International Cartographic Association
Association Cartographique Internationale

Eliciting user needs of a collaborative GIS for planning urban drone landing sites

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Keywords: collaborative GIS, web map, urban air mobility, user needs

Abstract:

Urban Air Mobility (UAM) technology, generally referred to as drones, are an emerging technology (Kramar et al., 2021; Grote et al., 2021), but need to respect the constraints of urban environments (Mladenović & Stead, 2021). Therefore, urban planners could benefit from a useful map-based decision support tool for planning drone launch and landing sites (LLS) (Mladenović et al. 2024). The goal of this study is to design, develop, demonstrate, and evaluate a Collaborative web GIS (CGIS; e.g. Koski et al. 2021) for LLS planning to study the potential of collaborative GIS in urban air mobility planning.

The study was carried out through user studies and by creating an early working demonstration of the CGIS. To further understand the context and needs of UAM planning, a workshop was organised for each of the three partner cities (Helsinki, Stockholm, and Hamburg), where the CGIS was first demonstrated to participants and then they were asked to contribute user stories from various perspectives of the CGIS. The user stories were prioritised according to MoSCoW (Hatton, 2008) and categorised.

The 16 workshop participants contributed 92 user stories, Figure 1. Import, export, and data management were the most important aspects to the participants. The participants identified among others as an UAM planner, a traffic planner, a permission authority, an urban planner, and a technical expert. An example of a valuable contribution related to data export was provided by one participant as follows: “As a traffic planner I want it to be able to export data in .shp-files since it’s a format we use regularly so that it can be used as layers in our map systems.”.

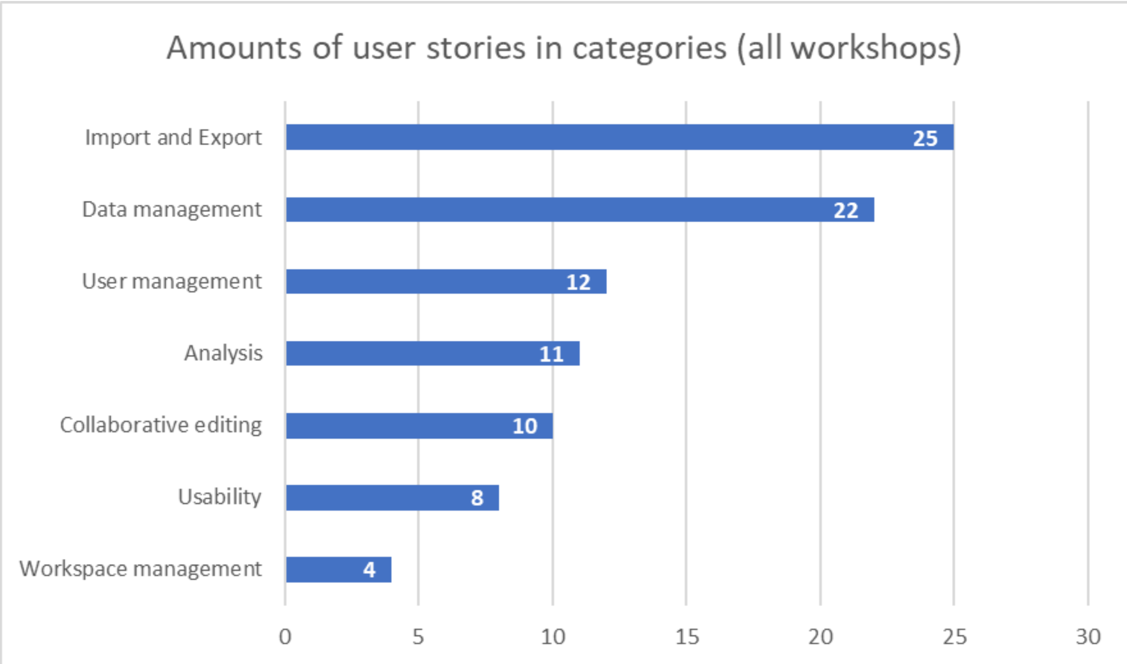

Figure 1. Categorisation of user stories from the partner city workshops.

Abstracts of the International Cartographic Association, 8, 20, 2024.
2024 ICA Workshop on AI, Geovisualization, and Analytical Reasoning – CartoVis24, 7 September 2024, University of Warsaw, Poland.
https://doi.org/10.5194/ica-abs-8-20-2024

The preliminary concept and architecture for the CGIS platform has been created based on previous CGIS, studies in the project and the user stories provided by the workshop participants, Figure 2. The CGIS platform consists of an extensive backend (Layman) offering user management, user access control, geospatial data management, QGIS integration via plugin, and an in-memory cache; a web-map UI (HSLayers-NG) built on top of OpenLayers and Angular; and an analysis service. The CGIS concept is based on map workspaces where collaborators can form a shared understanding of the situation with the help of basemaps, geospatial layers from various internal (e.g., import .shp files) and external sources (e.g. connect to a WMS service), collaborative drawing, and analysis performed either in QGIS and uploaded to the map workspace or using the server-side analysis service accessed from the map workspace.

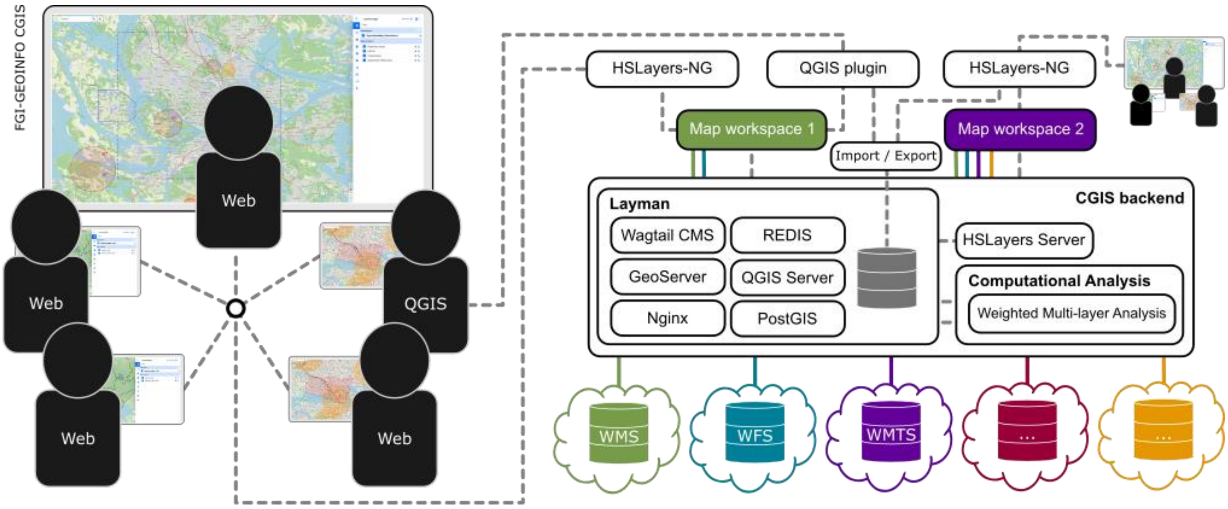

Figure 2. The concept and architecture of the collaborative web GIS for Urban Air Mobility (drones) launch and landing site planning is based on the idea of collaborative map workspaces.

This study will continue with on-going developing of the CGIS platform to be ready for demonstration to the partner cities. The demonstrations will be evaluated to further study the potential of collaborative GIS in urban air mobility setting.

Acknowledgements

This development and research has been funded through the Interreg Baltic Sea Region 2021-2027 programme, co-funded by the European Union (#C030 CITYAM). For the implementation of the CGIS, we use the geocomputing platform provided by the Open Geospatial Information Infrastructure for Research (Geoportti, urn:nbn:fi:research-infras-2016072513) funded by the Academy of Finland, CSC – IT Center for Science, and other Geoportti consortium members.

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