# Extending BIM Interoperability to Preconstruction Operations using Geospatial Analyses and Semantic Web Services

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Since the early 2000s, Building Information Modeling (BIM) has been used through the entire project lifecycle to facilitate effective project collaboration and integration of data to support project activities. Despite the successful applications of BIM in the design and construction stages, the use of BIM for preconstruction planning has not gained wide acceptance as in other phases of the project. The integration of BIM and geospatial analyses can offer substantial benefits to manage the planning process during the design and preconstruction stages. However, this integration suffers from a lack of interoperability across the geospatial and BIM domains. Semantic web technology is used in this study to convey meaning, which is interpretable by both construction project participants as well as BIM and Geographic Information Systems (GIS) applications processing the transferred data. To achieve this, we first translate building's elements and GIS data into a semantic web data format. Then we use a set of standardized ontologies for construction operations to integrate and query the heterogeneous spatial and temporal data. Finally, we use a query language to access and acquire the data in semantic web format. Through two scenario examples, the potential usefulness of the proposed methodology is validated.

**Key Words:** BIM, GIS, Semantic Interoperability, Semantic Web Technology