Beta release guide

LuciadRIA 2021.1

16 November 2021

Contents

About this release

The 2021.1 release of LuciadRIA focuses on helping developers deliver an optimal user experience. Samples using React.js, material support, and performance optimizations are just a few examples. In addition, we improved robustness by further completing the format/data type support.

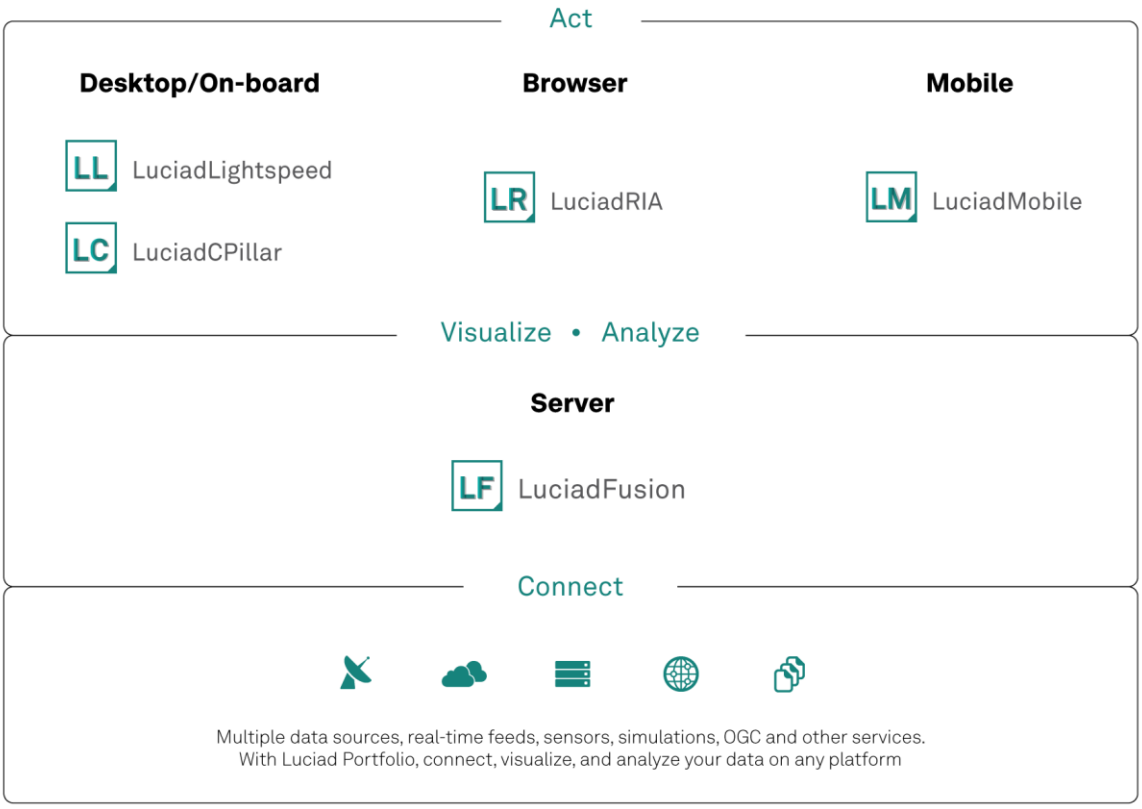

Figure 1: The Luciad Product Portfolio.

Benefits of the new features

Realistic 3D visualizations with physically based rendering

3D data sets have become more and more detailed. Textures on data help to distinguish between objects and make clear what an object represents. In the absence of textures, this is less clear.

Previous releases of LuciadRIA already added shadow effects and ambient occlusion. This greatly enhances insight into the geometric structure of objects.

There are situations, however, where objects are quite similar in geometry, but can be distinguished by material. Typical situations where that happens are factories and buildings.

Materials differ visually by how they reflect the light. A metal pipe, for example, will have a lot of reflection, while that is much less so for a sheet of paper. In this release of LuciadRIA, we enriched LuciadRIA with support for a set of materials. The computer graphics term for that is physically based rendering (PBR).

If information on the material like metallic-ness and roughness is present in the 3D objects, this will be picked up by the LuciadRIA rendering components. Environment maps are supported to create realistic reflection effects.

The PBR is supported on 3D icons in GLTF format and 3D tiles data containing material information.

Sample code to get you started

The LuciadRIA sample “Monitoring building information” has been extended to include PBR support.

Moreover, additional information on enabling PBR has been added to LuciadRIA documentation. Specifically, the how-to guides “Visualizing 3D icons,” “Styling mesh data,” and “Configuring WebGL Map effects” were extended.

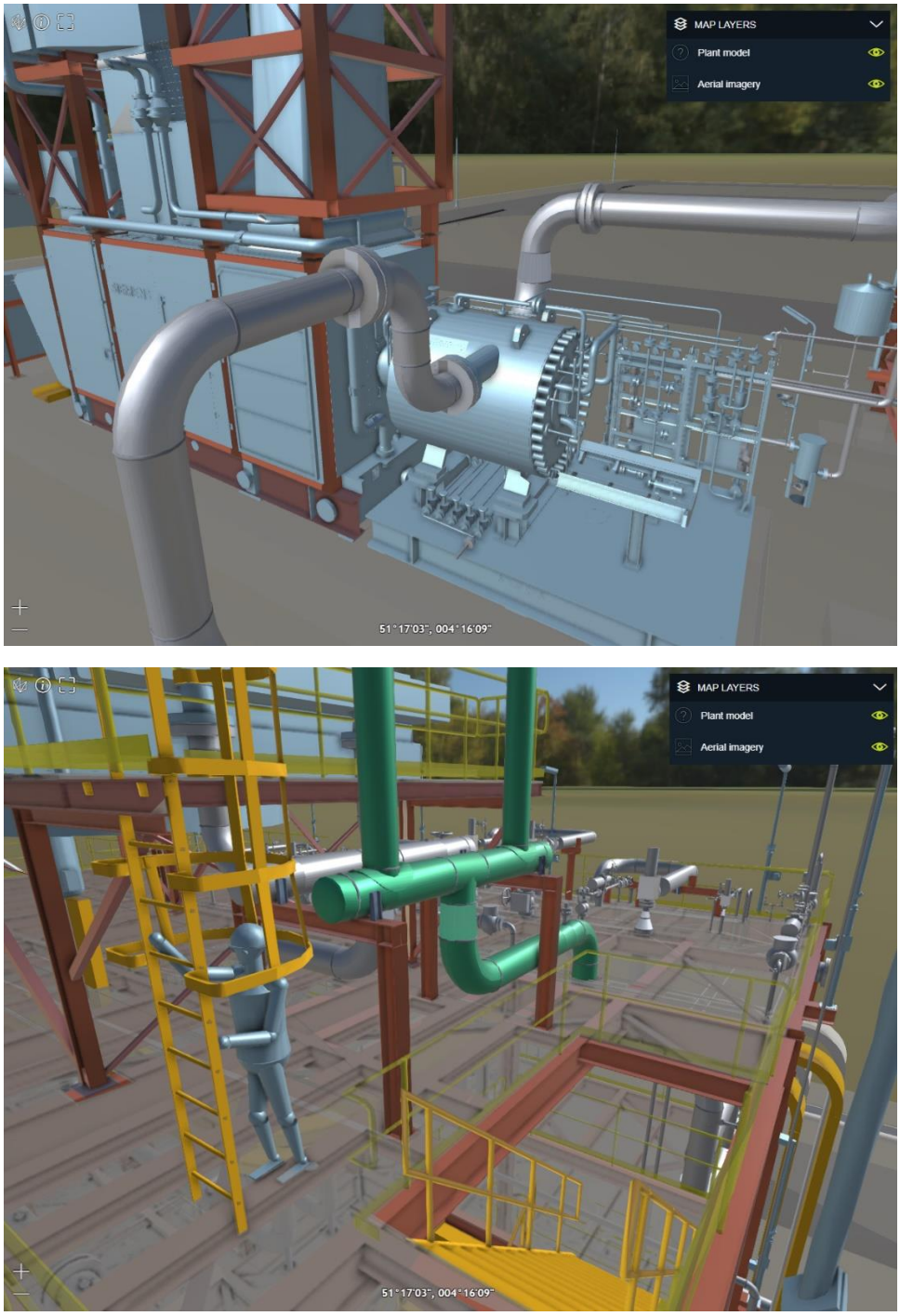

Figure 2: Some examples of the use of PBR showing material properties.

Consume optimized 3D tiles for best performance

3D tiles is an OGC community standard and popular exchange format for 3D information. A typical example of data that is very suitable to be exchanged in 3D tiles format is 3D city models. Despite the efficiency that comes from the tiled and multi-leveled nature of the data, there are still cases where the amount of data becomes a bottleneck. A solution for that is data compression. For 3D tiles, both geometry compression and texture compression can be used.

Support for the glTF Draco extension

For geometry compression, Google's Draco compression library is often used when encoding a 3D payload into the glTF format. LuciadRIA now consumes 3D tiles data sets where this compression has been applied. Note that LuciadFusion is an example of a system capable of generating Draco-compressed 3D tiles.

In addition, glTF 3D icons that were created using Draco compression are supported as well.

Support for WebP texture compression within glTF

For textures, another Google solution typically used is the WebP Image format. LuciadRIA now supports 3D tiles data sets including textures that were compressed into the WebP Image format.

If LuciadRIA has access to a 3D tiles data stream that does use Draco and WebP compression, the transmission of the data will be faster, because the data is smaller. Decoding the compressed geometries and textures is fast, so there will be a noticeable performance improvement when compared to 3D tiles that contain uncompressed geometries and less compressed textures.

The FAQ article "Which glTF version is supported and what are the limitations?" has been extended to reflect the supported glTF options and highlights.

Additional performance optimizations

In addition to the above, LuciadRIA has also been improved for 3D tile loading. The *TileLoadingStrategy* of *Tileset3DLayers* received a small but significant update. The *overview first* strategy has been optimized and is now the default setting instead of *detail first*. The benefit of this improved loading strategy is that it minimizes the amount of tiles that are pre-fetched. As a result, there will be data on the screen faster.

Enrich your application with detailed background data

Operational data is more relevant when shown in context. For that, detailed background data is essential. There are various providers of (imagery) data, and LuciadRIA already offers connectors for WMS and WMTS to connect to OGC-compliant data services. Next to that, LuciadRIA offers default connectors for dedicated services like Bing[1] or Google Maps[2].

With this release, we enriched our set of connectors with a Here maps[3] connector and provide guidance on how to connect to Open Street Map[4] data that is not offered via OGC services, but Open Street Map tile servers.

Add Open Street Map background data

Open Street Map (OSM) data and derived data sets like Open Sea Map can be delivered as OSM tile service. These services adhere to the tile URL pattern *http(s)://baseUrl/ ${z}/${x}/${y}.png*. The LuciadRIA API already offers a connector for this type of pattern via the *UrlTileSetModel*. A how-to article has been added to the LuciadRIA documentation.

Remember that you can also encounter services that offer OpenStreetMap data via the OGC WMS and WMTS protocols. If that fits your system architecture better, Open Street Map tile data can also be served as OGC WMS or WMTS via LuciadFusion.

[1] https://www.bing.com/maps
[2] https://www.google.com/maps
[3] https://www.here.com/platform/map-data
[4] https://www.openstreetmap.org/

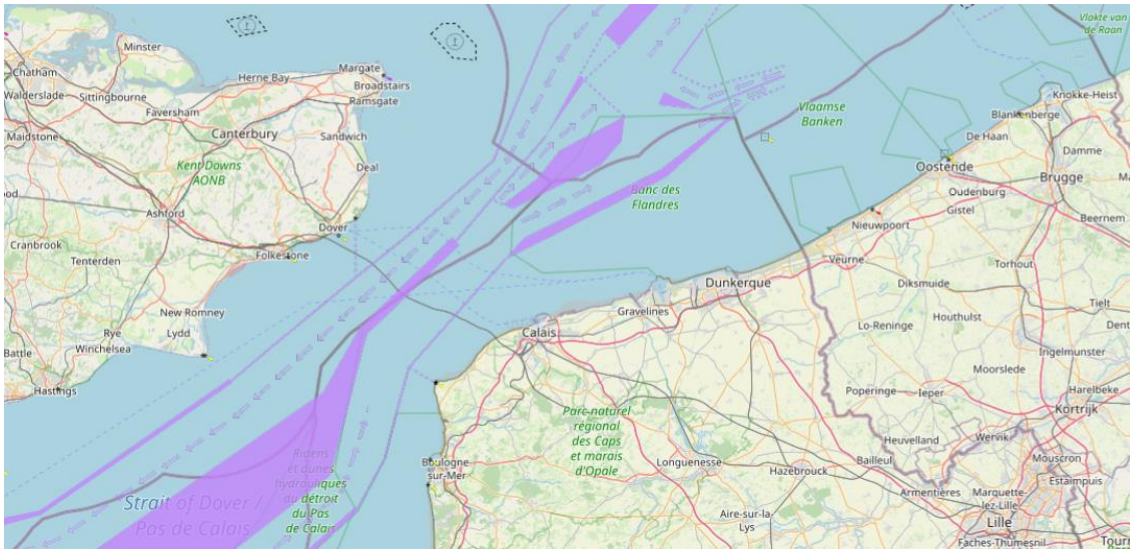

Figure 3: An illustration of OpenStreetMap data (containing roads) and OpenSeaMap data for the sea charts.

Sample code to get you started

The how-to article “How to visualize imagery from Open Street Map tile servers” explains in a few specific steps how to add Open Street Map data to your LuciadRIA map view.

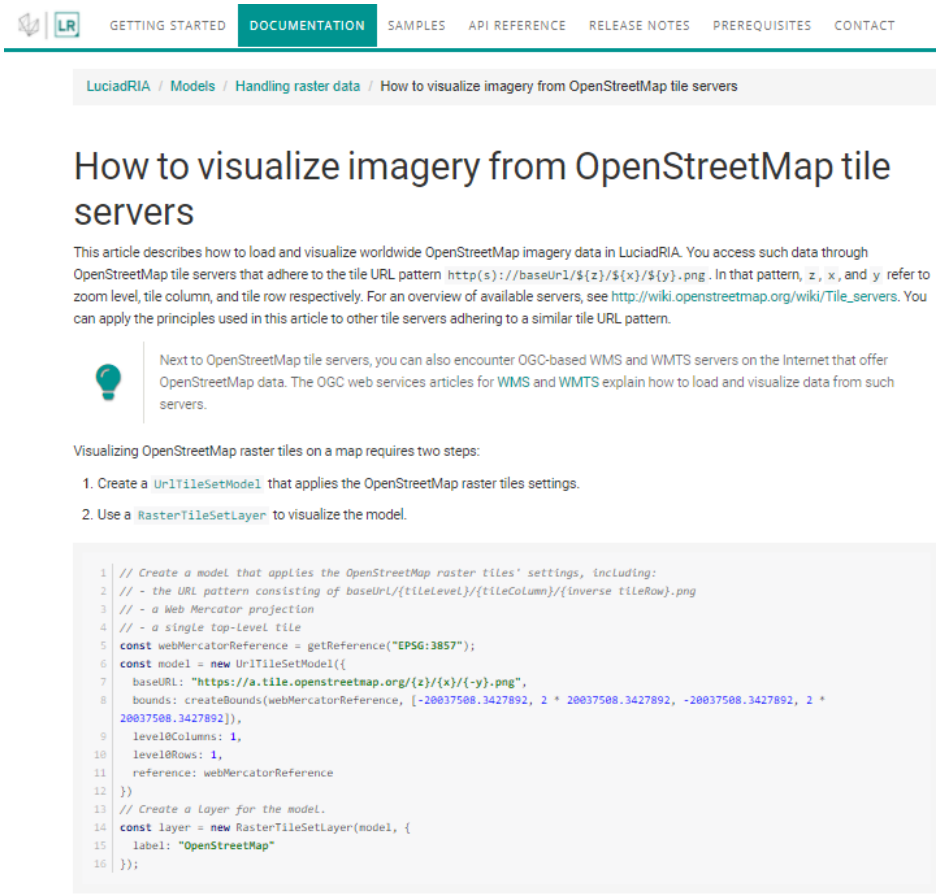

Figure 4: A dedicated How-to article has been added explaining how to add OpenStreetMap data to your LuciadRIA map view.

HERE Maps

HERE Technologies is a popular data provider. LuciadRIA now offers a connector to the HERE map tile API. You can access various types of data, including aerial imagery and traffic information.

LuciadRIA also takes care of the attribution, which is placed on the map.

Sample code to get you started

A tutorial, “Visualize HERE Maps data,” has been added to the LuciadRIA documentation. This tutorial guides you through all steps, starting with getting a HERE Maps key, through the selection of the right data type and visualization in a LuciadRIA map view.

Figure 5: A tutorial has been added to get you started with adding HERE maps data to your LuciadRIA map view.

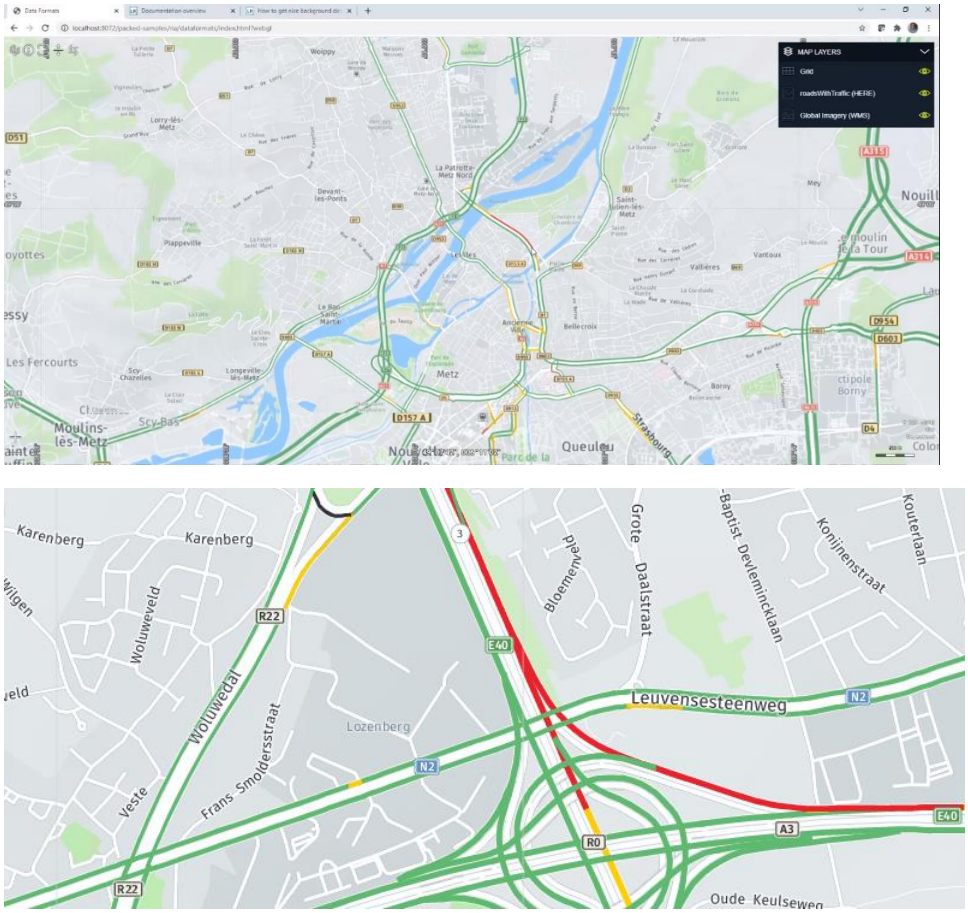

Figure 6: Illustrations of the visualization of HERE maps data in LuciadRIA, showing roads (top image) and traffic information (bottom image).

Extended OGC SE support: World-sized text

In most cases, text is used as annotation or “label” for data. Points of interest are accompanied by a meaningful name, street names are printed along a street, etc.

Sometimes, however, text must be considered as a georeferenced object. A good example are runway markings. These need to be displayed exactly on the runway, and at the correct size, expressed in a real-world unit of measure, like meters. LuciadRIA now supports world-sized text as feature within an OGC SE style specification.

Additional OGC SE improvements

- Strict text symbolizer placement via the OGC SE vendor option “conflictResolution”: When this option is set to false, LuciadRIA will not enable the automatic label deconfliction algorithm. All labels will be shown, and they will be positioned exactly as specified in the OGC SE description. Typical use cases for this option are cadastral maps and aeronautical charts.
- Rotation for point-placed labels: Through an OGC SE text style, you can now specify a rotation for point-placed labels.
- Customized external icon loading: You can now plug in an IconProvider that maps external graphics defined in an OGC SE to custom images or URLs.

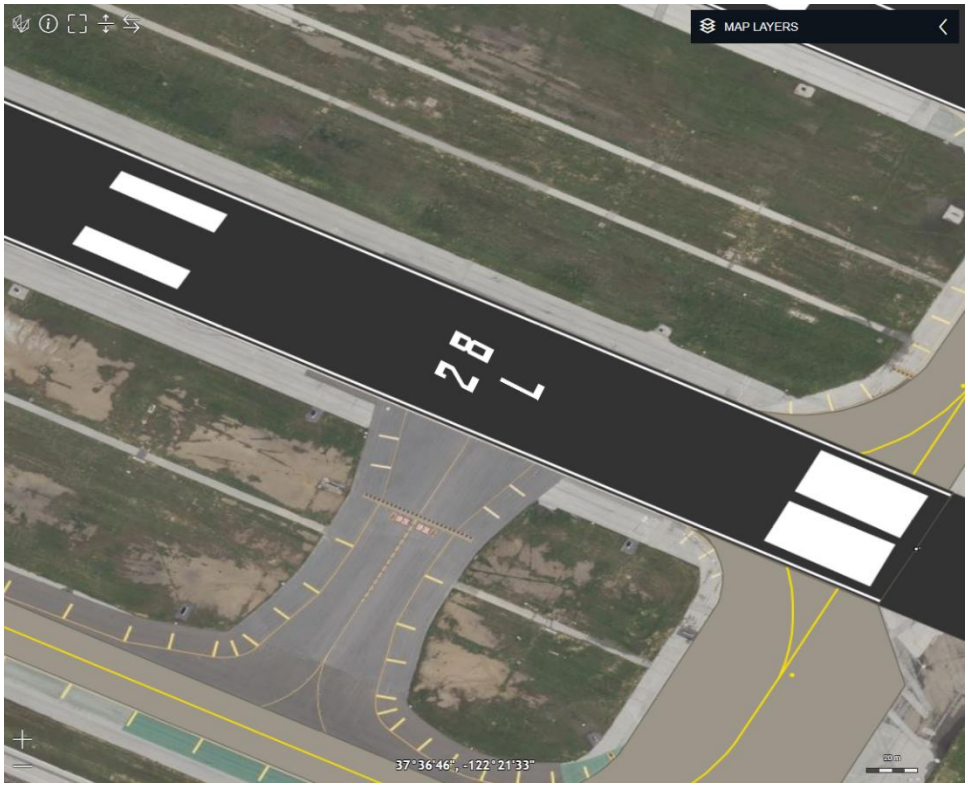

Figure 7: An illustration of world sized text, which is needed to correctly display runway markings.

Sample code to get you started

The LuciadRIA sample “Symbology encoding” has been extended with a world-sized text example. The SE style of the “Places” layer renders large cities with a world-sized text label when zooming in. This can be observed when zooming on Los Angeles or San Diego.

Other improvements

Ability to access the webGL context for external layer or object integration

The advanced LuciadRIA user and WebGL expert may want to enrich the WebGL view with effects or special content. Examples of such content are animated 3D icons and view-wide weather effects. To this end, the LuciadRIA WebGL view has been extended with a PostRender event. This offers a hook for advanced integrations.

An example of such integration is explained in the tutorial “How to add external content to the map: An example with three.js”. Detailed information is available as well in the API documentation of the WebGLMap class.

New API to create a topocentric reference

Topocentric references were already supported and handled correctly in LuciadRIA. In this release, the API has been extended to define custom topocentric references. More information can be found in the dedicated tutorial “Topocentric references.”

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