



Dissemination and Project Promotion report

D4.5

BEST

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Achieving the **BE**nefits of **SWIM** by making smart use of **Semantic Technologies**

This deliverable is part of a project that has received funding from the SESAR Joint Undertaking under grant agreement No 699298 under the European Union's Horizon 2020 research and innovation programme.

Abstract/Executive Summary

The essence of the BEST project requires a comprehensive dissemination and promotion materials in order to spread the earned knowledge and achievement of such an exploratory research project in TRL1. While such activities are planned in an independent deliverable. This document explains the project dissemination and promotion results along with their progress reports during the project.

This deliverable focuses on actual results of different dissemination, communication and exploitation activities which were planned before in order to provide an overall assessment of the expected impacts. The outcome of the report is obtained in a more detailed view on stakeholders' involvement, conferences and recorded statistics from the project website. Moreover, the importance of the continuous monitoring and assessment is to have a measure of the project effectiveness along with the project timeline as well as when it has been completed. This approach is truly a great help to plan for the future dissemination and communication strategies in further steps of the project.

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1 Introduction: About this document¹

1.1 Purpose

BEST's "Dissemination, communication and project promotion plan" [D4.2] states that *"The overall objective of project promotion activities in BEST is to maximise the probability that the impacts predicted in the DoA actually come about. This is split into sub-objectives:*

1. **Dissemination:** *To ensure that concrete results of the project, and knowledge gained in the project, are made available as widely as possible within the limitations of any knowledge protection restrictions that may apply.*
2. **Communication:** *To ensure that stakeholders with a potential interest in project results and/or the project itself are made aware of these and, where appropriate, establish dialogue with them.*
3. **Exploitation Planning:** *To define plans for how Dissemination and Communication activities during the project, and other measures after completion of the project, will encourage use and/or further development of project results.*
4. **Regulatory Compliance:** *When considering the broader audiences during dissemination and communication, all the activities will be in compliance with all the H2020 communications guidelines, regulations and specifications."*

In line with the Grant Agreement, this deliverable *"Describes all dissemination and project promotion activities that took place during the project, together with an assessment of their possible impact"* in order to achieve the objectives from D4.2². The differences in the types of project promotion activities can be summarised in the Figure 1.

In the plan (deliverable D4.2 Dissemination Communication and project promotion plan"), we specified the dissemination, communication and exploitation as separated concepts. In reality, they turned out to be closely linked. Each time we were communicating we were first providing information (dissemination) on the project then we were seeking a response that made the communication partners think about implementation (exploitation) of the proposed information. So far, a variety of promotional activities led the project through an interesting discussion and ideas for exploitation and future use of the project results.

¹ The opinions expressed herein reflect the author's view only. Under no circumstances shall the SESAR Joint Undertaking be responsible for any use that may be made of the information contained herein.

² "Dissemination, communication and project promotion plan"

Project Promotion Activities

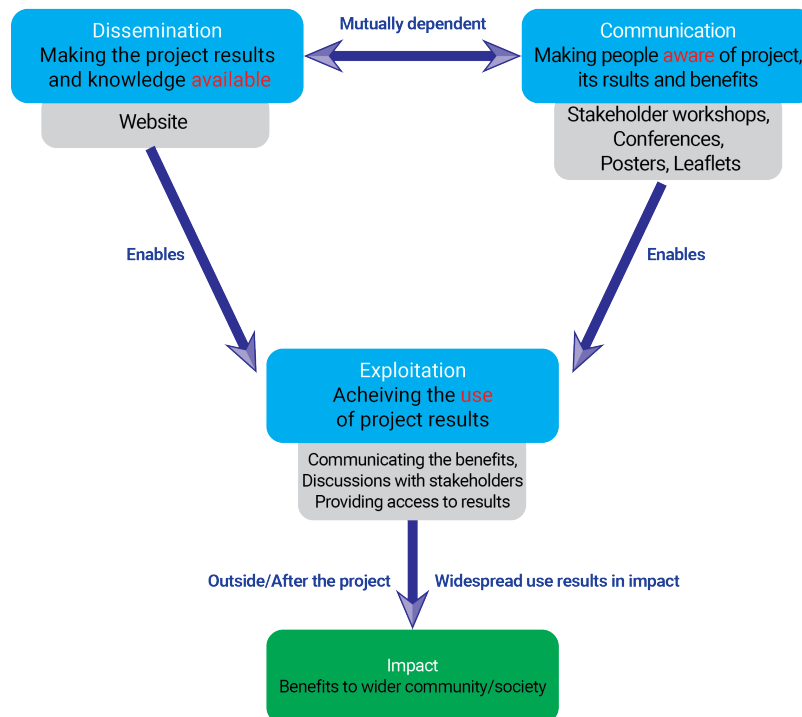


Figure 1: Project promotion activities and how they relate to impact: overview

1.2 Intended Readership

The structure of this document is designed in a manner to be an effective guiding material for people who are interested in future activities in:

- ATM information exchange
- Application of semantic technologies in ATM
- SWIM (System Wide Information Management)

1.3 Relationship to other deliverables

Deliverable	Relationship
D4.1 The stakeholder view	This deliverable provides reports about stakeholder views on potential application of semantic technology in order to enhance their routine procedures and evaluate the possible use cases by means of workshops and conferences.
D4.3 Governance recommendation for the use of semantic technologies in SWIM	This deliverable describes an overall approach to governance that deals with the emergence and evolution of semantic technologies in ATM. It emphasises on the promotion and exploitation strategies for further future development of the project results

D4.4 Tutorial for software developers	This deliverable target software developers of ATM applications in order to facilitate further development following the project methodology and achievements. It includes lesson learned from the BEST development in developer's language.
D4.2 Dissemination, communication and project promotion plan	It describes the target audiences and communication channels for the project promotion activities, including identification of targeted journals, other publications, conferences etc. Moreover, it defines some selection criteria for reference groups and provides refinement of the communication plan included in the project management plan

1.4 Acronyms and abbreviations

Acronym/Abbreviation	Explanation
AIRM	ATM Information Reference Model
ATM	Air Traffic Management
FAQ	Frequently Asked Questions
SESAR	Single European Sky ATM Research
SJU	SESAR Joint Undertaking
SID	SESAR Innovation Days
AIXM	Aeronautical Information Exchange Model
IWXXM	ICAO Meteorological Information Exchange Model
OWL	Web Ontology Language
RG	Reference Group
SWIM	System Wide Information Management
TRL	Technology Readiness Level
UML	Unified Modelling Language
XSLT	XSL Transformation

2 Dissemination Activities

The most basic way of dissemination is to use the Internet and enable the wider public (and of course the experts too) to have access to materials created by the project. To achieve this, the project has created a website and a wiki. In addition, social media was used in order to disseminate project activities.

2.1 BEST Website

The project website is publicly available at address: <http://www.project-best.eu>

The website was updated dynamically, so that the readers could follow the project work through the website directly. The website is a single channel, but is composed of different sections with different purposes. Sections of the website are about providing information about the project, and progress on its results, to various potentially interested partners. Various project's communication activities can be found in the "EVENTS" page.



ABOUT BEST

FOLLOW OUR NEWS

BEST is SESAR Exploratory Research project focusing on a new way of data handling. By creating new data classification methodologies it will enable the application of System Wide Information Management (SWIM) one of the main results of SESAR. BEST will determine how semantic technologies can be used effectively to maximise the benefits of adopting SWIM, one of the major results of SESAR. SWIM offers an "information sharing" approach to ATM information management and its adoption offers advantages for better situational awareness and information management. But the full benefits of SWIM can only be achieved if advanced support can be provided for developing smart SWIM-based applications that manage information effectively, and semantic technologies offer a promising way to do that. BEST identifies a set of focused research questions about how to exploit semantic technologies in a practical way in an ATM setting, and will produce concrete results that help address these.



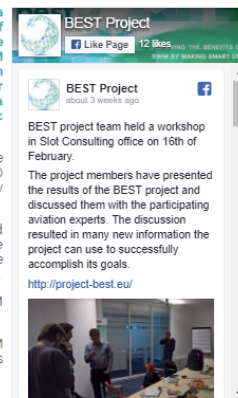
The project will experiment with use of semantic technologies with several use cases, and build on that experience to produce guidelines (aimed at practitioners) about how to use ontologies in flexible ways to describe meta-data, and how these can be used in innovative yet scalable ways.

BEST envisages use of multiple modular ontologies to maximise flexibility and applicability to specific application scenarios, but within a framework where compliance with the wider requirements of SWIM and the SESAR AIRM can be assured. This involves both technical compliance testing and governance aspects.

While BEST is primarily a research-oriented project, it is also designed to ensure relevance to and suitability for ATM operations, through project activities and the involvement of a Reference Group of key stakeholders.

The consortium includes a mixture of research and industrial partners (including one SME), all with extensive ATM experience. Several project partners have had leading roles in AIRM and SWIM work in SESAR, but some partners are new to SESAR and offer 'new blood'. The consortium also provides leading expertise on semantic technologies.

[Read more](#)



Consortium	Funded by	Contact information
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This project has received funding from the SESAR Joint Undertaking under Grant Agreement No. 699298, under European Union's Horizon 2020 Research and Innovation programme. [Disclaimer >>](#)

Figure 2: BEST Website - Home page

2.1.1 Home page

The home page provides a brief overview of the project, understandable by a wide audience (including the general public), together with links to the other more detailed sections – it is the starting point for navigating the site.

A news feed is provided, supported by an integrated Facebook box, where users can have direct access to the main social media site. Below the news feed area, a Calendar is provided introducing important upcoming dates (milestones, publications, project events, participation in conferences, etc.).

2.1.2 Project page

The project page describes the project in understandable way both for general public and the experts as well. The project has evolved constantly and we had a lot of communication with the stakeholders, so we have adjusted the project summary accordingly. It contains a link to a to “Frequently Asked Questions” page which was intended to supplement the “Project Description” with details on specific issues, explained in a clear and simple way.

Initial versions of the FAQ was based on questions that are anticipated rather than on questions that have actually been posed – the idea was to use this communication form as a good way to communicate detailed technical information. As the project proceeded, the FAQ was evolving to a list of questions that have actually been posed (e.g. at events where the project has been presented).

2.1.3 Publications page

The project deliverables are not created as the means of dissemination rather to document and report the project’s work. Project deliverables will be published at the “Publications” section as soon as they are approved by the SESAR JU and of course if their nature is “Public”.

We have realised that the difference between the general public and the “experts” is not that well defined. The difference in understanding the proposed topic is differentiating gradually. Some of the stakeholders could be considered as “novice” in relation to the topic, so need more high-level explanation and some of them although not working in the field yet have a pretty good understanding of SWIM. Therefore, we have decided to place all the available information on one page, so that the interested party can select the contents most suitable for his needs. Moreover, the project’s public deliverables are provisioned to be uploaded upon SJU approval.

The page contains the following information available for download:

- BEST - Project Summary I
- BEST - SID 2016 Project Poster
- BEST - SID 2017 Project Poster
- BEST - Project Summary II
- D1.1 Experimental ontology modules formalising concept definition of ATM data
- A zip file containing all OWL ontologies (both monolithic and ontology modules) developed from AIRM, AIXM and IWXXM.
- An OWL ontology automatically transformed from the AIRM UML model.
- AIRM Aircraft (owl)
- AIRM Base Infrastructure (owl)
- AIRM Common (owl)
- AIRM Meteorology (owl)
- AIRM Stakeholders (owl)
- AIRM Aerodrome Infrastructure

- AIRM Data Types
- AIRM Flight
- AIRM Navigation Infrastructure
- AIRM Obstacle
- AIRM Surveillance Infrastructure
- IWXXM TAF (owl)
- IWXXM METAR (owl)
- IWXXM Common (owl)
- AIXM Airport/Heliport (owl)
- AIXM Geometry (owl)
- AIXM Obstacle (owl)
- AIXM Organisation (owl)
- AIXM Shared (owl)
- A zip file containing a set of XSLT transformation scripts used for transforming from AIRM and AIXM UML models to OWL ontologies.
- ONTOLOGY-BASED DATA DESCRIPTION AND DISCOVERY IN A SWIM ENVIRONMENT - Abstract
- Semantic Data Containers for Realizing the Full Potential of System Wide Information Management – Paper

2.1.4 Events page

The events page provides information on events that are related to the consortium activities, like Kick-off meeting, that is related to the start of the project; or Stakeholders' workshop, that was an important event for the project as it was evaluating the project results not from the scientific point of view, rather from a point of view of real life application of the results.

2.1.5 Consortium and Contacts pages

This section presents the consortium partners. All the partners are listed together on the same page to introduce the main activities of their organisation. The pages contain logos of the consortium partners, links to their own web pages and general contact details of the organisations.

The contact page provides information or contacting the coordinator of the project.

2.2 BEST Wiki

We have realised that we are using a massive amount of various terms that should be defined and the exact meaning should be given to make the project work more understandable. First, it was causing some misunderstandings during the project work, so that the different deliverables used different terms for the same thing or same term for different things. We have created a vocabulary file for internal use then we have realized that this could be useful to the readers of the deliverables too. Therefore, a Wiki page has been created and it is available at the following link:

http://project-best.eu/mw/mediaw/index.php?title=Main_Page

The page is constantly under development as we are encountering different terms meaning of which have to be synchronised in context of different deliverables.

2.3 Social Media

The Facebook profile of the BEST project was created at the beginning of the project and was active for the duration of the project. The page provides short news on the project activities and points to the main project website.

The idea behind it was to reach those members of the Facebook community who is interested in ATM related research, maybe familiar with SWIM or interested in semantic ontologies. There is a link on the Facebook page pointing to the project's website and the interested people could follow it to the website to get further information, downloadable materials like examples, presentations made on conferences and deliverables.

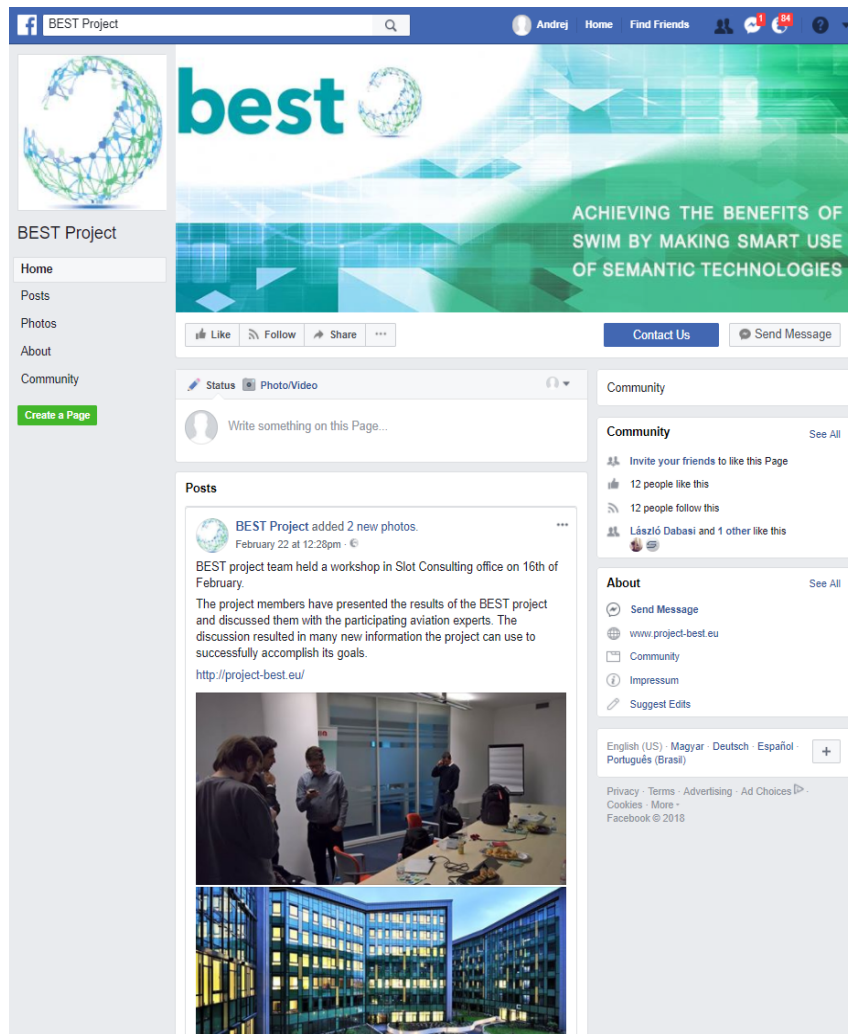


Figure 3: BEST - Facebook page

3 Communication and Exploitation Activities

Beside the website, the project undertook stakeholder workshops and was keenly involved in writing conference papers and posters. These activities went beyond just making material available.

Each time we involved the stakeholders we first providing information (dissemination) on the project then we sought a response that made the communication partners think about implementation (exploitation) of the proposed information. Therefore this chapter discusses communication and exploitation activities.

3.1 Stakeholder Involvement

3.1.1 Reference Group

The research performed by the project is based on a novel approach to supporting the implementation of SWIM in ATM domain. Therefore, it created a need for discussion with experts outside of the frame of the project, however, in possession of some knowledge in the field of aviation and IT. The project created a Reference Group, which is a group of people that are familiar at least with the ATM, but preferably have some IT related knowledge as well and as a best-case scenario good knowledge of SWIM.

The Reference Group is a dynamic assembly as on one hand not everybody always available and on the other hand, the needs of the project sometimes require different type of discussion and therefore collaborates with different knowledge level.

The basis of every good discussion is that the parties involved in discussion are familiar with the topic of the said discussion. Therefore, the consortium created presentations and various texts summarising the project activities, providing information on current state of the project. These presentations and texts were presented/delivered to the Reference Group members before the actual communication started, thus allowing them to be prepared for the in-depth discussion.

3.1.2 Survey

A survey was organised in the beginning of the project. The survey was organised using Google form that was to be filled in online. In the frame of the survey, we have created an electronic letter that contained a short introduction of the project and a link to the project's website. The invitation to the survey was sent out to approximately hundred people working in various field of aviation. Although the goal of the survey was to collect opinions in the process an act of dissemination was performed.

3.1.3 Stakeholder Workshop

A stakeholder workshop was organised in Budapest, Hungary in the SLOT office on 16th February 2018. A smaller workshop was organised for EUROCONTROL staff in Brussels on 16th April.

The purpose of the workshops was to learn the professional opinion on the best possible ways of implementing the BEST project results in the field of work of the participants. In addition, to receive input on building realistic use cases related to participants' work field to test and demonstrate the results of the project.

Despite the main goal of the workshop, the project partners have introduced the project and its results, so in a way it was also a dissemination event. The ideas that were formulated during the

workshop were related to practical implementation of the project results and that relates to exploitation of the project's results. In addition, further possible benefits were elaborated during the discussion with the stakeholders.

The description of the Stakeholder Workshops is available in deliverable D4.1 "The Stakeholder view".

3.1.4 Interviews

To support the needs of the project and as addition to the Stakeholder Workshop personal interviews were conducted where a group or an individual project member has organised an interview with a stakeholder to present the project results and discuss the best ways of exploitation and further research.

3.2 Conferences, workshops and other events

The consortium partners have prepared papers and presentations to participate in various events and present their work done in the frame of BEST project.

3.2.1 Posters

The consortium partners usually submitted papers and presentations to the conferences, however for two occasions we have created posters. Those two occasions were SESAR Innovation Days 2016 and SESAR Innovation Days 2017.

The first occasion was in the early stage of the project (2016) and the poster basically provided insight into ideas the BEST project was based on. The poster is available for download at the project website.

The second poster was created a whole year later (2017) and it provided an insight to the project work (the inner relations between the work packages of the project) and showed the achieved results and their relation the work packages. This poster is also available for download at the website.

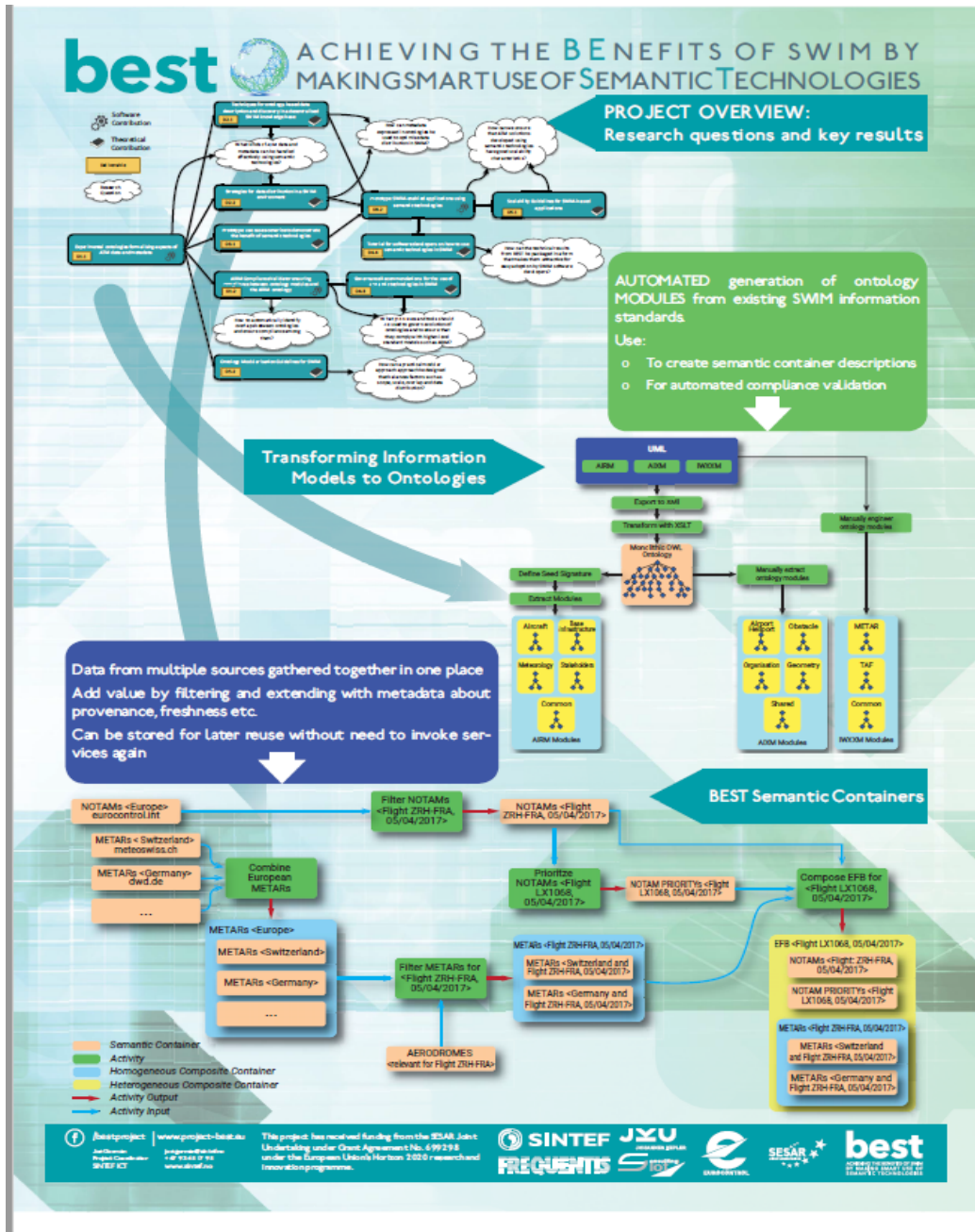


Figure 4 BEST - Project poster for SID 2017

3.2.2 Leaflet

The project has created a leaflet that introduces the project in a brief format and it was available for distribution for the entire duration of the project. The leaflet is explaining the concept of the project, showing the expected results.

ACHIEVING THE BENEFITS OF SWIM BY MAKING SMART USE OF SEMANTIC TECHNOLOGIES

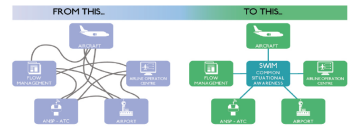
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WHAT IS BEST?

BEST is a SESAR Exploratory Research project providing on a new way of information handling. BEST will determine how semantic technologies can be used effectively to maximise the benefits of adopting System Wide Information Management (SWIM), one of the major results of SESAR. SWIM offers an "Information sharing" approach to ATM information management and its adoption offers advantages for better situational awareness and information management. SWIM means in principle that all aviation related information will be available for those who need it from the source that is best placed to provide it. This represents a real shift from today's bilateral aviation ICT environment to a real network based approach, as illustrated in the figure below.



EXPECTED CONCRETE RESULTS

- Prototype SWIM-enabled applications.** R1 is a proof-of-concept prototype to demonstrate the potential of the semantic-based approach used in BEST. It is built using semantic technologies and demonstrated in 2 pilot demonstrators.
- Experimental ontologies formalizing aspects of ATM data/metadata.** The ontologies are used for describing the content in semantic data containers / decentralized knowledge bases.
- Techniques for ontology-based data description and discovery in a decentralized SWIM knowledge base.** R3 comprises a method for the semantic description of data products providing requirements on how to formalize ontologies and techniques for discovering most relevant data products for a given information need.
- AIRM compliance validator** is a prototype software application that will identify correspondences among an AIRM Ontology developed as a representation of the AIRM Information Models and the ontology modules developed in BEST.
- Strategies for data distribution in a SWIM Environment.** R5 comprises an ontology-based language for describing data distribution, including data lineage and freshness requirements.
- Tutorial for software developers** describes how to use semantic technologies in SWIM.
- Ontology modularisation guidelines for SWIM** gives guidelines on how different ontology modules can be recombined into a consistent and coherent network of ontology modules.
- Scalability Guidelines for SWIM-based applications** gives guidelines on how applications using semantic technology can be applied in the ATM domain with good scalability characteristics.
- Governance Recommendations** for the use of semantic technologies in SWIM describes an overall approach to governance that deals with the emergence and evolution of ontologies in ATM. An emphasis will be put on how ontologies can co-exist and co-evolve and how to manage their dependencies with AIRM and other relevant information exchange models.

WHAT IS AIRM?

AIRM (ATM Information Reference Model) is a standardised information model for ATM designed to ensure that the information communicated in SWIM is clearly and uniquely defined and well understood. The AIRM comes as a package containing explanatory material and **Unified Modelling Language (UML)** models and the BEST project will employ these models and related specifications as a basis for the ontology development in the project. The **AIRM UML** models are structured to satisfy the needs of several different audiences and its use as a common reference. The models promote semantic interoperability between operational experts, systems and services within the European ATM Network.

Semantic interoperability ensures that the precise meaning of exchanged information is preserved and understood by all parties. The AIRM is recognised in the **ICAO Global Air Navigation Plan** and in the **European Union's Pilot Common Project**. The AIRM will become a EUROCONTROL specification.

WHAT ARE SEMANTIC TECHNOLOGIES?

Semantic technologies are a group of technologies that contribute to **establishing and employing context associated with data**. This is facilitated by linking data with other data through formalized and expressive associations. This enables machines as well as people to understand, share, and derive facts from this interrelated and context-enhanced data at execution time. With semantic technologies, adding, changing and implementing new relationships or interconnecting programs in a different way can be just as simple as changing the external model that these programs share.

WHAT IS ONTOLOGY?

Ontologies are **formal conceptual domain models with precise and unambiguous concept definitions**, fixing the meaning of types, properties, and interrelations of the entities that exist for a particular domain of discourse. The web ontology language OWL is the de-facto standard for specifying such ontologies and sharing them in decentralized information systems. By using an ontology, the various actors in a decentralized information system commit to the shared understanding of concepts as defined in the ontology, thus avoiding misunderstandings in their communications.

WHAT SORT OF BENEFITS MIGHT USING ONTOLOGIES BRING?

Semantic technologies provide the means to describe, organise and retrieve relevant ATM data according to the actual needs of the end-user. This is accomplished by expressive and machine-readable links between metadata concepts (used for describing the actual ATM data) in ontologies, employing these links when organising the concepts in the knowledge base, and consequently supporting the end-user information need by returning data from semantic queries utilising the associations in the knowledge base.

While the communicated data itself will be expressed using standardized exchange data models (such as AIXM, FIXM, IWXXM), the data describing the data (the metadata) is defined according to one coherent vocabulary, represented by the **AIRM ontology modules developed in BEST**. Thus, the semantic applications do not interfere with the standardized exchange data models.

The BEST decentralized knowledge base, which applies the metadata concepts of the AIRM ontology modules, includes a set of mechanisms that filter and retrieve the available data with respect to relevance and appropriate data distribution strategies. In combination with the concepts expressed in the AIRM ontology modules, the knowledge base assists the user in formulating the information need and in providing the most relevant information according to this need.

WILL THE PROJECT PRODUCE ANY TOOLS OR DEMONSTRATIONS?

The project will develop a **prototype application that will be demonstrated to and tested by the SWIM community**. The prototype will demonstrate how the specifications and developments in earlier parts of the project can contribute to realise the benefits of semantic technologies in a SWIM setting. Furthermore, the prototype application will be evaluated with respect to its scalability in such an ATM environment, and how the composition of the underlying semantic building blocks (i.e. the ontologies, the knowledge base and the data distribution strategies) can best be organised.

Furthermore, the project will develop a **compliance validator application that will help assure that ontology modules used in semantic applications are compliant with the standardized AIRM data models**. This helps to detect discrepancies between intended and actual usage, and to ensure that the AIRM data models and the ontology infrastructure can co-evolve.

BEST OPERATIONAL SCENARIOS

The operational scenarios illustrate how BEST supports SWIM by comparing how information management and associated processes are performed currently, with SWIM, and in a **SWIM-and-BEST** enabled setting in order to highlight the benefits of the BEST approach.

Some of the operational scenarios defined are:

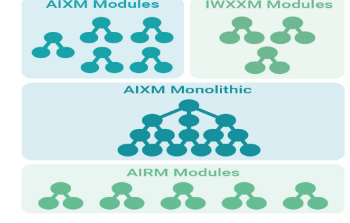
- Rerouting of Flights
- Failure of a Data Provider
- Sectorless ATC
- Quality rated ATM Information

The use case scenarios further define the scope of the prototype developments performed in the BEST project. The use case scenarios adopt the operational scenarios to support the development, configuration and deployment of the prototype application that will support the demonstration activities to be performed within the BEST project.

BEST ONTOLOGY INFRASTRUCTURE

The BEST ontology infrastructure includes a **monolithic ontology developed from the ATM Information Reference Model (AIRM) UML model** and a set of 13 ontology modules, each representing different sub-areas of ATM information exchange, extracted from the **Aeronautical**

Information Exchange Model (AIXM) and the **ICAO Meteorological Information Exchange Model (IWXXM)**. All ontologies are formalised in the OWL ontology language. The ontologies will be used as vocabulary for describing and supporting retrieval of relevant aeronautical information supported by the **BEST Semantic Containers**. Furthermore, the ontologies and the experiences from their development form a baseline for the establishment of guidelines describing how semantic technologies can be applied to support information exchange in a SWIM environment.



BEST SEMANTIC CONTAINERS

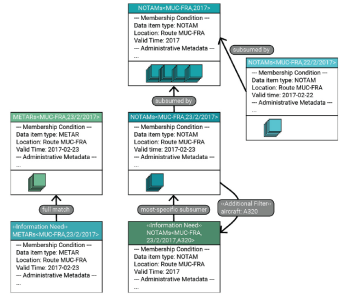
The upcoming **System Wide Information Management (SWIM)** within the aviation industry is accessed via services to ensure common situational awareness among all stakeholders. But, there are also limitations within SWIM. Generic filtering and aggregation of the data for specific purposes is not foreseen in the SWIM concept itself. SWIM also lacks administrative metadata for expressing the quality of the data, their provenance, as well as semantic, temporal, and spatial facets associated with the data. Developing **value-added data services and applications in SWIM** will encompass finding, selecting, filtering and composition of data from different sources (the "data logic"). Without dedicated support for these tasks, the data logic will likely be hard-coded in applications and service implementations, intertwined with business and presentation logic, which hinders reuse.

To overcome this problem, we introduce semantic containers as a means to encapsulate the data logic and clearly separate it from business and presentation logic. The provisioning of semantic containers for a specific purpose encompasses the discovery of existing source containers and often further value-adding processing steps such as filtering and annotating.

These tasks are supported by semi-automatic matching of information need and available data containers and services. Using a formal ontology-based specification of the information required for a specific operational scenario, the semantic container system can identify the missing processing steps that are necessary to generate a semantic container that fulfils the specified information need.

A **semantic container has content and description**. The content is a set of data items (such as NOTAM or METAR). The description includes a membership condition and administrative metadata, such as provenance, quality, and technical metadata. A semantic container should contain all and only data items that fulfil the membership condition, quality metadata (such as a last-update timestamp) gives indications of possible deviations of actual content from membership condition.

Subsumption reasoning allows for the hierarchization of data containers. A data container satisfies an information need if the translation of the information need into a container description is a subset of said data container. Consider, for example, the membership conditions of semantic containers in the illustration below. The membership condition of the container with label **'NOTAMS+MUC-FRA,2017'** subsumes the membership condition of the container with label **'NOTAMS+MUC-FRA,23/2/2017'**. The former semantic container contains all NOTAMs relevant for flight route **MUC-FRA** valid in year 2017. The latter is more specific a date description and contains NOTAMs relevant for the same route but only those with a valid time intersecting with day 23/2/2017.



SUPPORTED BY

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Table 1 BEST- leaflet

3.2.3 Conferences

The consortium partners have created a number of papers and presentations to be presented at conferences in line with D4.2 ³The following table provides information on these activities:

³ “Dissemination, communication and project promotion plan”



ID	Ref original plan ³	Topic	Event/Presentation	Main Authors	Published	Status	Date/Place	Remarks
01	E1	BEST project poster I	SESAR Innovation Days (SID) 2016	Multiple consortium members	Published at the project's website	01 Achieved	Nov 8-10, 2016, Delft, Netherlands	
02	E2	Ontology-based data description and discovery in a SWIM environment.	Integrated Communications, Navigation, and Surveillance (ICNS) 2017	Christoph Schuetz	Paper officially published via IEEE	01 Achieved	April 18-20, 2017, Washington DC, USA	Won the "Best in track" award. Presented and published.
03	E4	"Semantic Data Containers for Realizing the Full Potential of System Wide Information Management", focuses on the use-cases of a SWIM container system.	Digital Avionics Systems Conference (DASC) 2017	Eduard Gringinger	Paper officially published via IEEE	01 Achieved	21/09/2017, St. Petersburg, Florida, USA	Presented, published. During the Conference a Meeting with Rich Keller (NASA) is planned who is working on an FAA ATM ontology.

ID	Ref original plan ³	Topic	Event/Presentation	Main Authors	Published	Status	Date/Place	Remarks
04	E5	The US Federal Aviation Authority (FAA) and EUROCONTROL are hosting the 2017 Air Transportation Information Exchange Conference (ATIEC 2017) in Brussels. The theme of the event will be "Information Exchange Specifications supporting the ICAO Global Air Navigation Plan".	Air Transportation Information Exchange Conference (ATIEC 2017)	Eduard Gringinger, Frequentis		01 Achieved	5 - 6 October 2017, Brussels, Belgium	Participated
05	E7	Semantics-Based Summarization of ATM Information to Manage Information Overload in Pilot Briefings	31st Congress of the International Council of the Aeronautical Sciences (ICAS) 2018	Christoph Schuetz, Bernd Neumayr, Michael Schrefl, Scott Wilson, Eduard Gringinger		01 Achieved	01/09/2018, Belo Horizonte, Brazil	Paper accepted. Abstract was among the limited number (around 20 out of 860) selected by members of the ICAS Programme Committee for consideration for the Special Issue. This special issue will be published in the Aeronautical Journal (the world's oldest aeronautics journal currently in production)!

ID	Ref original plan ³	Topic	Event/Presentation	Main Authors	Published	Status	Date/Place	Remarks
06	E9/P5	A paper describing the results of the scalability analysis performed in WP 5	International Conference on Performance Engineering (ICPE) 2018	Gunnar Brataas, Christoph Schuetz, Bernd Neumayr		01 Achieved	15/04/2018, Berlin, Germany	Paper accepted
07	NEW	BEST project poster II	SID Belgrade, 2017	Multiple consortium members	Published at the project's website	01 Achieved	28 - 30 November 2017, Belgrade	Presented, Published.
08	NEW	A paper reporting about the developments in D1.2 (AIRM Compliance Validator), with a focus on the ontology matching techniques used in BEST.	International Conference on Knowledge Engineering and Ontology Development (KEOD 18)	Audun Vennesland, Joe Gorman, Christoph Schuetz, Bernd Neumayr, Scott Wilson		02 Pending	02/05/2018, Sevilla, Spain	Paper being prepared.
09	NEW	Project overview	Transport Research Arena	Multiple consortium members		02 Pending	16-19 April 2018, Vienna,	Ideas being developed.

ID	Ref original plan ³	Topic	Event/Presentation	Main Authors	Published	Status	Date/Place	Remarks
							Austria	
10	NEW	Towards A Value-Added Information Layer For Swim: The Semantic Container	ICNS 2018	Eduard Gringinger, Christoph Schuetz, Bernd Neumayr, Michael Schrefl, Scott Wilson		01 Achieved	April 10-12 2018, Washington DC, USA	Won the "3 rd place paper in track" award. Presented and published.
11	NEW	Informal "Reference Group" event at EUROCONTROL: project results will be presented and discussed informally with Eurocontrol staff with different roles.	Informal Reference Group Event	Presentation material from multiple consortium members.		01 Achieved	April 16 2018, Eurocontrol, Brussels	
12	NEW	Presentation at PJ19.03 plenary meeting, with participation of chairman of SWIM Governance project, Stephan Dubet.	Presentation and discussion at technical meeting			02 Pending	Madrid, 22 March 2018	

ID	Ref original plan ³	Topic	Event/Presentation	Main Authors	Published	Status	Date/Place	Remarks
13	P6	Combination of the results of D2.1 and D2.2 with the results of the SemNOTAM project.	Publication Only	Multiple consortium members	Journal of Web Semantics	02 Pending	01/05/2018	
14	E6/P2	Focus on the applicability of the BEST ontology infrastructure for semantic container management developed in WP 2 and how reasoning can contribute to achieving an optimized SWIM environment.	Conference article (industry track) for International Semantic Web Conference (ISWC 2017)	Bernd Neumayr, Chritoph Scheutz, Audun Vennesland		03 Rejected	15/10/2017, Vienna, Austria	Paper was produced, but not accepted by the event.

ID	Ref original plan ³	Topic	Event/Presentation	Main Authors	Published	Status	Date/Place	Remarks
15	E3/P1	Describes the development of the BEST ontological infrastructure (from AIRM) and how it will be applied in the semantic container reasoning/management in WP 2. Details about the scope of the ontology infrastructure (given a use case scenario?), how we managed to transform from AIRM UML models to a representative OWL ontology (transformation rules, challenges and how we overcame these,...), and (prospective) use of semantic reasoning provided by some use cases (aligned with the scenario).	Conference article for Extended Semantic Web Conference (ESWC 2017)	Audun Vennesland, Bernd Neumayr, Christoph Schuetz		04 Dropped	27/05/2017, Portoroz, Slovenia	The conference was added as a candidate in an early phase of the project. However, this is a basic research conference not suited for the more applied ontology developments performed in D1.1 of BEST.

ID	Ref original plan ³	Topic	Event/Presentation	Main Authors	Published	Status	Date/Place	Remarks
16	E6/P3	Describing the (preliminary) results of the compliance validator on principles from ontology matching from WP1. Poster/demo paper?	Conference article (industry track) for International Semantic Web Conference (ISWC 2017)	Bernd Neumayr, Chritoph Scheutz, Audun Vennesland		04 Dropped	15/10/2017, Vienna, Austria	Technical work on the compliance validator was not sufficiently mature at this time. The work will instead be described in a paper for KEOD 2018.
17	E8/P4	Describing the SWIM applications developed in WP 3 and how the different technological innovations from WP 1 and WP 2 help realize them. Also taking in (preliminary) results from the evaluation of the ontology infrastructure (monolithic vs modular) from WP 5	European Semantic Web Conference (ESWC) 2018	Web Eduard Gringinger		04 Dropped	2018	The conference was added as a candidate in an early phase of the project. However, this is a basic research conference not suited for the more applied ontology developments performed in D1.1 of BEST.

Table 2 Planned, delivered and dropped conference appearances

The same table appears in the revised deliverable D4.2 “Dissemination Communication and project promotion plan”. It makes sense as it holds information on planned conference appearances that will happen after the project end. However, as a report on actually performed activities this deliverable should contain all the relevant data also. Therefore, the table is repeated here as well.

4 Regulatory Compliance

The consortium ensured it followed the H2020 rules. It acknowledges the H2020 and SJU role in its website and in the papers submitted to conferences. Extract of these are given here.

4.1 Website Footer

Funding information consists of EU flag and the following text: *“This project has received funding from the SESAR Joint Undertaking under Grant Agreement No. 699298, under European Union’s Horizon 2020 Research and Innovation programme.”* Is provided at the project website footer.

4.2 Conference Paper

The submitted papers contain the following acknowledgment:

“This project has received funding from the SESAR Joint Undertaking under grant agreement No 699298 under the European Union’s Horizon 2020 research and innovation program. The views expressed in this paper are those of the authors.”

5 Assessment

The following chapter describes the interaction between the project and the stakeholders, and an assessment of its possible impact. It is important to emphasise that there is a deliverable D4.1 “The Stakeholder view” devoted to describe this activity in detail.

5.1 Stakeholder involvement

The project partners considered it important to communicate with stakeholders. Therefore the project organised a couple of such occasions.

The first occasion was the “Survey”. The consortium decided that, as survey was conducted at the beginning of the project, it would not be reasonable to have a workshop. This was mainly because the results to discuss were few at that time. However, the project needed the response from the stakeholders regarding the idea of using semantics in ATM communications and evaluating some use case scenarios that the project intended to use. It also was a good opportunity to disseminate the project idea. Around one hundred individuals were approached and provided with the information about the project activities. The detailed description of the survey is available at deliverable D4.1 “Stakeholder view”⁴. The “Survey” had a positive impact in two ways: it raised awareness about the project and established the initial list of contacts that was used in subsequent stakeholder events; and it gave the project an initial insight into what stakeholders understood by semantic technologies and its potential impact.

Presenting a poster is another excellent way to interact with the stakeholders. The project created and displayed posters twice on the SESAR Information Days. The colleagues presenting the posters reported that the presented posters generated sufficient interest from the participating public and that they had a good deal of discussions with the stakeholders. This also added to achieving the goal of exploitation as well.

The leaflet was distributed widely ensuring once more that awareness about the project and its objectives for ATM was raised.

The project organised two stakeholder workshops closer to end of the project with an aim to present the project results and to discuss their application with the stakeholders. The workshops went well and generated a lively discussion on real life application of the project results and the expected benefits. The detailed description is available at deliverable D4.1 “Stakeholder view”. The workshops had a very positive impact: the stakeholders became more engaged in the project and expressed a view that the research into semantic technologies in ATM should continue. Moreover, these interactions encouraged the production of a master-presentation which can be used in various environments. The master-presentation was a digest of the outputs of the project in an as easy to understand format as possible. As a result of this interaction, some key exploitation scenarios have been noted for further exploration.

Another discussion with the stakeholders was initiated at the SESAR project PJ19.03 plenary meeting where the project members have presented the project results and managed to discuss

⁴ D4.1 “The Stakeholder view” authors: Roland Gurály, Andrej Kocsis, Peter Vass

implementation with the stakeholders. More on this occasion is available at deliverable D4.1 "Stakeholder view".

Taking into consideration the difficulties of organising workshops the project decided to approach some individual experts personally and organise an interview with them. The goal of the interviews was to present the project's results and to discuss their real life application.

5.2 Conference involvement

The presentations and papers at conferences were accepted well. One presentation won the "Best of Track" Award at Integrated Communications Navigation and Surveillance (ICNS) Conference 2017. A further paper was awarded "Third place in track" at ICNS 2018.

The colleagues presenting the papers reported that they have managed to raise interest of the participating public and have had intense communication. They have discussed the project's objective and goals as well as they have discussed the application of the project's results. The writing of conference papers has had a positive impact on how semantic technologies are seen in the ATM community. This is amply illustrated by the awards given to the papers.

5.3 Website statistics

This section shows the statistics of the website visitors and analytic reports which are extracted from google analytics for the past 12 months.

Below bar chart shows the growth traffic of the website over past year. Obvious impact of the project dissemination and communication can be seen in average number of visitors which has changed from below 5 to more than 10 visitors a day.

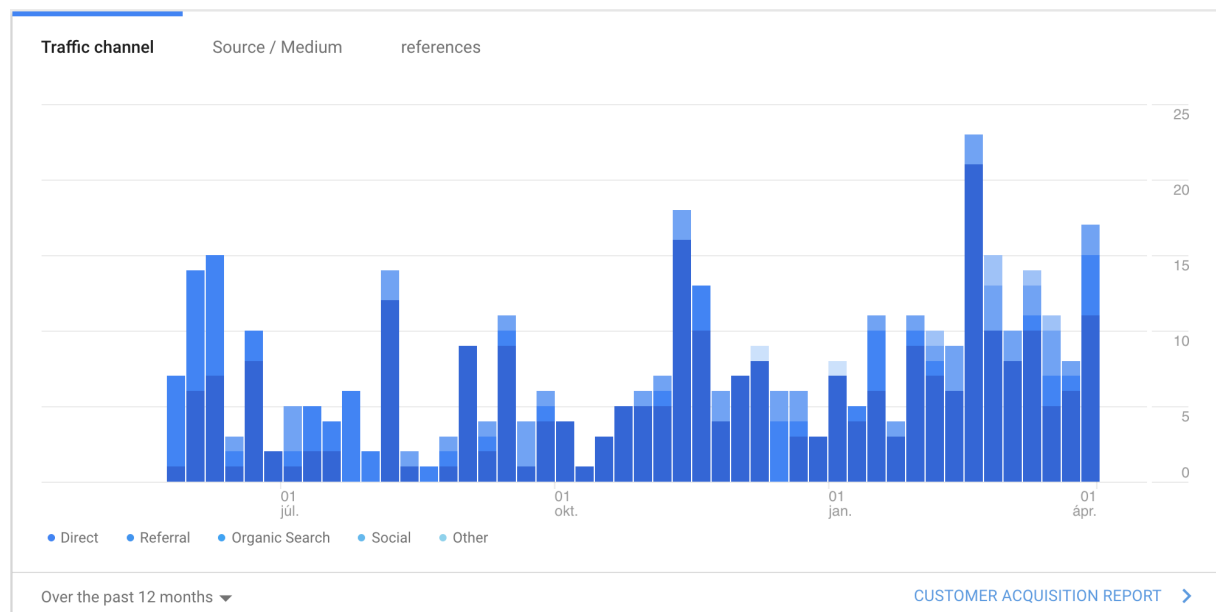


Figure 5: Website traffic

Active users chart has a slight increase in monthly users after October 2017 which shows the maturity and usefulness of the project materials in the website.

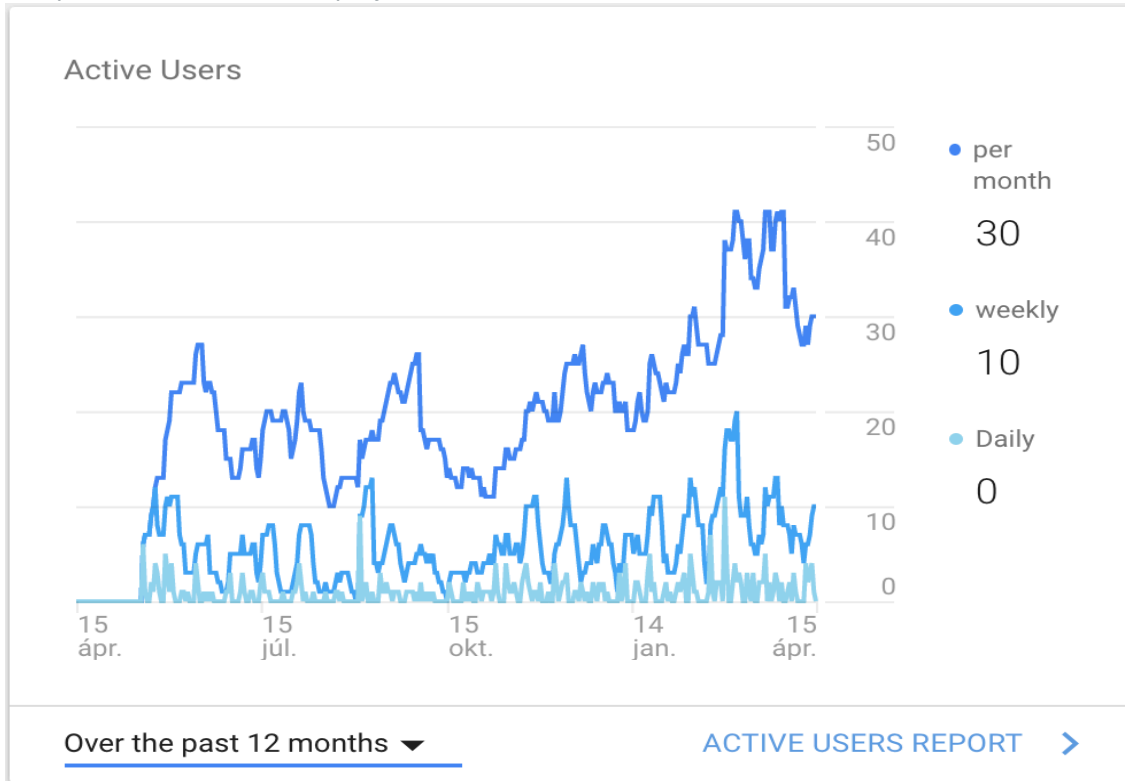


Figure 6: Active users

Figure 7 shows the website sessions per country. Surprisingly, illustrated that out of Europe countries were quite interested in the project progress and achievements. Australia, India, Brazil and united states had the highest session numbers apart from top European countries. Interestingly, the recorded sessions from US are higher than Norway and Belgium which are project members. In general, these analytic reports express that the maturity of the project’s outputs directly affects the website viewers around the world.

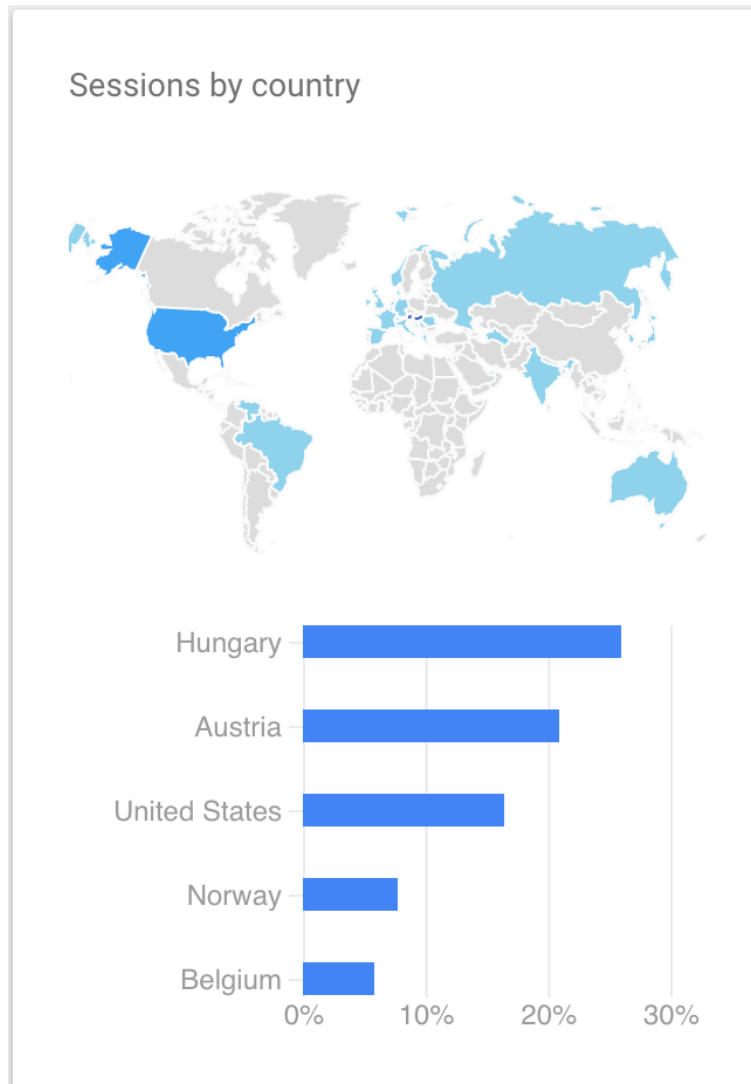


Figure 7: Countries

6 Conclusion

The project's topic complexity along with the essence of such basic research project in TRL1 were the initial barriers to prevent stakeholders from perceiving the major results. However, the novelty of the proposed solution in information sharing, caused an acceptable level of contribution from stakeholders and target users which were precisely explained above through a variety of dissemination and promotion activities.

The project partners have placed all results and potential future benefits in to the presentations, website, social media and communication channels with keen stakeholders. It turned out that some of the presentations are still ahead, however the presentation delivered so far show that there is a sufficient interest from the stakeholder side and the discussions related to the project results are really deep and constructive. despite the fact that the project topic and results not easily comprehensible the discussions on exploitation of the project results and the use case scenarios were lively and provided good results.

Moreover, the website statistics showed that the interest to the project and its results was rising as the results took more mature form and were presentable on the conferences and further events. So the project maturity, has directly affected the clarity in the final proposed results and consequently more users became eager about the future of the project. Indeed, the stakeholder involvement and their fruitful suggestions made a huge impact on the project vision refinement and further development.

7 References

Generally, the majority content of this deliverable is originated from the outcome and results of the D4.2 (Dissemination, communication and project promotion plan) which aimed to establish the required guidelines and schedule for such activities.





Moreover, variety of inputs from the project website, presentations, conferences and further promotional activities were contributed to generate this report.

<http://www.project-best.eu/publications.html>

[1] Roland Gurály, Andrej Kocsis, Peter Vass D4.1 “Stakeholder view”

[2] Roland Gurály, Andrej Kocsis, Peter Vass D4 2 “Dissemination Communication and project promotion plan”

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