

ITEA Award for project on use of BIM, towards intelligent and collaborative city planning

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The international collaborative research project BIMy has been awarded with the ITEA Award of Excellence for Innovation. The ITEA project BIMy focused on how building information modelling (BIM) can be used and exploited beyond its normal use, and how to improve integration of BIM and geographic information systems (GIS). It created a shared space for digital representations of construction projects in their environments, enabling collaboration between multiple stakeholders within the Smart City domain and paving the road for new applications.

Smart city planning involves multiple players and encompasses diverse domains. Building information modelling (BIM) is an important enabler of this task, yet modelling conventions differ and BIM models are often designed independently. Moreover, model integration within the natural/built environment (GIS - geographic information systems) and the filtering of BIM models in terms of level of detail and time have been underdeveloped. If BIM is to reach its full potential, these roadblocks must be overcome and the international research project BIMy was set out to tackle this, successfully.

Enabler of collaboration between existing BIM platforms

As a generic, open intermediary, BIMy is an enabler of collaboration between existing BIM platforms. Through a unique, standardised API, it offers BIM model sharing, storing and data filtering among different stakeholders and their integration and visualisation in the built environment. Such interoperability allows multiple designers to exchange information quickly and accurately, regardless of differences in their file formats/workflows. Additionally, BIMy provides a secure working environment and a digital marketplace for storing and sharing BIM models and model data. These enable new applications and facilitate new interactions that increase the usage and value of BIM and thereby develop the Smart City domain.

A key technological innovation of BIMy is the filterable integration of BIM with GIS to create previously unanticipated usage scenarios. The BIMy platform allows BIM/GIS data querying and semantic filtering at various levels of detail and integrates with repositories of surrounding (GIS) environments. A data transformation layer prepares and transforms BIM and GIS data for use in new applications so that architects and city planners can download existing surrounding constructions (BIM) and the environment (GIS) instead of redrawing these. When uploading a BIM model to the BIMy platform, a construction project can be modelled with future repurposing or demolition in mind, paving the road for urban mining and the circular economy. Annotations on (parts of) a shared model can be exchanged across stakeholders in the standardised BIM Collaboration Format (BCF).

Efficiency and safety benefits

BIMy holds the promise of technical, commercial and societal benefits through its multi-stakeholder use-cases.

- For building permits, it allows guidelines to be modelled and applied to BIM models, gaining lead time by avoiding the need to apply for a permit to know if a building will fit a location and its urban regulations. In addition, fully digital access to building permit data speeds up its approval process. It facilitates reviews and updates in the building lifecycle thanks to centralised information and documentation for permits processing, automated validation and digital update during permit process and public enquiry.
- For fire safety, BIMy allows inspectors to ensure that a building complies with regulations, such as by querying a 3D model for semantic properties or by annotating a 3D model during inspection.
- Similarly, the combined BIM/ GIS data (possibly enriched with IoT data) can be used in crisis management to identify evacuation routes and train citizens using virtual or augmented reality, e.g. to learn how to escape safely during an earthquake. Also, to ensure that the building is tested by simulating earthquake and other disaster scenarios, akin to the 'digital twin' paradigm.
- For the circular economy and recycling, the project enables the modelling and mining of reusable materials within a building and the option to design buildings with future extraction in mind.
- Hazardous materials and materials that require special attention when handling can be properly taken care of prior to repurposing, refurbishing or demolishing a building. Quantities and locations can be calculated in advance and appropriate measures can be taken preventively.

The BIMy project partners validate the innovation power of the project.

As BIMy’s cloud-based solution lowers entry barriers for new tech adopters, the project will ultimately enable companies to set up new business cases in the European BIM and GIS markets. Seven building blocks for standardisation have also been identified; one notable innovation is a standard on data dictionaries for semantic mapping, which would greatly boost the use and value of BIM data by replacing existing free text annotations with standardised definitions irrespective of the stakeholder’s language.

> *"Digital transformation is fundamentally changing the way we work and live our lives. Digital technologies are paving the road for novel paradigms across industry sectors. The ITEA3 project BIMy pushed the limits of using and exploiting building information modelling (BIM) and explored novel opportunities offered by integrating BIM and geographic information systems (GIS). BIMy proposed ways to overcome limitations of current tools and standards, and explored ways to query and filter BIM and GIS data to create a new digital service offering. We hope that the soon to be published 'BIM in the City' book will inspire others in their digital transformation."*
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> Olivier Biot, Senior project manager at Sirris

Click here for the press release.

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