

FINAL DISSEMINATION REPORT

D5.6



MAY 30, 2022

VERSION 1.0



D5.6 – FINAL DISSEMINATION REPORT

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VERSIONS OF THE DOCUMENTS

Revision	Date	Description
0.1	07/04/2022	Initial version / Skeleton of the Document
0.2	19/05/2022	Final version sent for peer review (internal)
0.3	25/05/2022	Updates after internal review
1.0	30/05/2022	Final version after internal review

EXECUTIVE SUMMARY

This document is the final version of deliverable “D5.6 – Dissemination Report” of the European project “CERTIFIABLE LOCALISATION UNIT WITH GNSS IN THE RAILWAY ENVIRONMENT” (hereinafter also referred to as “CLUG”). The final version of this deliverable is due at T0+30 months of the project. This final version of the Dissemination Report presents the project communication and dissemination activities carried out during the whole duration of the project (01/12/2019 to 30/05/2022).

The objective of this deliverable, D5.6 is to report all dissemination activities for the project. It includes a presentation of the deliverables and outputs related to communication and dissemination activities since the beginning of the project including CLUG visual identity, dissemination material, website, conferences, events, and social networks.

In this report, all dissemination activities are presented in detail such as the creation of the project identity, the creation of the CLUG website, the publication of 17 articles on the CLUG website, the publication of the public deliverables, the production of two brochures and five newsletters, the participation to conferences and events and finally the organisation of the CLUG final event in Paris, France and online webinar for general public and experts alike.

The dissemination of the CLUG project activities and results is considered as an integral part of the project activities. The main objectives of the project dissemination can be summarized as follows:

- Increase the visibility, comprehension within the European railway sector, the EGNOS stakeholders, the consortium members, and the partners.
- Reach a large public and create new connections with external actors such as press organisations, the scientific community, civil society and finally the worldwide railway companies and industries.
- Promote the proposed solution towards the implementation of future European interoperability specifications (ERTMS L3).
- Highlight the result of the CLUG project and activities (deliverables, tests, articles...) all along the project steps.

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APPLICABLE DOCUMENTS

The following documents define the contractual requirements that all project partners are required to comply with:

- Grant Agreement N° 870276
- CLUG Consortium Agreement, CA96_20001_V2.7_CO
- CLUG Project Management Plan
- CLUG Communication and Strategy Action Plan

Each of the above documents was established at the start of the project, and copies were supplied to each partner.

In the event of a conflict between this document and any of the contractual documents referenced above, the contractual document(s) shall take precedence.

REFERENCES

CLUG. «Consortium Agreement.» 2020.

—. «D1.1 - Project Management Plan.» February 2020.

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Institute, Project Management. *A Guide to the PROJECT MANAGEMENT BODY OF KNOWLEDGE.* 2017.

ACRONYMS

C

CER : *Community of European Railway and Infrastructure Companies*

CLUG : *Certifiable Localisation Unit with GNSS in the railway environment*

E

ERA : *European Union Agency for Railways*

EU : *European Union*

EUG ERTMS User Group

W

WP : *Work Package*

1 INTRODUCTION

This document is the final version of the Dissemination Report of the CLUG project which covers the whole duration of the project (from 01/12/2019 to 30/05/2022). Dissemination activities are a core part of the project. Clear, specific, and measurable objectives are key to the success of any communications strategy.

The objective of this document is to trace the communication and dissemination activities of the WP5 of the CLUG project:

- Section 1 is the present introduction
- Section 2 will present the communication and dissemination plan
- Section 3 will present the communication and dissemination activities

2 COMMUNICATION AND DISSEMINATION PLAN

2.1 GOAL AND STRATEGY

Work Package (WP) 5 is responsible for the dissemination of the CLUG project results and coordinate this task at consortium level. To accomplish this objective, SNCF as WP5 leader and the contributors have defined the main guidelines for a high impact communication strategy. To multiply the impact on the people involved and enlarge the community reached by this effort, the CLUG project has developed links with ERA, railway stakeholders (eg. EUG, CER), railway industry (eg. UNISIG) and European Space stakeholders (e.g. EUSPA, EC, ESA) to engage them in the promotion of CLUG's public deliverables, general project news and events.

Hence, a strategy for dissemination of results has been planned as one of the strong components of the project and to which all partners are committed to contribute.

CLUG dissemination actions aim at communicating the project's objectives and results to a wide audience by promoting the adoption of project's results and demonstrating its impact, as well as by facilitating the exchange of information and the interaction not only with other related projects and initiatives but also with activities in industry, academia, and society. This process is managed in respect with the confidentiality and the rules defined in the CLUG Grant Agreement and the Consortium Agreement.

Dissemination has been made around 6 main pillars during the project (see Figure 1):

1. The project identity helping to clearly describe the project through a specific branding
2. The public information, notably all public deliverables and articles produced during the project
3. The public website used to promote the project and to disseminate public deliverables

4. The social media, playing a strategic role to show our continuous activities and progress and actively share our new publications on the website
5. The scientific publications, contribute to visibility and status to the project and its results
6. As well as the final in-person conference and the online webinar for the general public used to promote the project and the views for the future of rail localisation units.



Figure 1: Pillars of the dissemination and communication policy of the CLUG project

2.2 DISSEMINATION AND EXPLOITATION OF RESULTS

The aim of the CLUG project is to set up and to test an innovative localisation system based on the existing and future European GNSS. Innovative technologies will be explored and resulting concepts of the ongoing activities within CLUG will be shared across the rail transport sector. The outputs will be used to deliver new technology demonstrators, at pilot scale, and to present them to all the actors of the railway sector.

2.2.1 Dissemination among the main stakeholders

As SBB, DBN and SNCF are part of the ERTMS User Group and are highly involved in the Localisation Working Group (EUG-LWG), the results of CLUG have been largely disseminated in this group so that the experience gained during CLUG can benefit to push work on specification further. A specific NDA was even set up to allow the EUG members to have access to some confidential deliverables of the CLUG project.

SNCF, DBN and SBB shared with the other members their experience with this new kind of localisation system and notably their experience in defining performance requirements (RAMS). Taking as basis the work performed in CLUG, and building upon it, EUG-LWG is going to publish a version of the track occupancy concept that the operators would like to see in the future, including the definition of requirements based on operational needs as initiated in CLUG. The publication of the track occupancy concept is planned for June 2022 and documents will be notably shared with ERJU to be used as basis in the discussions in this group.

In addition, CLUG consortium members - SNCF and Airbus have strengthened their links with ESSP in the frame of another project i.e. EGNSS-R. EGNSS-R project aims at defining a EGNOS service for rail and the work performed was based on the concept initiated in CLUG.

2.2.2 Dissemination in the Shift2Rail Group

The consortium has benefitted from the fact that many members of the CLUG consortium (i.e. SNCF, DB Netz, SBB, SIEMENS & CAF) are also members of the Shift2Rail Joint Undertaking and are involved in the relevant WP. The X2RAIL5 project of Shift2rail TD2.4 has benefitted from the work performed in CLUG. The standardised format of inputs and outputs developed in CLUG have notably been used as basis for the work performed in X2RAIL5.

The demonstrators planned by SNCF on one side, and DBN/Siemens on the other side have been defined based on the work performed in CLUG, and therefore participate fully to the dissemination and reuse of the work initiated in CLUG.

SNCF worked with ADS to reuse the fusion algorithm developed in CLUG and complement it with outputs from another project called GREET. Moreover, SNCF and Airbus started to work on the integrity filter, defined but not developed in CLUG. Consequently, the X2RAIL5 demonstrator of SNCF will be an improved version the CLUG demonstrator.

On DBN/Siemens side, the CLUG demonstrator was reused to demonstrate the performance that could be obtained with an absolute failsafe positioning solution used as the odometry function of the current ERTMS standard.

2.2.3 Dissemination among industrial partners and public

The work performed in CLUG was shared during conferences and as well during the CLUG final event. We manage to reach a broad audience, explaining the benefit of using EGNOS and multi-sensor navigation for railway localisation solutions. The publications of articles on journals and during navigation related conference also participated to broaden the audience and awareness of the public to CLUG.

2.2.4 Dissemination of the raw data of the measurement campaigns

Specific data sets, i.e. a subsets of the data collected during the project, will be shared openly with the public so that universities, and research laboratory, or anyone intending to make research on train localisation, can access it and use it freely.

The data is made accessible through the CLUG Amazon Web Services (AWS) cloud services maintained by SNCF in the framework of the projects. The open access data will be made available at the end of the project through the AWS platform by registering on the AWS cloud to then be able to openly access the data through the link that will be provided to the public on the CLUG website.

3 COMMUNICATION AND DISSEMINATION ACTIVITIES

3.1 PROJECT IDENTITY

A project identity including templates for presentations and reports and the CLUG logo have been developed. The project identity helps the dissemination activities and ensure a consistent communication of the project concept, objectives, and results.

The project logo is used in the different following cases:

- All documents developed within the framework of the CLUG project and documents submitted to the EC
- PowerPoint presentations used for communication and dissemination activities

- Articles and other publications

by each participant within the framework of the project,

- CLUG website and websites of the participants with a link to the project website and social profiles.

The respect of the project visual identity in order to maximize the impact on the audience. For this purpose, templates with CLUG logo have been prepared for partners use:

- Deliverables (MS Word format)
- Meeting Calling Notices (MS Word format)
- Meeting Minutes (MS Word format)
- Presentations (MS PowerPoint format)



Figure 2 : CLUG project identity

3.2 PUBLIC WEBSITE

3.2.1 General presentation

The CLUG website is the main information channel of the project. The website is a user-friendly platform that collects relevant information about the project. It was created and updated carefully in order to improve the visibility for search engines (e.g. considering the Search Engine Optimization SEO). The website is publicly accessible and offer the visitors the possibility to subscribe to the email project newsletter.

The public website is available since 15/06/2020 at www.clugproject.eu in English and French. This portal is open to the public and displays throughout all the duration of the CLUG project the key project information, partners, results, news/events, and links to the partners' institutions. All the public deliverables will be published on the website and will be available for download.

The CLUG website is divided into four main sections in addition to the homepage; content is written in both English and French:

- **HOMEPAGE:** the home page is dedicated to present the CLUG project. It shows a selection of 3 latest news, partner logos and links, and an elegant representation of the key steps of the CLUG project.

[Home | The Clug Project](#) (EN) [Accueil | The Clug Project](#) (FR)

- **PRESENTATION:** this page presenting the context of the project with a detailed presentation, it also illustrated the objectives of the project and shows a focus on a structured workplan.
- **NEWS:** this part is dedicated to the promotion of our activities, it presents the latest news structured with filters, and articles to promote events, workshops and more.
- **PARTNERS:** this section is dedicated to the partners involved into the CLUG consortium. It shows logos, added value of each partner and links toward each partners website.
- **DELIVERABLES:** this part is dedicated the public deliverables promotion. This section displays all details of the public deliverables with the possibility to download the documents in their final status.



Figure 3: CLUG website homepage

3.2.2 Website KPIs

To understand the behaviour and to track all the CLUG website online traffic sources and KPIs, Google analytics have been used (since February 2021) to track and understand the user experience, online content, type of visitors in term of demographics, geography, and general interests online.

The number of users and pageviews are the fundamental basis for monitoring the traffic to the tracked website: since the launching of the January 30, 2021, the website got 12490 pageviews, 4226 users and 1844 returning visitors. In Google analytics, each visitor is initially considered as a user, but if the user visits the website for the very first time, Google analytics consider it as a “new user” and if the user visit the website more than once, it’s considered as “returning user”.

The demographic metrics are also important to understand from one part where the CLUG website users come from, it also helped us to maintain the languages used on the website which are English and French for all website

sections. And from another part the gender & age statistics to describe more precisely the CLUG website audience.

In this same demographic context, Google analytics provides several geographical dimensions, such as city, country, and continent, etc. Those statistics are automatically collected from the IP address of the website audience. CLUG website reached users from all over the world, which shows the international visibility gained throughout all the duration of the project concretely: 3059 from Europe, 791 from Americas, 295 from Asia, 63 from Africa, 29 from Oceania and one undefined user.

The most popular pages are first the English and French homepages which is normal because the main website link and QR codes redirect to the homepage. Followed by the English version of deliverables page with 1035 page views, and then by the English presentation with 776 pageviews.

Following a detailed KPIs dashboard of the CLUG website:

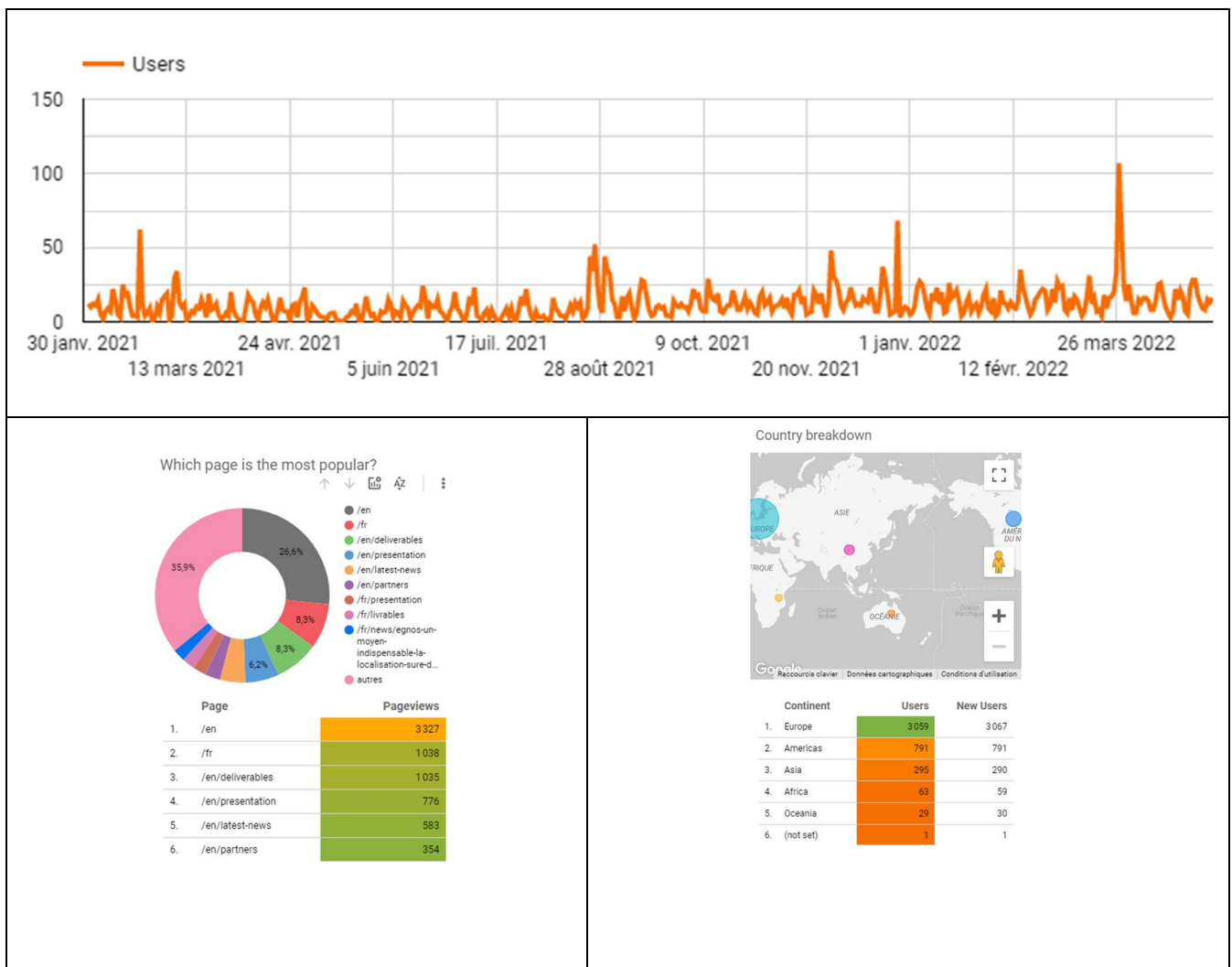


Figure 4: CLUG website dashboard

3.3 BROCHURE

3.3.1 The first version of the brochure

The first version of the project brochure was delivered at T0+10. The brochure is available in A5 format in English. The objective of the first brochure is to provide a wide audience with some preliminary information on the goals of the project, the structure, and main planned activities of the project.



Figure 5: Cover page of the CLUG brochure (V1)

The brochure is 8 pages long and contains 6 sections in addition to the cover page on the last page. The first section is a presentation of the project, followed by the main objectives of the project in the second section. The 3rd and 4th sections present the WBS, the milestones and the main architecture of the localisation module. The 5th and 6th sections present the consortium, the partners, and the project information.

This first version of the brochure was planned to be printed and distributed in InnoTrans 2020, but the event had been cancelled.

3.3.2 The second version of the brochure

The second version of the brochure is an 8 pages brochure combining text and infographics to easily communicate the core message of the project and simplify the presentation of the big amount of data and information. This brochure is divided into 3 parts:

- **The front panel** displaying the CLUG project logo, the project headlines (project vision and a brief project presentation) to grab the reader's attention and finally the contact section to keep in touch with the readers using a QR code of the CLUG LinkedIn page, the CLUG website link, the LinkedIn page and the CLUG email account for further contact.
- **The inner panel** presents in detail the project, its objectives, and the technical part notably: the test train and data analysis, system architecture and data management.

- **The final panel** is the last page of the brochure; this page displays principally an infographic of the CLUG project partners by country presented in Europe map. In addition of the project contact information (LinkedIn, email, website link).

The second version of the brochure (see Figure 6) was delivered at T0+25. 200 copies were printed and distributed in the EUROPEAN RAIL SUMMIT organised in Paris from February 21, 2022, to March 03, 2022, and during the CLUG final event that took place on May 19, 2022 in Paris. The second version of the brochure will also be distributed in the SmartRail congress that is scheduled to take place in Roma from the June 13, 2022, to June 15, 2022 and where CLUG outcomes will be presented by SNCF.

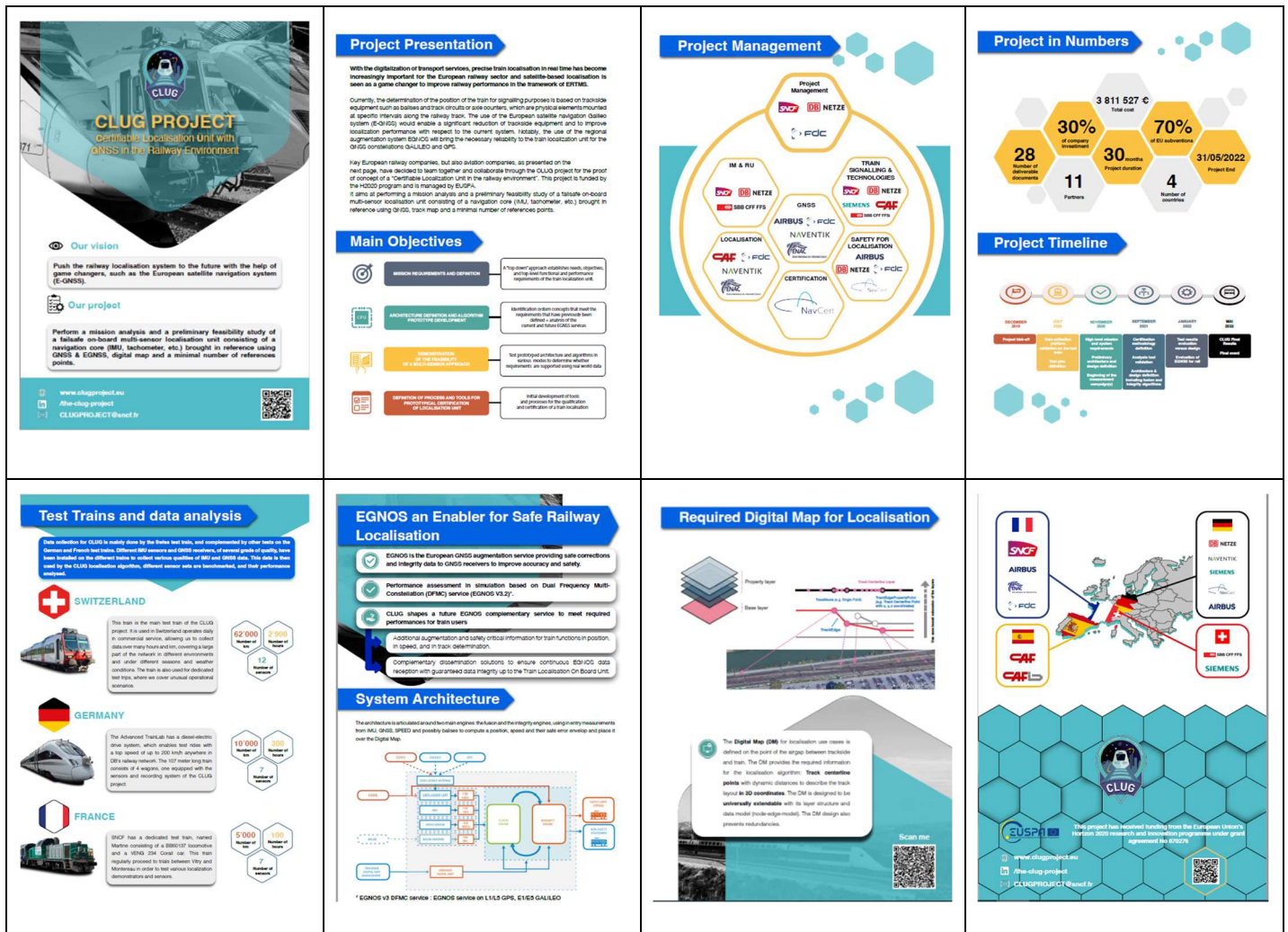


Figure 6: CLUG Brochure (V2)

3.4 SOCIAL NETWORKS

CLUG is present on two main professional social media accounts: LinkedIn (the-clug-project), and on Twitter (@theclugproject).

The purpose of CLUG presence on social media is to increase the awareness of the project activities by sharing every week to maximise the project impact. On Table 1, the Twitter and LinkedIn general metrics are presented:

Social media	Account name	Followers
LinkedIn	the-clug-project	668
Twitter	@theclugproject	27

Table 1: CLUG social media metrics

3.4.1 LINKEDIN

LinkedIn is the largest business-oriented networking website which gave us the opportunity to showcase the CLUG project and increase the project visibility among rail and space stakeholders, CLUG partners, researchers from all over the world. The posts were first shared only in English, but during the project, French was added as more than 40% of the page audience is located in France.

To improve the page performance, a monthly analysis of LinkedIn statistics & dashboard was important throughout all the period of the project.

The following table summarise the statistics by post from the launching of the LinkedIn account:

Month	Post date	Post title	Post Link	Impressions	Engagement rate (%)	Click-through rate (%)
June	June17, 2021	Data collection around the world	Link	1004	8,27	6,37%
	June23, 2021	Third CLUG newsletter	Link	1010	6,24	4,46
July	July 05, 2021	The revolution is underway	Link	4811	7,21	5,57
	July 27, 2021	The project presentation (Fr)	Link	1454	4,68	3,23
	July 27, 2021	The project presentation (En)	Link	1431	4,33	2,1
August	August 09,2021	The TLOBU unit	Link	2983	8,21	6,07
	August 24,2021	EGNOS an Enabler for Safe Railway Localization	Link	2497	7,05	4,89
September	September 17,2021	EUSPA article about CLUG	Link	1260	6,11	3,25
	September27,2021	GNSS augmentation usage for CLUG (D3.1.1)	Link	890	6,85	4,04

October	October11,2021	Limiting multipath error	Link	1001	5,19	3,4
	October 15, 2021	GNSS augmentation needs for rail (D3.4)	Link	1518	8,63	6,19
November	November 17,2021	Project end date update	Link	917	4,14	2,51
December	December 02,2021	The fourth newsletter	Link	634	6,31	4,57
	December 07,2021	EGNSS-R(Egnos and Galileo for rail)	Link	809	6,3	4,45
	December 21,2021	Challenges for GNSS in the railway environment	Link	1107	7,5	5,78
January	January 05,2022	The CLUG project on its way to certification	Link	1022	5,68	4,01
February	February 02,2022	CLUG brochure (Version 2)	Link	1180	7,37	4,92
	February 15,2022	The CLUG digital map	Link	1757	8,94	6,72
March	March 22, 2022	Test trains and data analysis	Link	1813	5,52	3,75
April	April 13, 2022	The CLUG final event	Link	1083	3,97	1,57
	April 19,2022	The CLUG final Webinar	Link	540	5,19	2,04
May	May 11, 2022	Establishing the security requirements for a GNSS-based TLOBU	Link	342	4,97	3,22
	May 24,2022	CLUG final event	Link	1279	34,95	30,84
	May 25,2022	Webinar: save the date [FR]	Link	15	0	0
	May 25,2022	Webinar: save the date [En]	Link	19	0	0
June	June 02, 2022	Clug Project : Many thanks !	Link	1077	4,3	2,5

June 08, 2022	CLUG Newsletter #5 Link	411	6,1	3,2
June 20, 2022	Data collection on the line Geneva-Annemasse Link	1221	5,7	3,3

Table 2: CLUG’s LinkedIn page KPIs

Figure 7 shows some extracts of CLUG LinkedIn posts that have been shared:



Figure 7: Examples of CLUG LinkedIn posts

3.4.2 TWITTER

Even though we used the same communication materials on both Twitter and LinkedIn, it was rather quickly visible that our LinkedIn page was reaching out a lot more than Twitter (see Table 1). Posts and communications were always made on Twitter as on LinkedIn, however, the communication team mainly used LinkedIn as reference to define the communication strategy.



Figure 8: CLUG tweets examples

3.5 NEWSLETTER

The CLUG project has produced five newsletters. The newsletters summarise and share all the quarterly results such as: the published articles, the approved deliverables, and the progress of CLUG activities.

The CLUG newsletter is divided into 4 main parts:

- **Nameplate:** this banner contains the newsletter title and number, the project logo, the newsletter main subject & headlines, the delivery date and finally a subscription bouton.
- **Editorial:** the purpose of this part is the enlightening of the most important subjects of the newsletter.
- **Contact panel:** this part contains CLUG social media links (Twitter, LinkedIn, and website link) to increase their visibility.
- **News:** this part contains the published articles since the previous newsletter delivery date.
- **Deliverables:** this part displays the new approved public deliverables.

Following a table summarizing all the newsletters information of the published newsletters from the launching of the project:

N°	Main subject	Publication date
1	Project launch	Jan 18, 2021
2	Switzerland test campaign	Mar 25, 2021
3	Data collection summary	Jun 22, 2021
4	Project postponement announcement	Dec 1, 2021
5	CLUG final event and webinar	June 01,2022

Table 3: CLUG newsletters general information

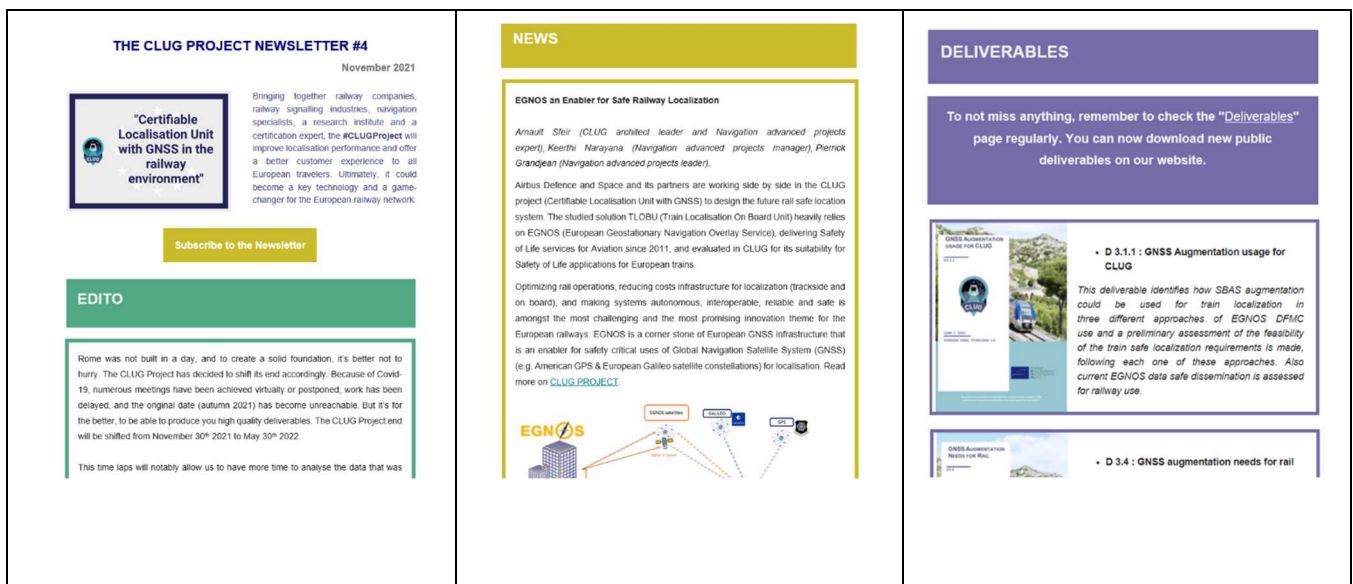


Figure 9: CLUG Newsletter example

3.6 EVENTS

CLUG was presented in several worldwide events, some events were in-person like the ITS World Congress that took place in Hamburg or virtual events like the GSA User Consultation platform.

Unfortunately, due to COVID restrictions, many events were cancelled like ESA's NAVITEC and InnoTrans.

Table 4 summaries all the attended events:

Target Community	Conference Title	Timeline	Status	Place	Partner presence
<u>GNSS</u>	ION-GNSS+ 2020	21-25/09/2020	Attended	Virtual	ADS
<u>GNSS/Rail</u>	GSA User Consultation Platform	02/12/2020	Attended	Virtual	SNCF, ADS, DBN, SMO, SBB
<u>GNSS</u>	ION-GNSS+ 2021	20-24/09/2021	Attended	St. Louis, Missouri, USA	ENAC
<u>GNSS</u>	European Navigation Conference (ENC)	15-18/11/21	Attended	UK	NAVCERT, ADS
<u>Rail</u>	SmartRail Congress	13-15/06/2022	Attended	Rome, Italy	SNCF
<u>Technology</u>	ITS world	11-15/10/21	Attended	Hamburg, Germany	NAVCERT, DBN, SBB

Table 4: Attended and upcoming events

3.7 CLUG Video

As part of the test runs made in CLUG, a specific test was made between France and Switzerland with the Swiss Domino train. This test took place on March 26, 2022, between Genève and Annemasse.

The present video highlights the collaboration between SNCF and SBB to get the Domino train authorisations to drive in France. This test typically demonstrates the strong collaboration that happened between the partners during the project.

During these tests a reporter was present to highlight the teams work and CLUG test activities. A film was realised as a short version (teaser) as well for social network dissemination. This film was presented during the CLUG final event.

Figure 10 presents pictures taken from the video:

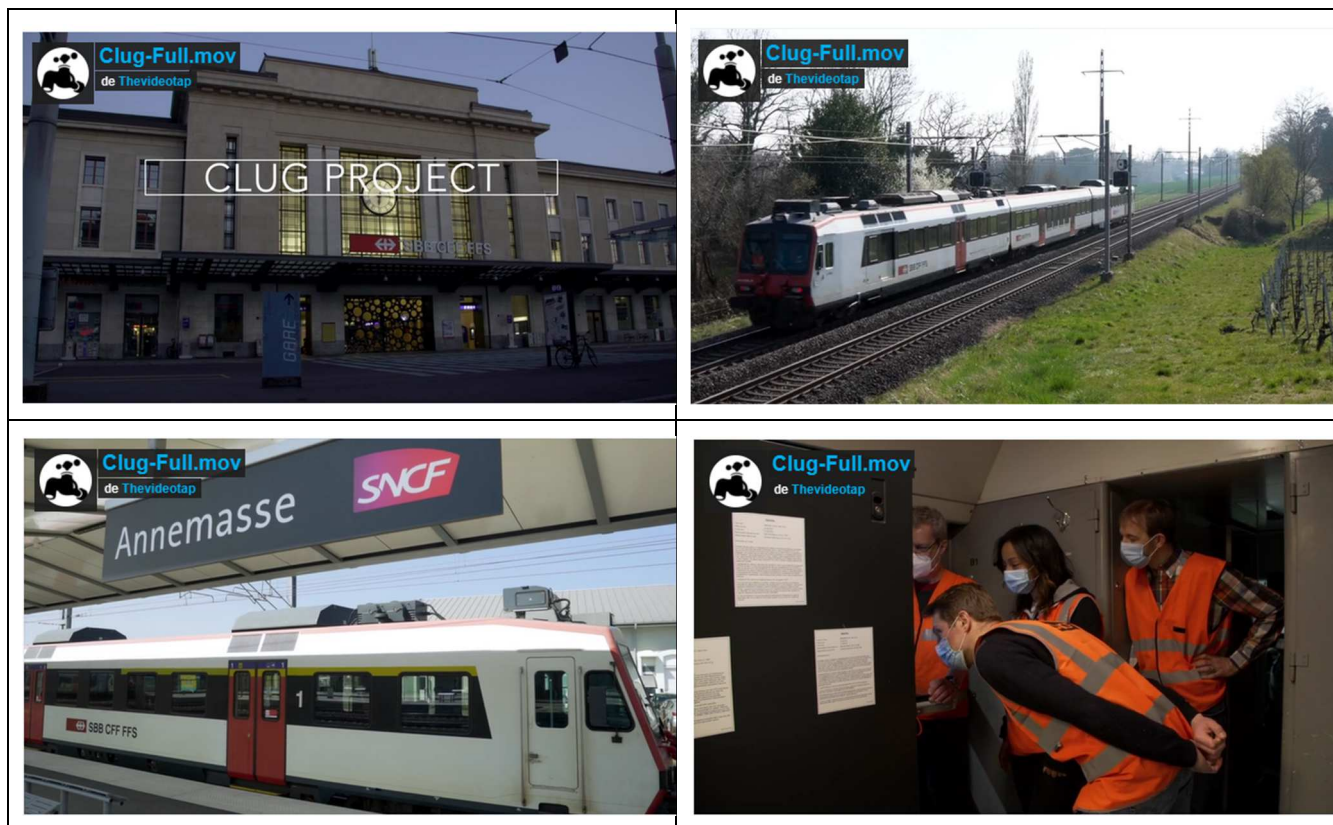


Figure 10: CLUG video pictures

3.8 CLUG articles and publications:

3.8.1 Website article:

In this section, all the website articles are presented in the table below:

Article title	Publication date	English link	French link
The kick-off of the CLUG Project at the GSA	January 21, 2020	English link	French link
Second workshop: the future localisation system architecture	February 26, 2020	English link	
The kick-off of stage 3: designing the localisation system	March 03, 2020	English link	French link
A joint publication by Airbus and SNCF selected by the Institute of Navigation (ION)	June 12, 2020	English link	French link
The kick-off of stage 4: testing and evaluating	July 28, 2020	English link	French link
First test train started CLUG data collection campaign in November 2020 in Switzerland	December 04, 2020	English link	French link

The CLUG project attended the third edition of the User Consultation Platform (UCP) at the first online edition of the European Space Week	January 14,2021	English link	
Subscribe to the next CLUG newsletters	February 02,2021	English link	French link
Interview: Christoph Weirich	February 05,2020	English link	French link
“Integrity points” – a new approach for generating reference points	February 12, 2021	English link	French link
Curvature changes for localization	March 05, 2021	English link	French link
ADAS and Railway systems united for future mobility	March 31, 2021	English link	French link
SNCF and its partners are working side by side to set up the future rail location system	April 29, 2021	English link	French link
CLUG collects data “Around the World”	June 15, 2021	English link	French link
EGNOS an Enabler for Safe Railway Localization	August 24, 2021	English link	French link
ENAC engineers in the CLUG project: limiting multipath error	October 05, 2021	English link	French link
CLUG Projects: Challenges for GNSS in the railway environment	December 14, 2021	English link	French link
CLUG Projects: Required Digital Map for Localisation	February 14, 2022	English link	French link
Establishing the security requirements for a GNSS-based Train Localisation On-Board Unit (TLOBU)	May 11, 2022	English link	French link
CLUG FINAL EVENT - Online Webinar	June 02,2022	English link	French link
CLUG Project: Many thanks!	June 02,2022	English link	French link

Table 5: CLUG website articles

3.8.2 External articles

The CLUG project dissemination isn't limited to CLUG website and social media, external articles, published on external website or journals have also been published

Title	Organisation	Date	Link
EU Space services to back up Europe's Railway Traffic Management System (ERTMS)	EUSPA	August 30, 2021	Article's link
Train localisation : air technologies enter to stations	RGCF	September 2021	N°318 September 2021

CLUG - A new approach to train localisation using European GNSS	Digitale Schiene Deutschland	May 2022	Article's link
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Table 6: CLUG external articles

3.8.3 ION CLUG publications

The institute of navigation (ION) selected two CLUG publications, following the detail:

- **2020 ION CLUG publication:** "Infrastructure Free Solution for Train Positioning Using Train Track Using Track Database". Authors: ADS and SNCF.
- **2021 ION CLUG publication:** " Machine Learning Based Overabound Modelling of Multipath Error for Safety Critical Urban Environment". Authors: ENAC

3.8.4 Public deliverables

Table 7 presents the list of public deliverables. This list can be found on the CLUG website with a link to download each one of them.

Deliverable Number	Title	Description
D2.1	High Level Mission Requirements Definition	This deliverable defines the high-level mission requirements and -level system requirements.
D2.2	Operational Scenarios Definition	Regroups all the railway operating scenarios relevant to the project.
D2.7	Identified Validation Certification Methods	This deliverable identifies the most suitable methods for validation and certification considering the preliminary work done on system definition and considering the legal background.
D.3.1.1	GNSS Augmentation usage for CLUG	This deliverable identifies how SBAS augmentation could be used for train localization in three different approaches of EGNOS DFMC use and a preliminary assessment of the feasibility of the train safe localization requirements is made, following each one of these approaches. Also, current EGNOS data safe dissemination is assessed for railway use.
D3.4	GNSS augmentation needs for rail	This document presents how additional EGNOS data for rail (or for terrestrial users), could improve the safe train localization, in particular the localization performances for along-track position, speed, and rail track determination functions.
D4.2	Raw Data	The raw data collected with the test trains over various tracks in different environments is stored in .csv format with a description on how the data has been collected. The present deliverable will be detailed in the next subsection.

D4.3	Ground Truth	The ground truth (true position of the train) generated for the individual test runs will be delivered in an agreed format, supplemented by a description on how the ground truth has been generated. This will allow the involved parties to re-evaluate the collected raw data at a later stage against the true position of the train.
D5.1	Communication Strategy and Action Plan (CSAP)	Definition of the various targets, messages, tools and activities that will deliver the overall communications strategy.
D5.3.1	Project brochure n°1	This brochure presents the project and its results.
D5.3.2	Project brochure n°2	This brochure presents the project and its results.
D5.4	Definition of the Required maps for Localization	The deliverable defines, according of the results of the different WPs, a comprehensive definition of the digital map for the train localization system.
D5.6	Final Dissemination Report	The report presents the project communication and dissemination activities' results.
D5.7	Preliminary Definition of the System Performances and Interfaces	<p>The deliverable presents:</p> <ul style="list-style-type: none"> • The mission definition and requirements for a train localization unit, • The preliminary definition of Failsafe multi-sensor localization (system, sub system, internal and potential external interfaces), • The feasibility (performances and assessed safety of life level) of Failsafe multi-sensor localization unit.

Table 7: Public deliverables list

D4.2 “raw data”

The D4.2 is a public deliverable consisting of a subset of the data that was collected during the project. This data subset is made public through the [AWS cloud](#) maintained by SNCF in the framework of the project. The open access data is made available through the AWS platform by registering on the AWS cloud to then be able to openly access the data.

Data and metadata use a formal, accessible, shared, and broadly applicable language for knowledge representation. The csv format, as well as the RINEX file format described in CLUG D4.1 deliverable and recalled in the note associated to the public data on the AWS cloud fulfils all the requirements for interoperability. A short document detailing the data format has been made accessible to the public on the AWS cloud.

Because of the very big amount of data generated (approximately GB per hour) and because of the complexity to manipulate this kind of data, the IQ data recorded during the project will not be shared.

The data collected and generated during the lifetime of the project can be useful to different typology of stakeholders such as:

- CLUG consortium;
- EUSPA;
- European Commission services and European Agencies;

- EU National Bodies;
- The general public including the broader scientific community
- Future H2020 (including Shift2Rail) projects.

The open access data will be usable under specific conditions that will be explained in a note on the open access cloud: the data can be used for scientific research only

3.9 Final event

The CLUG project has organized a final event to celebrate the successful end of the project and validate the achievement of all its objectives. The CLUG final event took place on May 19, 2022, from 10.00 AM to 06.00 PM at Business Center Edouard VII, 23 rue Edouard VII in Paris, and has welcomed nearly 30 representatives of the CLUG consortium in addition of the external guests. This event was a great opportunity to comment the valuable work of the many actors involved in this innovation project.

Throughout the event day, the results of the project were at the heart of the discussions. Preliminary location requirements for the railway system have been defined. Two different solutions were tested to create a working system architecture. Data collection was carried out on board three different trains. The performances obtained in terms of reliability, availability, maintainability and safety have been studied at length. Finally, the initial certification work for CLUG solutions has been initiated. All these elements were presented in detail during the final event, followed by a round table with management from operators (SBB, DB Netz), industrials (Siemens and Airbus D&S) and agencies (EUSPA and ERA) on the topic “ **GNSS-based train as a game changer for the future of railway systems - opportunities and challenges** ”.

Figure 11 presents the event agenda and badge.

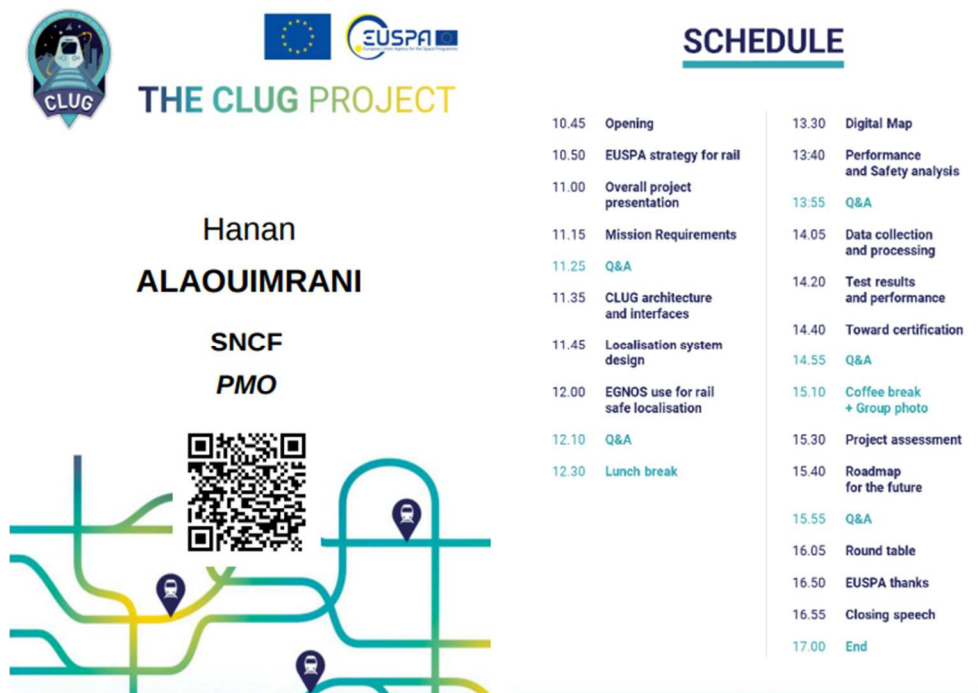


Figure 11: The event agenda and badge

Following, some CLUG final event pictures:



Table 8: Highlights from the CLUG final event

3.10 Online Webinar

In addition of the CLUG final event organised in Paris, a webinar, open to the public, has been organised by DB on June 09, 2022, to share the project results. The same topic as in the final event in Paris has been presented during the webinar, leaving the opportunity to everyone to see the project results.

258 persons attended the live Webinar. To enrich discussions around the future localisation system, five sessions were dedicated to questions with 47 questions received from attendees.

The following table presents the CLUG Webinar agenda:

09:00-09:05	General welcome, information regarding Q&A tool and overview of event agenda by moderators' team
09:05-09:20	Welcome address by Annika Hundertmark, Head of Railway Digitalization at Deutsche Bahn
09:20-09:30	EUSPA strategy for rail by Daniel Lopour, CLUG Project Officer at European Union Agency for Space Applications
09:30-09:45	Introduction to CLUG project: Technical objectives and challenges by Valentin Barreau, CLUG Project Coordinator and Localisation project manager at Société Nationale des Chemins de Fer français
09:45-10:05	Q&A Session #1
10:05-10:20	Localisation needs of the Railways and System requirements by Muthukumar Kumar, CLUG Technical Manager and System Architect at Deutsche Bahn
10:20-10:30	CLUG architecture and interfaces by Sebastian Ohrendorf-Weiss, Localisation Project Manager, Swiss Federal Railway
10:30-10:50	Localisation system design by Arnault Sfeir, CLUG WP3 Lead and Advanced projects in Navigation space and ground segments at Airbus and Michael Jüttner, Chief Operating Officer at Naventik
10:50-11:10	Q&A Session #2
11:10-11:25	Short Break
11:25-11:35	EGNOS use for rail safe localisation by Pierrick Grandjean, Head of Navigation proposals and studies France at Airbus Defence and Space
11:35-11:45	Digital maps for failsafe localisation by Henning Nitzschke, Product Owner, Digital maps at Deutsche Bahn
11:45-12:05	Performance and safety analysis by Pierrick Grandjean, Head of Navigation proposals and studies France at Airbus Defence and Space
12:05-12:30	Q&A Session #3
12:30-13:30	Lunch Break
13:30-13:50	Data collection and processing by Bernhard Stamm, CLUG WP4 Lead and Senior Key Expert at Siemens Mobility and Paul Fritsche, Localisation Expert at Deutsche Bahn
13:50-14:10	Test results and performance evaluation by Bernhard Stamm, CLUG WP4 Lead and Senior Key Expert at Siemens Mobility
14:10-14:25	Q&A Session #4
14:25-14:35	Toward certification by Sravan Machiraju, Technical certifier at NavCert

Table 9: CLUG webinar Agenda