

IIS-066

**Exploration and Formalization of an Ontological Engineering Approach for
Enabling Interoperability between CAD and GIS to Support the Management of
Infrastructure Systems**

Burcu Akinci

Assistant Professor, Department of Civil and Environmental Engineering, Carnegie
Mellon University, Pittsburgh, PA

Hassan Karimi

Professor, Department of Information Science and Telecommunications, University of
Pittsburgh, Pittsburgh, PA

Industry Participants

Jorge M. Suarez, P.E.

Michael Baker Corp., Pittsburgh, PA

Mary Rosick, P.E.,

Michael Baker Corp., Pittsburgh, PA

Abstract

Designers, constructors and managers of infrastructure systems perform tasks that require data from numerous sources and operations available across different platforms. The bulk of the data and operations required in infrastructure systems management is spatially oriented and utilized in Computer-Aided Design (CAD) and Geospatial Information System (GIS) platforms. Hence, numerous design, construction and infrastructure management tasks require information processed by both CAD and GIS.

The objectives of this project are: (a) To understand the appropriate level of semantics needed to enable interoperability among heterogeneous GIS and CAD platforms within the infrastructure systems management; (b) To explore approaches that will support the level of semantics needed and hence will provide a step towards enabling the interoperability between GIS and CAD; (c) To formalize a set of methodologies and algorithms for semantically interoperable infrastructure software systems; (d) To generate a detailed research agenda towards this goal. Given that seamless interaction between GIS and CAD is needed and that in the absence of interoperability between them, time and money is wasted and safety problems occur, the newly developed methodology will potentially have a significant impact on the design, construction and management of future Pennsylvania infrastructure projects.