Deliverable D2.1:
Techniques for ontology-based data description and discovery in a decentralized SWIM knowledge base

What is the contribution of this deliverable to the overall goals of BEST?

Deliverable D2.1 identifies kinds of ATM information and metadata that semantic technologies can handle effectively. The proposed semantic container approach complements SWIM service (instance) definitions with a means for the description of the information that a service instance uses and provides. A faceted approach using existing semantic technologies and ontology modules (from D1.1) allows for flexible information description. The packaging of information into semantic containers allows for the caching of information and its subsequent discovery for later re-use.

Current Status of the Deliverable

Completed, but awaits final approval by funding authority (SJU).

What items does the deliverable contain?

When we talk about a "Deliverable" in BEST, we mean not only the formal document describing the work done, but also any associated technical artefacts such as software, models, ontologies, diagrams etc. However, for this particular deliverable, there are no accompanying technical artefacts – all information is provided in the document itself.

Item#	Brief Description	What it can be used for
1	Concepts and terminology related to the *semantic container approach* for information management in SWIM; an explanation of how semantic technologies can be used for information description and discovery (Chapter 3)	The semantic container approach complements SWIM service (instance) definitions by providing a flexible means for information description. Service instances use and provide information. With semantic technologies, the information used and provided by service instances can be described in order to facilitate service discovery. When packaged in semantic containers, information can also be cached for re-use, more easily exchanged, and more easily combined with information from other services.

2	Examination of existing semantic technologies with respect to their fitness for semantic container management and discovery (Chapter 4)	The various existing semantic technologies have quite different characteristics with very specific advantages and drawbacks. In order to decide on the ideal technology mix for information description, one must know how the existing technologies can be used for the description of typical ATM information.
3	Experimental evaluation of semantic technologies for description and discovery of information (Chapter 5)	The benchmarks show whether previously identified possibilities of using semantic technologies for description and discovery of certain types of information are feasible in practice, which allows to making right decisions for a suitable technology mix in the future.
4	Introduction of the concept of administrative metadata and identification of different kinds of administrative metadata. (Chapter 6)	Besides a description of the information contents, additional metadata related to data format, data quality, and provenance are required in order to combine effectively ATM information from different sources.
5	Identification of types of composite semantic containers that combine information from various sources (Chapter 7)	SWIM services may also aggregate information of various types, e.g., integrated digital briefing. For composite containers, different additional metadata must be considered to efficiently manage the containers.

What details can I find in the deliverable document?

Details about what?	Reference
Semantic containers as a means for description and discovery of ATM information	Chapters 3.3 and 3.4
Key concepts of semantic containers	Chapter 3.5
Value-added containers and derivation chains of semantic containers	Chapters 3.6 and 3.7
Using RDF(S) and SPARQL for the description of ATM information	Chapter 4.1
Using OWL and SWRL for the description of ATM information	Chapter 4.2

Using the AIRM ontology and ontology modules from D1.1 for faceted container description	Chapter 5.2
Representing geospatial information using the Web Ontology Language (OWL)	Chapter 5.3
Employing materialization to speed up container discovery	Chapter 5.4
Representing an information need in OWL and matching the information need to container descriptions	Chapter 5.5
Technical metadata, i.e., information about data format, encoding, volume, etc.	Chapter 6.1
Provenance metadata, i.e., information about the source that produced a container.	Chapter 6.2
Quality metadata, i.e., information about freshness, accuracy, etc.	Chapter 6.3
Composition of semantic containers: Combination of semantic containers of the same element type (e.g., NOTAMs), composition of different types of information (e.g., NOTAMs, weather data), and value-added data (e.g., prioritized NOTAMs).	Chapter 7