optional feature

Functionality	Essential	Pro
Core GIS engine	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Geospatial reference models	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Transformation and projection engine	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4D cartesian and geodesic geometry model	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CPU 2D vsualization engine	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GPU 2D/3D visualization engine	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Customizable symbology	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2D/3D/4D interaction model	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vertical, profile and timeline views	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Visual analytics	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Raster connectors	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vector connectors	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Point clouds and reality meshes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OGC standards	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
360 panoramic imagery		<input checked="" type="checkbox"/>
Advanced GIS engine		<input checked="" type="checkbox"/>
Defense symbology		<input type="checkbox"/>

## Functional specification

Below is a high-level, non-exhaustive overview of the functionality available in LuciadFusion. You can use the functionality it offers out of the box or extend it to meet user-specific requirements.

<p>Core GIS engine Geospatial reference models Transformation and projection engine</p>  <p><b>E P</b></p>	<ul style="list-style-type: none"> <li>• Perform on-the-fly map transformations in the browser.</li> <li>• Visualize data in any EPSG map projection. Visualize accurate geodetic lines and warp raster data.</li> <li>• Benefit from support for MGRS coordinate formatting.</li> </ul>
<p>4D cartesian and geodesic geometry model</p>  <p><b>E P</b></p>	<ul style="list-style-type: none"> <li>• Model any data format.</li> <li>• Load big data sets asynchronously.</li> <li>• Represent complex geodetic object geometries with their metadata. Supported geometries include points, polylines, polygons, circles, ellipses, circular arcs, elliptical arcs, circular arc bands and buffers.</li> <li>• Benefit from support for static data, as well as dynamic data feeds.</li> </ul>
<p>CPU 2D vsualization engine GPU 2D/3D visualization engine Customizable symbology</p>  <p><b>E P</b></p>	<ul style="list-style-type: none"> <li>• Visualize data in a multi-layered 2D or 3D view, and add a lon-lat grid.</li> <li>• Apply flexible styling (2D and 3D icons, meshes, line styles, fill styles, transparency) to your data and customize it using the OGC-defined Styled Layer Descriptor/Symbology Encoding (SLD/SE) standards.</li> <li>• Create versatile labels, with options for styling and decluttering.</li> <li>• Benefit from integrated high-performance imagery rendering in the view, using multi-leveling and tiling techniques.</li> <li>• Drape any data, including vector data and dynamic data, on terrain.</li> <li>• Apply lighting effects to simulate light sources realistically.</li> <li>• Dynamically display thousands of moving tracks and generate interactive and dynamic heat maps.</li> </ul>
<p>2D/3D/4D interaction model</p>  <p><b>E P</b></p>	<ul style="list-style-type: none"> <li>• Start off with a ready-to-use controller that includes standard controls (zoom, pan, select), freehand drawing and editing, multi-touch support (including Microsoft Pointer events and Gesture events) and snapping.</li> <li>• Fine-tune navigation using the configurable 3D camera.</li> <li>• Discover changes between two data sets with the swipe and flicker visual change detection controllers.</li> <li>• Easily create other controllers for custom interaction.</li> </ul>
<p>Vertical, profile and timeline views</p>  <p><b>E P</b></p>	<ul style="list-style-type: none"> <li>• Use cartesian views with the ability to display any kind of quantitative data (e.g., altitudes, distances, speed values, time).</li> <li>• Configure these views with a reference that displays these quantities in a certain unit of measure (e.g., flight level, meters, nautical miles).</li> <li>• Benefit from a wide range of customizing options for the annotation of the view axes. Concrete examples of cartesian views are provided in the form of a vertical view and a timeline view.</li> </ul>

**E** Included in Essential    **P** Included in Pro



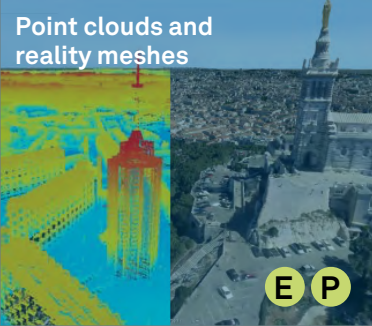




 <p><b>Visual analytics</b></p> <p><b>E P</b></p>	<ul style="list-style-type: none"> <li>• Rapidly gain a thorough understanding of your geospatial data using advanced visual analytics tools.</li> <li>• Configure clustering algorithms to aggregate a multitude of data objects into easily distinguishable clusters based on their properties.</li> <li>• Analyze trajectory information and plot information by applying filters and parameterized styles, or interactively and visually explore them simulated over time.</li> <li>• Create heat maps based on static and dynamic data.</li> <li>• Apply any expression to 3D meshes (e.g., show cross-sections of buildings).</li> </ul>
 <p><b>Raster connectors</b> <b>Vector connectors</b></p> <p><b>E P</b></p>	<ul style="list-style-type: none"> <li>• Access both raster and vector data in a variety of formats.</li> <li>• Raster data: <ul style="list-style-type: none"> <li>• LuciadFusion Tile Service, Bing Maps, Google Maps, OGC WMS, OGC WMTS, HERE maps, Open Street Map</li> <li>• Direct support for georeferenced raster data</li> </ul> </li> <li>• Vector data: <ul style="list-style-type: none"> <li>• GeoJSON, glTF, GML, OGC WFS, KML.</li> </ul> </li> </ul>
 <p><b>Point clouds and reality meshes</b></p> <p><b>E P</b></p>	<ul style="list-style-type: none"> <li>• Connect to and visualize unlimited point clouds and reality meshes.</li> <li>• Load 3D tiles optimally. Draco and WebP compression are supported.</li> <li>• Style and filter point clouds and reality meshes.</li> <li>• Apply shading, depth of field, PBR and shadow effects to 3D meshes.</li> <li>• Add custom and dynamic metadata to 3D meshes data at runtime.</li> <li>• Combine 3D data with terrain, other geodata, annotations and measurements</li> <li>• Supported through a LuciadFusion connection: <ul style="list-style-type: none"> <li>• OSGB, LAS, LAZ, OGC 3D tiles, HSPC.</li> </ul> </li> </ul>
 <p><b>OGC standards</b></p> <p><b>E P</b></p>	<ul style="list-style-type: none"> <li>• Access data through the OGC data exchange standards.</li> <li>• OGC: GML, KML, filter, simple features, symbology encoding, WFS, WMS, WMTS, 3D tiles.</li> </ul>
 <p><b>360 panoramic imagery</b></p> <p><b>P</b></p>	<ul style="list-style-type: none"> <li>• Connect to and visualize 360° panoramic image data sets.</li> <li>• Integrate with other data sources in the 3D view.</li> <li>• Load multiple panoramic data sets.</li> <li>• Measure off the panoramic image.</li> <li>• Combine with 3D data like terrain, 3D structures, meshes, and point clouds for accurate positioning and realistic transitions.</li> <li>• Supported through a LuciadFusion connection: <ul style="list-style-type: none"> <li>• E57, Leica Pegasus</li> <li>• Add other formats via the LuciadFusion API.</li> </ul> </li> </ul>
 <p><b>Advanced GIS engine</b></p> <p><b>P</b></p>	<ul style="list-style-type: none"> <li>• Perform constructive geometry calculations on the client-side.</li> <li>• Create and visualize the union, intersection and difference between (sets of) shapes.</li> </ul>
 <p><b>Defense symbology</b></p> <p><b>P</b></p>	<ul style="list-style-type: none"> <li>• Create, visualize and edit all tactical graphics from military standards on the client-side, with configurable and customizable symbol styling and graphics stroking.</li> <li>• Symbology standards: <ul style="list-style-type: none"> <li>• APP-6A, APP-6B, APP-6C, APP-6D, MS2525b, MS2525c, MS2525d.</li> </ul> </li> </ul>



Figure 3 - Visually comparing layers with the swipe controller.

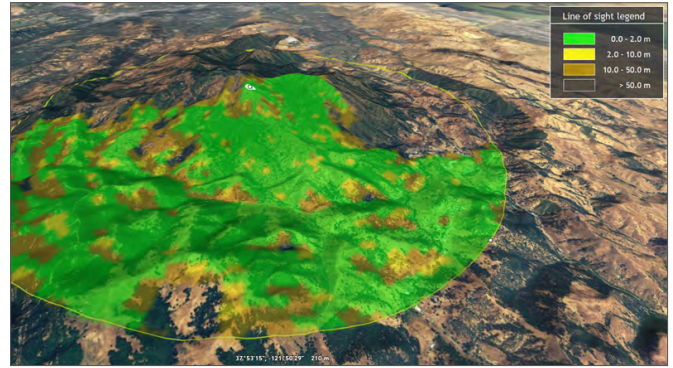


Figure 4 - Streaming and visualizing high-resolution terrain with the result of a line of sight calculation draped over the terrain.

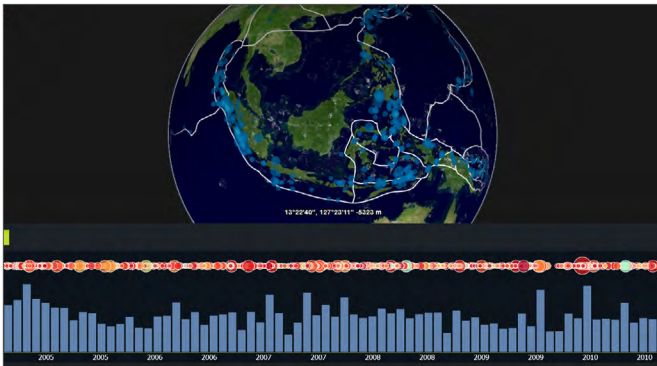


Figure 5 - Visualizing the density of earthquake events with time filtering.

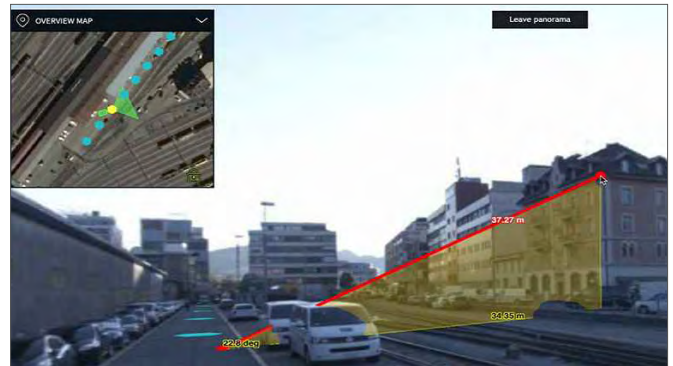


Figure 6 - Performing accurate measurements of your 3D imagery.

## More information

LuciadRIA requires:

- Any HTML5-capable browser
- For 3D visualization and advanced visual analytics, support for WebGL and Web Assembly are a prerequisite

LuciadRIA comes with:

- Code samples for all components, running live on [dev.luciad.com](http://dev.luciad.com)
- A convenient sample launcher
- Developer guides with clear explanations, how-to guides and descriptions of best practices
- API reference offering detailed description of all interfaces and classes
- Release notes to see what's new
- Technical notes describing technical requirements and device support reporting tool
- A declaration file and instructions for TypeScript development

To learn more or schedule a demo, contact us at [info.luciad.gsp@hexagon.com](mailto: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](https://www.hexagon.com) and follow us @HexagonAB.