

Grant Agreement No.: 7750824

Call: IDEJE

Hybrid Integrated Satellite and Terrestrial Access Network



D7.2: Mid-term report on dissemination and communication activities

Work package	WP 7
Subactivity	T7.1, T7.2
Due date	30/6/2023
Submission date	30/6/2023
Deliverable lead	ICEF
Version	1.0
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Document Revision History

Version	Date	Description of change	List of contributor(s)
V0.1	21/6/2023	1 st version of D7.1	Dejan Drajić
V0.2	27/6/2023	2 nd version of D7.1	Predrag Ivaniš
V0.3	28/6/2023	3 rd version of D7.1	Goran Đorđević
V1.0	30/6/2023	Final version	Dejan Drajić

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ACKNOWLEDGMENT



This deliverable has been written in the context of hi-STAR project who has received funding from the Science Fund of the Republic of Serbia, Programme IDEJE under grant agreement n° 7750284.







EXECUTIVE SUMMARY

The hi-STAR project addresses one of the most critical challenges for the next generation wireless networks, which is integration of non-terrestrial networks with terrestrial 5G network. The general objective of the project is to develop flexible framework for integrated terrestrial 5G and Low-Earth-Orbit (LEO) satellite networks, where traffic management is performed with assistance of newly developed artificial intelligence methods.

This deliverable is a result of the work done in the context of WP7 Subtask T7.1 – Website, communication channels and project dissemination materials and WP7 Subtask T7.2 – Publishing results at journals and conferences. While in the deliverable D7.1 is presented description of developed project website and project dissemination and communication plan, this deliverable D7.2 present Mid-term report on realized dissemination and communication activities in the first period of the project (M1-M18). Consequently, deliverable D7.3 will be Final report on dissemination and communication activities in the second period of project and will be an update of D7.2 deliverable for the period (M19-M36).



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ABBREVIATIONS

AI Artificial Intelligence

F2F Face to Face

IoT Internet of Things

KPI Key Performance Indicator

LEO Low-Earth-Orbit

PCE Project collaborative environment

WP Work Package



SECTION 1 - INTRODUCTION

The initial work carried out in WP7 Subtask 7.1 is summarized in the first deliverable D7.1. presenting work done by the end of M1 of the project (description of developed project website and project dissemination and communication plan). Deliverable D7.2 Mid-term report on dissemination and communication activities is extension of D7.1. and summarizes realized activities on dissemination and communication activities in the first period of the project (M1-M18) in the context of WP7 Subtask T7.1 – Website, communication channels and project dissemination materials and WP7 Subtask T7.2 – Publishing results at journals and conferences. Consequently, deliverable D7.3 will be Final report on dissemination and communication activities in the second period of project and will be an update of D7.2 deliverable (M19-M36).

This deliverable is structured as follows: In Section 2 dissemination strategy is presented. Target groups and dissemination activities are defined. Section 3 defines dissemination materials and activities (project branding, dissemination materials, contribution and participation in events) and dissemination channels (web site, social networks accounts and other channels) are demonstrated. In Section 4 programme and project-internal dissemination activities are explained. Section 5 concludes the document.



SECTION 2 – DISSEMINATION STRATEGY

To enhance the impact and improve the exploitation potential of the action, a global dissemination strategy has been tailored from the early stages of the project. The goal of the dissemination strategy is to foster the dissemination of the hi-STAR results to the targeted communities, in order to attract different types of potential stakeholders, such as scientific and technical communities, businesses, policy making bodies, academic institutions and users (professional and general public).

Dissemination will be stimulated both at consortium level and partners' level, and will revolve around the following methodology:

- Define what will be disseminated; the dissemination "products" and when (during and after the project).
- Identify the target groups for dissemination.
- Establish the appropriate source for the dissemination activities (in terms of roles and responsibilities).
- Raise public awareness about the project achievements through the most suitable means for communicating with the respective target groups.

Besides, hi-STAR consortium will communicate specific findings during the course of the project, for example via publications in local and national journals or paper submissions to conferences and workshops.

The dissemination will create interest and interactions between the Consortium and interested parties. The activities ensure that the different target groups are addressed in an appropriate manner. The results of hi-STAR should garner interest in several specific communities. In particular the external stakeholders to be targeted are:

- **Scientific Communities** that focus on for instance 5G networks, satellite communications, artificial intelligence, information theory, FPGA programming, software defined networks, and Internet of Things research.
- **Technical Communities** who are interested in the methodologies and tool prototypes developed in the area of 5G networks, satellite communications and Internet of things.
- **Business Entities** who would like to use the project results to develop products and services based on end-users needs, applications of artificial intelligence in 5G networks and on Internet of things technologies.
- Policy Making Bodies such as ITU and 3GPP.
- **General Public,** in particular those who have experience with 5G and satellite networks, loT use and engaging in technology development projects.

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D7.2: Mid-term report on dissemination and communication activities

Dissemination activities will be performed during the whole life-cycle of the project, together with a regular review of their effectiveness, in order to allow modifications and adoptions according to the current project life-cycle stage. The main foreseen activities are:

- Publication and promotion on the project website and social medias;
- Promotion of the project;
- Face to Face (F2F) meetings;
- Dissemination of project leaflets and other promotional material;
- Organization of presentations, workshops;
- Publication of a scientific paper in the conferences and the journals;
- Video elaborations to promote project scope;
- Newspaper articles and interviews.

These activities could be categorized as primary and secondary dissemination mechanisms described below.

Primary dissemination mechanisms

The following is a sample of the primary dissemination mechanisms which will be utilised by the hi-STAR project, that are more dynamic and can be easily distributed to wider public:

- hi-STAR Website: The project web portal, with the latest project results will be a key element of the communication strategy.
- **Social Networks**: Creating profiles and disseminating information and engaging in crowdsourcing through social networks such as Facebook and LinkedIn.
- YouTube video: Promoting project ideas and results through YouTube video.
- **Newspaper articles, TV interviews**: Press releases will be used to disseminate hi-STAR project results to wider audience.

Secondary dissemination mechanisms

The secondary dissemination mechanisms which will be utilised by the hi-STAR project, targeting more specific audiences, are:

- Participation at Conferences and Workshops: These events will be important in disseminating hi-STAR results and getting inputs to the project's strategic actions from interested stakeholders.
- Publications, Presentations, Posters: The hi-STAR partners will identify suitable events to
 disseminate the projects results. This will be via presentations and posters, and will
 include industrial and scientific events, conferences, workshops, invited presentations.
- **hi-STAR A4 flyers:** An A4 flyers and factsheet will be used as an inexpensive way to promote hi-STAR project in conferences.



SECTION 3 – DISSEMINATION MATERIALS AND ACTIVITIES

This section presents the dissemination material that will be created and activities and planned activities that will be undertaken by hi-STAR partners from the beginning of the project.

3.1. HI-STAR LOGO

The hi-STAR Logo was created to provide the project with a clear visual identity. hi-STAR Logo is shown on the Figure 1.



Figure 1: hi-STAR Logo

3.2. HI-STAR WEBSITE

A project website is designed, set up and will be continuously updated throughout the project duration. In order to follow and complement identity of the project defined by hi-STAR logo, the same colours are dominant also in the web site. The project web site is located in https://hi-star.etf.bg.ac.rs/. The web site is regularly updated with the public results and deliverables of the project as well as with news, agenda, events and articles about project results. As an initial contact point for both general public and hi-STAR users and stakeholders, the project website presents an overview of the work being carried out by hi-STAR.

The web site contains the following information:

- **Home** the home page of the project contains the project overview.
- **Objectives** contains the main project objectives.
- **Consortium** links to the all project partners are given and companies that provided letter of support to the project.
- **Deliverables** contains all publicly available deliverables of the project.
- **Publications** contains all publicly available publications of the project.
- Workshops contains info about conducted workshops.
- **News** project news are presented here and related events were partners were participated and where plan to participate.
- **About us** contains info all project participants.

Beside that, the following information about the project is provided on the Home page:

- Project info
- Contact
- Links to the social networks

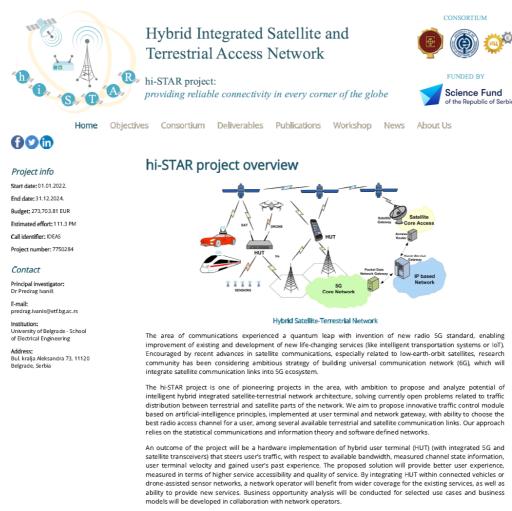


Figure 2: hi-STAR web site

3.2.1. GOOGLE ANALYTICS

In order to get a better understanding of the usage of the hi-STAR project website, it was registered with the free Google Analytics facility. This enables powerful reporting on the website access statistics, giving a very clear picture of information such as:

- How many users are visiting the site;
- What links and pages are most popular;
- What websites users are coming from;
- Where visitors are coming from geographically.



Google Analytics is expected to help the consortium determine the effectiveness of its web tools and targeted dissemination activities.

Here we are not collecting any IP addresses, nor any other data related to the web site visitors. We are extracting only information about the number of hi-STAR web site visits in the observed time interval.

3.3. HI-STAR PROJECT POSTER/ROLL-UP

The Project poster/roll-up is created in an A1 format to present the project and its expected achievements. It contains:

- a box describing the "project at a glance", containing the main features of the project, such as number of months, funding, etc...;
- the logo;
- the list of partners;
- explanation of what hi-STAR is, project main objectives and expected contributions.

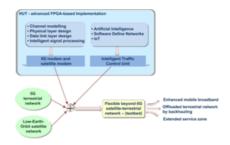
Poster is presented in the Figure 3.





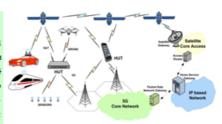
WHAT IS hi-STAR?

The hi-STAR project addresses one of the most critical challenges for the next generation wireless networks, which is integration of non-terrestrial networks with terrestrial 5G network. The general objective of the project is to develop flexible framework for integrated terrestrial 5G and Low-Earth-Orbit (LEO) satellite networks, where traffic management is performed with assistance of newly developed artificial intelligence methods.



MAIN PROJECT OBJECTIVES

- To design and analyze innovative integrated satelliteterrestrial network
- To implement high-performance moderns for satellite and terrestrial channels on advanced FPGA boards
- To develop novel Hybrid User Terminal (HUT)
- To design intelligent network core traffic distribution controller
- To experimentally demonstrate the key concept and advanced techniques



WHAT hi-STAR WILL BRING?

An outcome of the project will be a hardware implementation of HUT (with integrated 5G and satellite transceivers) that steers user's traffic, with respect to available bandwidth, measured channel state information, user terminal velocity and gained user's past experience.

The proposed solution will provide better user experience, measured in terms of higher service accessibility and quality of service.

By integrating HUT within connected vehicles or droneassisted sensor networks, a network operator will benefit from wider coverage for the existing services, as well as ability to provide new services.

Business opportunity analysis will be conducted for selected use cases and business models will be developed in collaboration with network operators.

Program: Call IDEAS, grant agreement No 7750284 flunding from the Science Fund of the Republic of Serbia

Total cost: 273,703.81 EUR Start date: 1. January 2022 Duration: 36 months

PI: Dr Predrag Ivaniš, predrag.ivanis@etf.rs

Research and Innovation Challenge - integration of satellites with fifth-generation (5G) terrestrial network







Consortium:

University of Belgrade - School of Electrical Engineering ETF, University of Niš - Faculty of Electronic Engineering FEE-UNIS, Innovation Centre School of Electrical Engineering in Belgrade ICEF

Figure 3: hi-STAR project poster

3.4. HI-STAR FACTSHEET, FLYERS

The Project Factsheet (Figure 4.) contains the following information about project:

- a box describing the "project at a glance", containing the main features of the project, such as number of months, funding, etc...;
- the logo;
- abstract, keywords;
- the list of partners;



- explanation of the hi-STAR challenge, project main objectives and concept (approach);
- target users and their needs.

It is created to be printed in an A4 format and represents a major dissemination tool, as it will be used in all the events attended by partners of the hi-STAR project.

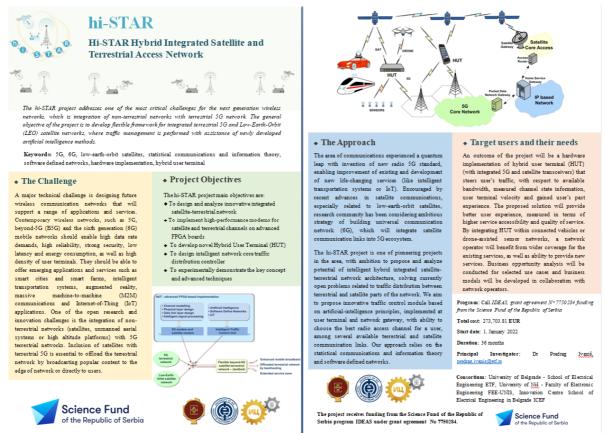


Figure 4: hi-STAR factsheet

3.5. HI-STAR VIDEOS

A film about the project motivation, objectives and expected results will be created. This video will be available on the official hi-STAR Youtube channel.

3.6. TEMPLATES

Project templates have been generated for presentations (.PPT) and deliverable reports (.docx). In this way the hi-STAR visual identity including the logo will become recognizable and project visibility will be further expanded. Project presentation is created.

3.7. SOCIAL NETWORKS



Hi-STAR will actively use social networks to promote the project activities, news, and results. The following social network profiles (Facebook and LinkedIn) were set-up at the very beginning of the project including public information about the hi-STAR. These profiles will be regularly updated during the project lifetime and related KPIs will be monitored. Twitter account was also created at the beginning of the project, but due to the change of Twitter ownership and usage, subscription and privacy policy, we decided not to use this social network for dissemination.

3.7.1 LINKEDIN

A hi-STAR LinkedIn group https://www.linkedin.com/company/82260202/ has been created. A hi-STAR group on LinkedIn allows registered users to maintain a list of contact details of people in the area of 5G/AI/Satelite communications/IoT. The contact network consists of direct connections, the connections of each of their connections and also the connections of second-degree connections.

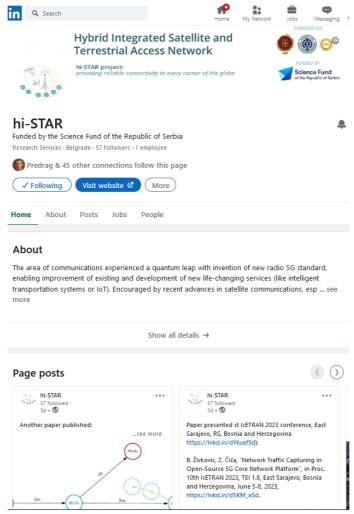


Figure 5: hi-STAR on LinkedIn

3.7.2. FACEBOOK

Hi-STAR project has a Facebook profile https://www.facebook.com/hiSTAR2022 which aim is to promote the project ideas and enable crowdsourcing through social networks. In this way different stakeholders can be notified of certain events, or different ideas can be targeted at certain groups which are already present on the Facebook. Also, the personal hi-STAR open group on Facebook allows adding other users as members, and exchanging messages, including automatic notifications when members update their profiles.

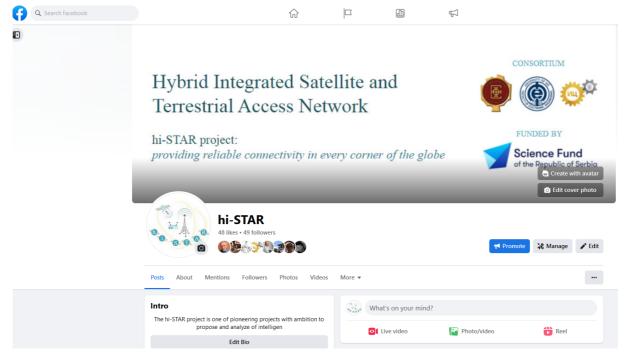


Figure 6: hi-STAR on Facebook

3.8. NEWSPAPER ARTICLES, TV INTERVIEWS

When there is significant progress in the project, a powerful means to reach out is to get interest from the press, usually via a newspaper articles and TV interviews.

3.9. DISSEMINATING KNOWLEDGE

This section contains the dissemination activities carried out during the project and will be constantly updated during its lifetime. It contains information on the organization and the participation to events, papers and contribution to conference and journals, chapters in books etc.



3.9.1. PUBLICATIONS (BOOK CHAPTERS, JOURNALS, SCIENCE CONFERENCES)

Table 1 : Book chapters, Journals, Science conferences

Event	Contribution	Participants	Date
MDPI Entropy	Journal article: "Suspicion Distillation Gradient Descent Bit-Flipping Algorithm"	ETF	April 2022
IEEE Communication Letters	Journal article: "Adaptive Gradient Descent Bit-Flipping Diversity Decoding"	ETF	October 2022
MDPI <i>Axioms</i>	Journal article: "Estimation of Truncation Error in Statistical Description of Communication Signals over mm- Wave Channels"	FEE	October 2022
Mathematics	Journal article: "Error Probability of a Coherent M-Ary PSK FSO System Influenced by Phase Noise"	FEE	January 2023
MDPI <i>Drones</i>	Journal article: "Capacity Analysis of Power Beacon-Assisted Industrial IoT System with UAV Data Collector"	ETF	February 2023
MDPI Sensors	Journal article: "Performance Analysis of Wirelessly Powered Cognitive Radio Network with Statistical CSI and Random Mobility"	ETF	May 2023
9th International conference on Electrical, Electronic and Computing Engineering, ICETRAN 2022	Conference paper: "Reliability of Earth - Space Links under Deep Fades with Interleaved Reed - Solomon Codes"	ETF	June 2022
9th International conference on Electrical, Electronic and Computing Engineering, ICETRAN 2022	Conference paper: "On Pulse Shaping for Generalized Faster than Nyquist Signaling with and without Equalization"	ETF	June 2022
9th International conference on Electrical, Electronic and Computing Engineering, ICETRAN 2022	Conference paper: "Effect of Phase Noise on Error Probability of MPSK Receiver over TWDP Channel - Simulation Study"	FEE	June 2022
57th International Scientific Conference on Information, Communication and Energy Systems and Technologies (ICEST 2022)	Conference paper: "Outage Probability of Mixed Satellite RF / Terrestrial FSO Cooperative System"	FEE	June 2022
13th International Symposium on	Conference paper:	ETF, FEE	July



Communication Systems, Networks and Digital Signal Processing (CSNDSP 2022)	"On the Secrecy Analysis of Satellite-Terrestrial Communication Link over Gamma-shadowed Ricean Fading Channels,"		2022
13th International Symposium on Communication Systems, Networks and Digital Signal Processing (CSNDSP 2022)	Conference paper: "Multidimensional LDPC-coded signal transmission over TWDP fading channel"	FEE	July 2022
2022 30th Telecommunications Forum (TELFOR 2022)	Conference paper: "Profiling of GNU Radio DVB-S2X transmitter using multi-core CPU and hardware accelerators"	ETF	Novemb. 2022
22nd International Symposium INFOTEH- JAHORINA (INFOTEH 2023)	Conference paper: "The method of generating shadowed Ricean fading with desired statistical properties"	ETF, FEE	March 2023
22nd International Symposium INFOTEH- JAHORINA (INFOTEH 2023)	Conference paper: "Survey of Network Selection and Vertical Handover Techniques in Heterogeneous Wireless Networks"	ICEF, ETF	March 2023
10th International conference on Electrical, Electronic and Computing Engineering, ICETRAN 2023	Conference paper: "Performance analysis of land mobile satellite-terrestrial systems with selection relaying"	ETF	June 2023
10th International conference on Electrical, Electronic and Computing Engineering, ICETRAN 2023	Conference paper: "Outage Performance of Mixed Shadowed Ricean/TWDP Relayed Assisted Link"	FEE, ETF	June 2023
10th International conference on Electrical, Electronic and Computing Engineering, ICETRAN 2023	Conference paper: "Network Traffic Capturing in Open-Source 5G Core Network Platform"	ETF	June 2023

3.9.2. CONFERENCES & WORKSHOPS

Table 2 : Conferences & Workshops

Dates	Event name	Contribution	Partners involved
28.3.2022.	COST Action CA19111 "European NEtWork on Future Generation Optical Wireless CommUnication TechnologieS (NEWFOCUS)", 4th Management Committee Meeting, Thessaloniki, Greece.	Project presentation	FEE
16.3.2023.	22nd International Symposium INFOTEH-JAHORINA (INFOTEH 2023)	Project presentation	ICEF
10.5.2023.	Second ICEF workshop - Presentation of scientific research work	Project presentation	ICEF





Figure 7: hi-STAR project presentation on Second ICEF workshop

3.10. WP7 KPIS

A set of key performance indicators (KPI) has been established and presented in the table below, including measurable objectives. The project outcomes will be regularly analysed by the Principal Investigator and WP7 leader from the KPIs perspective to monitor the success of the project. When the results are not positive, a backup solution will be taken into consideration and implemented. Table 3 shows the KPIs and measureable objectives of the WP7:

Table 3: hi-STAR WP7 KPIs table

Dimension	KPIs	Target	Current status
Subactivity 7.1. (monitored quarterly)	Yearly growth rate of visitors on the website Average duration of website visits	>100% 2 min	M12: 577 visits M18: 1246 (growth 116%) 2 min, 46 sec
	Number of likes of hi-STAR Facebook page per year Number of posts on hi-STAR Facebook page per year	30 15	48 27
	Number of connections on LinkedIn per year Number of posts on LinkedIn page per year	30 15	57 23



	Number of followers on Twitter per year Number of Tweets mentioning hi-STAR per year	20 15	N/A. This KPI is not monitored (this social network is not in usage).
	Number of published papers at JCR indexed journals/book chapters	15	6
	Number of conference papers	18	12
	Number of technical solutions	9	0
	Total number of citations	200	9
Subactivity 7.2. (monitored bi- yearly)	Average Increase of h-index per team member in percentage	30	5
	Number of novel PhD courses	2	0
	Number of PhD dissertations	3	0
	Number of proposals for new EU projects	1	0
	Number of new partnerships	1	0
	Number of new spin-offs in Serbia	1	0
Subactivity 7.3. (Will be measured in Y3)	Number of participants on the workshops	50	0

KPIs for Subactivity 7.1. are fully succeed. Regarding Subactivity 7.2. the values for most of the KPIs will be visible in the Y3 and later, since they are long-term KPIs and can't be measurable at the moment.



SECTION 4 – INTERNAL DISSEMINATION ACTIVITIES

4.1. FACE-TO-FACE MEETINGS

Face-to-face meetings and conferences are an integral part of the communication strategy. Face-to-face meetings will be decided on a case-to-case basis. We strive to hold them back to back with other meetings and events.

4.2. REGULAR ONLINE MEETINGS

Additional net meetings will be organized if and when useful, as a suitable way to reduce travel costs and to exchange information about the progress within single tasks.

Microsoft Teams, Zoom, or similar, will be used for e-meetings. The currently used e-meeting tools (and links for joining meetings) are sent to partners well in advance to meetings.

Plan for meetings: once a month on the second Thursday of each month. The meeting schedule is decided by the Principal Investigator, based on a Doodle poll filled in by partners.

4.3. PROJECT FILE REPOSITORY

Google Drive for Deliverables and other confidential documents is used as project file repository. Public deliverables are also available on hi-STAR web portal.

4.4. MAILING LISTS

To avoid unnecessary mailing messages, senders carefully select the recipients to the narrowest audience possible.

The distribution list hit-STAR@etf.bg.ac.rs is reaching out to all partners. Mailing lists are defined in the spread sheet on mail lists and committees which can be found in google drive.

4.5. HI-STAR PROJECT HANDBOOK

Internal confidential document "hi-STAR Project Handbook" was created. The overall purpose of this document including its supplements is to support the accomplishment of project objectives and targets. The targeted readers are all project participants.

The document provides key information about project objectives, plans, working procedures and project organisation. It also describes best practice in project management.

The content of this document is structured as follows:

- Definition, scope and basic facts about project
- Commitment and objectives
- Work-plan
- Financials
- Working procedures
- Organisation
- Project collaborative environment (PCE) and tools
- Naming & coding standards
- References



CONCLUSIONS

This document D7.2 Mid-term report on dissemination and communication activities is extension of D7.1. and summarizes realized activities on dissemination and communication activities in the first period of the project (M1-M18) in the context of WP7 Subtask T7.1 — Website, communication channels and project dissemination materials and WP7 Subtask T7.2 — Publishing results at journals and conferences. Presented materials will be continuously reviewed and updated throughout the project lifetime. The document D7.3 will be Final report on dissemination and communication activities in the second period of project and will be an update of D7.2 deliverable with activities performed in the period (M19-M36).