Introduction: SWIM and Semantics

BEST

- research
- outcomes
- leveraging

Next Steps
What is SWIM?

SWIM emphasizes interoperability.
**What is semantics?**

<table>
<thead>
<tr>
<th>Semantics</th>
<th>the meaning of language constructs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semantic</td>
<td>the ability of computer systems to</td>
</tr>
<tr>
<td>interoperability</td>
<td>exchange data with unambiguous,</td>
</tr>
<tr>
<td></td>
<td>shared meaning</td>
</tr>
<tr>
<td>Semantic</td>
<td>enables machine computable logic,</td>
</tr>
<tr>
<td>technology</td>
<td>inferencing, knowledge discovery,</td>
</tr>
<tr>
<td></td>
<td>and data federation between</td>
</tr>
<tr>
<td></td>
<td>information systems</td>
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</tbody>
</table>
What is BEST?

VIM by making smart use of Semantic Technologies.

www.project-best.eu

What is SWIM?

SWIM is the answer to achieving global interoperability and service orientation in air traffic management.
What was researched?

- Automated generation of Web Ontology Language (OWL) ontologies from existing information standards
- Automated alignment checking
- Create semantic container descriptions
- Scalability, modularization, governance aspects
What was done?

Generate OWL ontology
What was done?
Alignment checking using ontology matching
What was done?

Evaluating ontology matching

Manually created reference alignments
What was done?

Semantic containers

The **description** includes a membership condition and administrative metadata, such as provenance, quality, and technical metadata.

The **content** is a set of data items from multiple sources that fulfill the membership condition.
What was done?

Semantic NOTAM - Integrating into SWIM

ATIEC 2021

What was done?

Semantic NOTAM

Video is available in the video booth
What happened next?

AI Situational Awareness Foundation for Advancing Automation

UML Models / XSD

OWL/RDF Vocabularies

Mapping Engine

Information/Data

Knowledge Graph

Machine Learning Module

conforms to

transformed to

conforms to

transformed to

affects

prepared as

added to

https://aisa-project.eu/
What happened next?

AIRM semantic correspondence viewer

<table>
<thead>
<tr>
<th>Term</th>
<th>URN</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>locationIndicatorICAO</td>
<td>urn:aero:airm:1.0.0:LogicalModel:Subjects:BaseInfrastructure:AerodromeInfrastructure:Aerodrome@locationIndicatorICAO</td>
<td>A four-letter code group formulated in accordance with rules prescribed by ICAO and assigned to the aerodrome.</td>
</tr>
</tbody>
</table>

Concepts that are semantically correspondent with it

<table>
<thead>
<tr>
<th>Model</th>
<th>Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIXM 4.2.0</td>
<td>locationIndicator</td>
</tr>
<tr>
<td>AMXM 2.0.0</td>
<td>idarpt</td>
</tr>
<tr>
<td>AIXM 5.1.1</td>
<td>locationIndicatorICAO</td>
</tr>
</tbody>
</table>

https://airm.aero/developers/semantic-correspondences.html
What happened next?

Service categories

https://reference.swim.aero/information-services/service-categories.html


The Meteorological information exchange regulated in

https://reference.swim.aero/information-services/service-categories.html

2021

Smart.

Secure.

Shareable.

Aviation Information.
What are the next steps?

Looking ahead

- Continue to leverage semantic technologies
  - publish more vocabularies e.g. topics to classify ICAO digital data sets
  - realize opportunities for automated alignment checking

- Gather more detailed requirements
  - identify opportunities at data level

- Validate new ideas and tools as they emerge