GSAW 2012 Tutorial D:

Advanced Technologies for Organizing and Sharing Ground System Data

Length: Half day

Overview:

Ontologies no longer belong only to the library science field. In the last decade ontologies, including those which are the basis for linked data, have gained importance because of use in major companies' architectures, life sciences, earth sciences, government data, and ecommerce. *The Web of Linked Data* also referred to as the *Semantic Web*, provides an exciting and powerful tool for ground data systems engineers to expand access to information. The session begins with an introduction to the technology including Tim Berners-Lee's "Linked Data Principles" and a NASA example from the Linked Open Data Cloud. Foundations consist of namespaces and the Resource Description Framework (RDF) data model. The next topics are the taxonomy, vocabulary and ontology description languages: SKOS (Simple Knowledge Organization System), RDFS (Vocabulary Description Language, also known as RDF Schema), and OWL (also known as the Web Ontology Language). The description languages will be illustrated with space flight examples. Through SPARQL query language examples, how to retrieve, manipulate, and federate web based ground data system vocabularies will be demonstrated. The tutorial concludes with an overview of how to publish linked data and what are the good practices.

Techniques for this tutorial come from three different books: Semantic Web for the Working Ontologist, 2nd edition by Dean Allemang and Jim Hendler, Morgan Kaufmann Publishers, 2011; Linked Data by Tom Heath and Christian Bizer, Morgan & Claypool Publishers, 2011; and Learning SPARQL by Bob DuCharme, O'Reilly, 2011. Examples are based on the vocabularies built by the instructor using ground data systems and space flight domains combined with *NASA JPL SWEET Ontology and NASA Space Flight and Astronauts Data*. Tools used for these examples include Protégé, Jena ARQ, and Jena Fuseki.

Instructor: Magdi Carlton, Semantics4g.com

Biography:

Magdi Carlton recently started a company: Semantics4g.com, with a focus on consulting, training and application development for GDS using semantic technologies.

Magdi worked for the Multimission Ground System and Services (MGSS) Program at Jet Propulsion Laboratory (JPL), where she was the Program Element Manager for Mission Control, Data Management & Accountability, and Spacecraft Analysis (MDAS). She has been engaged in ground data system engineering and management in various roles for over 25 years, including systems engineering for Deep Space Network, leading the GDS development and operations teams for Mars Reconnaissance Orbiter, teaching GDS system engineering, and managing service oriented developments. She received NASA Exceptional Service and Exceptional Achievements awards. Education: B.S. Mathematics, University of Eotvos Lorand, Budapest, Hungary; Certificate in Systems Programming, UCLA; Software Architecture Professional Certificate, CMU/SEI.

While she was working at JPL, Magdi Carlton participated as a trainer at GSAW 2009 in a session addressing service oriented architecture (SOA) and GSAW 2010 in sessions addressing various architectures.

What Participants Should Expect to Learn:

Introduction to Linked Data; Overview of link data description languages; SPARQL query language examples; How to publish linked data.

Who Should Attend:

Ground data systems engineers, software systems engineers, and space operations engineers.