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Deliverable D 7.2

Dissemination Report and Exploitation Plan

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Report contributors		
<i>Name</i>	<i>Beneficiary Short Name</i>	<i>Details of contribution</i>
Christine HASSOUN	UIC	First draft
Pedro Ribeiro	Evoleo	General contribution
Christine Hassoun	UIC	General contribution
Adam Bevan	HUD	Deliverable contribution and review

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1. Executive Summary

LOCATE work-package 7 (WP7) covers the dissemination, communication and results exploitation of the project. WP7 has been coordinated by UIC and all LOCATE partners have been committed first to raise awareness, engage external stakeholders and then disseminate and exploit the project's results within and beyond the Shift2Rail JU. The core objective of work package 7 was to disseminate key findings and outcomes of the project in a structured manner in order to maximise project impact and outreach across key stakeholder groups during and after the end of the project.

This document has been prepared to report the communication, dissemination and exploitation activities performed all along LOCATE project life, and to describe the means that have been used to facilitate the wide-spread of information and knowledge from the results created by the project, among and beyond the members of the consortium.

In this deliverable, we will present materials and strategies used by the consortium partners for communicating and disseminating LOCATE objectives and results to related stakeholders and the scientific community. Those include:

- The creation of a project identity;
- The creation of a public website;
- The use of social media;
- Publications/articles on the project objectives and achievements;
- Participation in conferences and forums;
- Interactions with other Shift2Rail projects;
- Videos, and
- The organisation of a final event.

The last chapter of this report will be dedicated to the exploitation measures that have been undertaken during the past 30 months and to the exploitation measures planned beyond the life of the project.

2. Abbreviations and acronyms

Abbreviation / Acronyms	Description
AB	Advisory Board
CFM	Call For Members
ECM	Entity in Charge of Maintenance
FGC	Ferrocarrils de la Generalitat de Catalunya
GA	Grant Agreement
GPS	Global Positioning System
FR8HUB	Real time information applications and energy efficient solutions for rail freight
FR8RAILIII	Smart data-based assets and efficient rail freight operation
HUD	University of Huddersfield
IEEE	Institute of Electrical and Electronics Engineers
IP	Innovation Programme
IST	Instituto Superior Técnico
LCC	Life Cycle Cost
LOCATE	Locomotive bOgie Condition mAinTEnance
OBU	On-Board Unit
RLS	Recursive Least Squares
RTR	European Rail Technology Review
S2R JU	Shift2Rail Joint Undertaking
STC	Steering Committee
TD	Technology Demonstrator
TDI	Trasmissibility Damage Indicator
TOC	Table of Content
TRA	The Transport Research Arena
UIC	Union Internationale des Chemins de fer
WCRR	World Congress on Railway Research
WP	Work Package

3. Background

LOCATE “Locomotive bOgie Condition mAinTEnance” is a 30-month project, funded by the Shift2Rail JU under the European Union Horizon 2020 Research and innovation programme.

LOCATE project answers to the challenges identified in the Shift2Rail Open Call “S2R-OC-IP5-01-2019: Condition-based and preventive maintenance for locomotive bogie”. The call is inserted on Shift2Rail Innovation Programme 5 -IP5 “Technologies for Sustainable and Attractive European Rail Freight” of the Shift2Rail Master Plan, and it is related to the topics of Condition Based Monitoring for Predictive Maintenance, and maintenance in general. The project will also have relevant impact on Asset Control Tower and Customer Communication topic.

The Call is associated to the Technology Demonstrator – TD5.1.1 Condition Based Maintenance under TD5.1 Fleet Digitisation and Automation.

The present document “Dissemination Report and Exploitation Plan” - Deliverable D7.2 – is the second deliverable within Work Package 7 (Dissemination and exploitation) of the LOCATE project (Grant Agreement No. 881805).

WP7 involves three tasks, as follows:

- Task 7.1 - Project Promotion and Communication
- Task 7.2 - Project Exploitation
- Task 7.3 - Recommendations for new Standards

This report contributes to task 7.1, 7.2 and 7.3.

4. Objective/Aim

The Shift2Rail funded project LOCATE (Locomotive bogie Condition mAINTenance) aims to provide the methods and tools by which every Entity in Charge of its Maintenance (ECM) to implement predictive maintenance of bogie, which is one of safety-critical component in a rail vehicle. The specific objectives are to:

- Ensure safety. The parts concerned are continuously under surveillance;
- Increase availability and reduce cost by avoiding unnecessary controls. Most checks do not result in repair or replacement. The data collected makes a continuous improvement of the maintenance process easier to implement;
- Increase reliability. Interventions are made before any problem in operation;
- Without impact on maintainability. The implementation of surveillance equipment will be done under the control of the people doing the maintenance.

The communication and dissemination approach is implemented at two different levels:

- internal, and
- external communication.

The dissemination of LOCATE has been essential throughout the project's life and needed to be carried out with the cooperation of all work packages and all project partners. The aim of this document is to provide the dissemination, communication and exploitation activities as well as the impact of these actions to fulfil the objectives of WP7 described in the LOCATE GA.

This deliverable will show the achievements of WP7, i.e.:

- The development of all planned dissemination tools,
- The creation of all planned publications (project brochure, articles and final brochure),
- The use of social media to communicate efficiently on the project;
- The complete list of disseminated LOCATE activities at events such as workshops, conferences, webinars and internal meetings,
- The cooperation with other Shift2Rail projects,
- The organisation of several Advisory Boards, and
- The organisation of a final event.

It will also detail the exploitation measures that have been undertaken during the past 30 months and will present the exploitation plan of the project partners after project end.

5. INTERNAL COMMUNICATION

5.1. Dedicated private workspaces

LOCATE partners have used two cooperation tools (member's areas) which access is reserved to project partners only.

The first one was created at project inception. It is accessible on Sharepoint at: https://evoleotechnologies-my.sharepoint.com/personal/rodolfo_martins_evoleotech_com/_layouts/15/onedrive.aspx?ga=1&id=%2Fpersonal%2Frodolfo%5Fmartins%5Fevoleotech%5Fcom%2FDocuments%2F96%2DLOCATE%2FS2R%2DLOCATE. This area is being used by project partners to work on shared documents. Figure 1 below shows the structure of this working area.

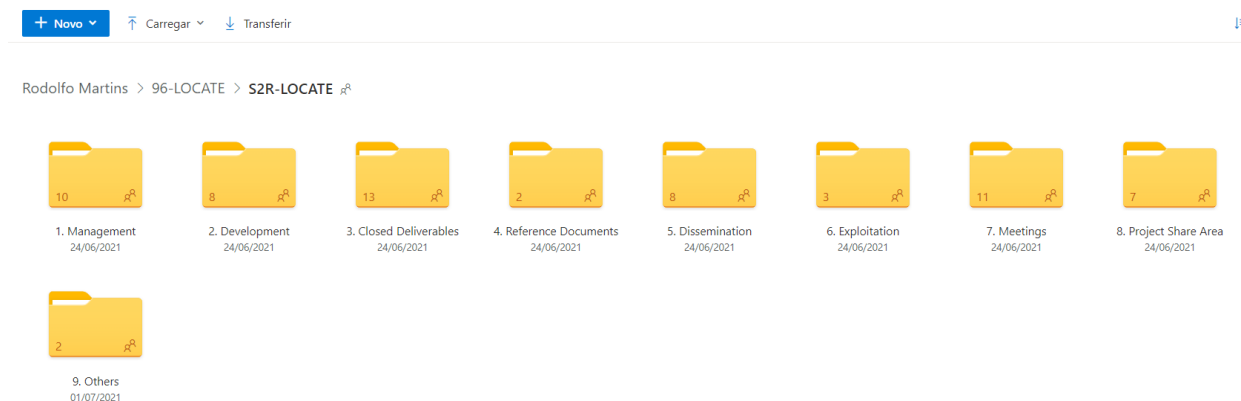


Figure 1 LOCATE Working area

The second area was created in the UIC collaborative Tool which is a collaborative platform based on a large community of users. This workspace enables project partners to share and store documents and manage directories and contacts. This member's area has been mostly updated by the coordinator and the dissemination leader and contains only final versions of all documents. The LOCATE workspace is accessible at <http://extranet.uic.org>. Figure 2 below shows the homepage of the workspace.

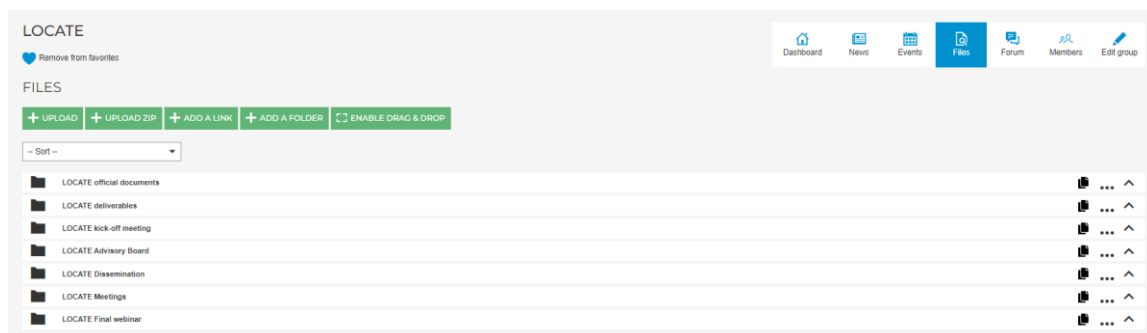


Figure 2 Homepage of the LOCATE private area

5.2. LOCATE MAILING LIST

One mailing list for internal communications has been created for all members of the consortium. This list is available on the private working areas.

6. EXTERNAL COMMUNICATION AND DISSEMINATION ACTIVITIES

6.1. Target audience

Fundamental aspect of an effective dissemination strategy is the definition of the target group(s) to which the dissemination/communication activities have to be tailored.

The LOCATE consortium has identified five main categories of stakeholders:

- Railway undertakings
- Regulatory bodies
- Rolling stock manufacturers
- Technology providers
- Research community

Target Group	Project website	Social media	Events	Mailing	Leaflets	Press releases
Railway undertakings	✓	✓	✓	✓	✓	✓
Regulatory bodies			✓		✓	✓
Rolling stock manufacturers	✓	✓	✓		✓	✓
Technology providers	✓	✓	✓	✓	✓	✓
Research community	✓		✓	✓	✓	✓

Table 1 Dissemination and exploitation tools by project target group

6.2. Message/results to be disseminated

The primary objective of the LOCATE project is to develop a set of tools to access the condition of freight locomotive bogies to implement a condition-based maintenance program. LOCATE aims at contributing to optimise the availability of rolling stock, the quality of service, maintenance costs and return on investment.

The table below summarises how LOCATE project contributes to the Shift2Rail vision.

Input to Vision	Project Contribution
Asset Control Tower & Customer Communication	
Locomotive	GPS Localisation of the Locomotive
	Locomotive Asset Condition Monitoring
	Raw data of sensors, can provide info of Rail Infrastructure Condition
Infrastructure	Sending Condition Based Data to Cloud Systems or Private Infrastructure for processing
Condition Monitoring for Predictive Maintenance	
Locomotive	Sensor for Condition Monitoring of the Bogie
	Integration of Data with OBU
	Knowledge Extraction for New Locomotives and Retrofit of existing ones to reduce LCC
Infrastructure	Backbone of wireless communications on the train
	Dynamic Maintenance Planning on Maintenance Shops
	Communication with Suppliers for parts delivery
	Condition Based Maintenance Regime

Table 2 LOCATE contribution to Shift2Rail vision

WP N°	Key messages to communicate	Railway undertakings	Regulatory bodies	Rolling stock manufacturers	Technology providers	Research community
WP2	Methods of analysis for predictive maintenance	✓	✓	✓		✓
WP3	Guideline to define physical parameters to be monitored	✓	✓	✓	✓	✓
WP4	Numerical model definition	✓		✓		✓
WP5	Guidelines for implementation of predictive maintenance	✓				
WP6	Guidelines for testing the predictive maintenance system	✓				
WP7	Market perspectives	✓	✓	✓	✓	✓

Table 3 Key messages to be communicated to project target groups

LOCATE project has innovated by:

- Contributing to a necessary industrial shift from preventive maintenance to predictive maintenance through digitalisation; achieving optimised condition-based maintenance strategies while developing dynamic tools that can easily assess the overall impacts in maintenance planning and railway operations, and open the path towards guaranteed asset health and availability;
- Providing innovative application of sensors to monitor structural integrity of critical and high cost components of the bogie, following a cost-effective and reliability-based optimisation of the sensor design. Achievements demonstrated on the freight locomotive bogie can be transposed to develop more intelligent passenger trains and freight wagons;
- Developing intelligent tools to support maintenance scheduling that can integrate maintenance operations tasks into daily services, while assigning maintenance crew and technicians according to their skills/competences, thus increasing availability and punctuality;
- Setting-up and validating an open architecture able to carry asset management data to the operator beyond the locomotive bogie (freight wagons, track condition, etc.) allowing the operator to extract more insights and value from the collected data;
- Increasing the freight reliability, availability (reducing downtime), provide a shift from inspection activities and LCC associated to cost-effective monitoring online solutions, improving overall competitiveness of freight rail transport;

Providing a comprehensive methodology to derive minimal digital twins of a complex mechatronic railway system. This technology has been introduced by the development of a minimal digital twin for the bogie system, based on vehicle dynamic simulations and post-processing, while considering the requirements of the system.

6.3. Project graphic identity

6.3.1. Logo

As a first step, the project logo was prepared and approved by all partners. The LOCATE logo type is made with a round, sober and modern typography, specially designed to represent a truck, and radio waves that can detect defective parts. The letter A also represents the symbol of the location. Grey symbolises the railway, rolling stock, technology; and orange safety, prevention and communication.

This logo was used for all dissemination actions and has played a role of utmost significance in creating project association regarding visual communication.

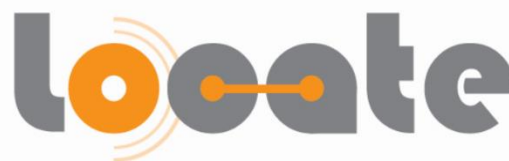


Figure 3 LOCATE Logo

6.3.2. Project templates

Project templates for Powerpoint presentations, word reports and meeting agenda and minutes, were prepared immediately after the creation of the project logo and were updated when necessary. This Deliverable Report was made according to the deliverable template that has been used for all project deliverables.

6.3.3. Project Flyer

An A5 flyer has been prepared in the first months of the project. It contained a synthetic description of the project background, objectives and expected outcomes as well as facts and figures and the list of partners at the kick-off date. Due to Covid and meeting restrictions, it has not been possible to distribute printed copies of this document, but a pdf version of the flyer was made available for download on the project website and advertised through social media accounts of project partners.

6.4. Project public website

The website of the LOCATE project has been set up at the beginning of the project and is available at the following address: <https://locate-project.eu/>. This website contains a public area, used for dissemination, in which the content is provided in HTML or PDF format, following EU recommendations. It also contains a private area, implemented in the UIC extranet, for management and collection of the technical information. Figure 1 below presents the LOCATE website homepage.

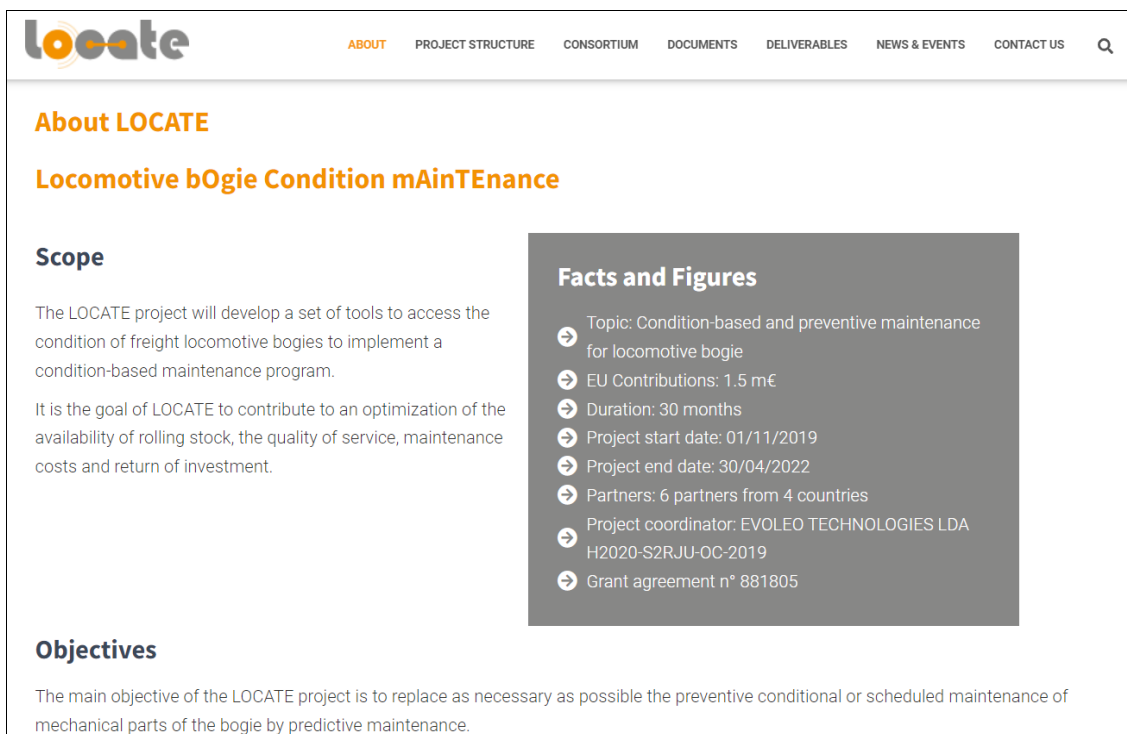


Figure 4 LOCATE website homepage

The public area was designed to display a similar look in most web browsers as well as mobile devices (responsive design style).

Keywords have been used to take advantages of Search Engine Optimization (SEO) techniques and ease indexing by any search engine.

All documents prepared for the project (flyer, videos, news, documents and recording of final event, etc.), as well as all approved public deliverables have or will be soon published on the website, announced via twitter and LinkedIn and are still available for download. The website will remain active at least five years after the end of the project.

Analysis of the website impact

Google Analytics and Google’s tools for webmasters were used to analyse the RSS feeds and web page use. All along the project life, the website was visited by 1900 users who viewed 3 900 pages (see figure below).

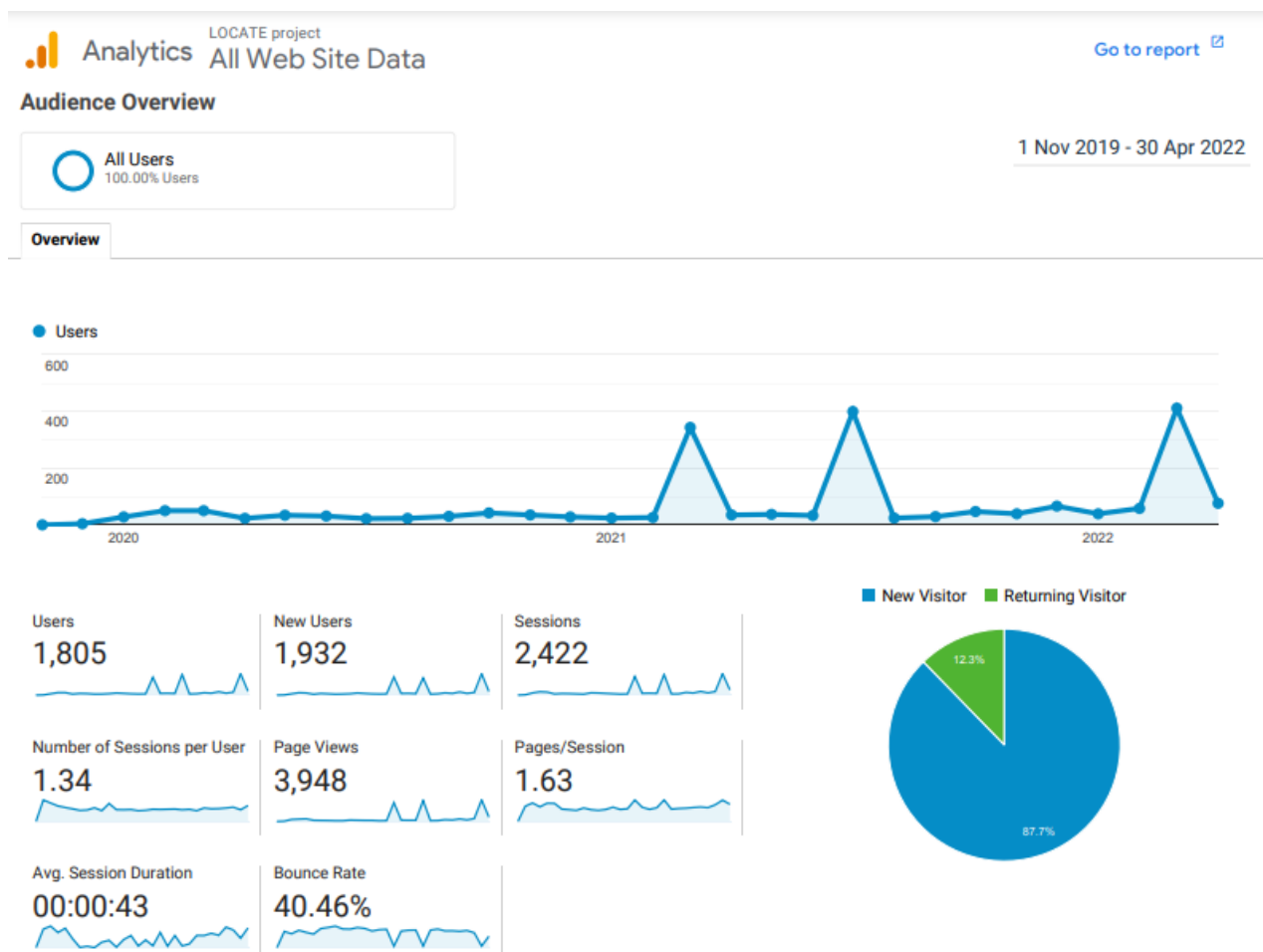


Figure 5 LOCATE Website audience overview

6.5. Project news

All along the project life, several news articles were published on the project website:

13 November 2019 - "LOCATE kick-off meeting held from 4 – 5 November 2019 at EVOLEO in Porto":

<https://locate-project.eu/2019/11/13/locate-kick-off-meeting-held-from-4-5-november-2019-at-evoleo-in-porto/>

06 October 2021: "LOCATE (Locomotive bogie Condition mAinTEnance) Video":

<https://locate-project.eu/2021/10/06/locate-locomotive-bogie-condition-maintenance-video/>

07 February 2022 : "LOCATE Project at WCRR 2022, Birmingham, 6 – 10 June 2022":

<https://locate-project.eu/2022/02/07/locate-project-at-wcrr-2022-birmingham-6-10-june-2022/>

10 March 2022: "LOCATE Final demo successfully installed in FGC premises":

<https://locate-project.eu/2022/03/10/locate-final-demo-successfully-installed-in-fgc-premises/>

06 April 2022: "Europe's Rail-funded IP5 LOCATE project final webinar to be held on 29 April 2022 from 10.00 am to 12.00 pm CET":

<https://locate-project.eu/2022/04/06/europes-rail-funded-ip5-locate-project-final-webinar-on-29-april-2022-morning/>

05 May 2022: "Europe's Rail funded IP5 LOCATE project final webinar":

<https://locate-project.eu/2022/05/05/a-webinar-was-held-on-29-april-2022-to-present-the-main-results-from-the-shift2rail-ju-funded-ip5-locate-project/>

News were also published in the partners channels:

Article in the UIC Enews #668 on 12 November 2019: "LOCATE kick-off meeting held from 4 – 5 November 2019 at EVOLEO in Porto":

<https://uic.org/com/enews/nr/668/article/locate-kick-off-meeting-held-from-4-5-november-2019-at-evoleo-in-porto>

6.6. Social Media

Social Media, especially LinkedIn and Twitter, have been largely used to communicate about the project objectives and results.

A LOCATE LinkedIn page was created at project mid-term. The homepage of the LinkedIn page in figure 7 below shows that the page has now more than 70 followers. This page has been used to announce the publication of LOCATE documents, project videos and news in the project website, as well as to inform the public about project events.

The twitter accounts of all project partners and of the Shift2Rail JU were also used to disseminate project activities and results using the hashtag #LOCATE_Project.

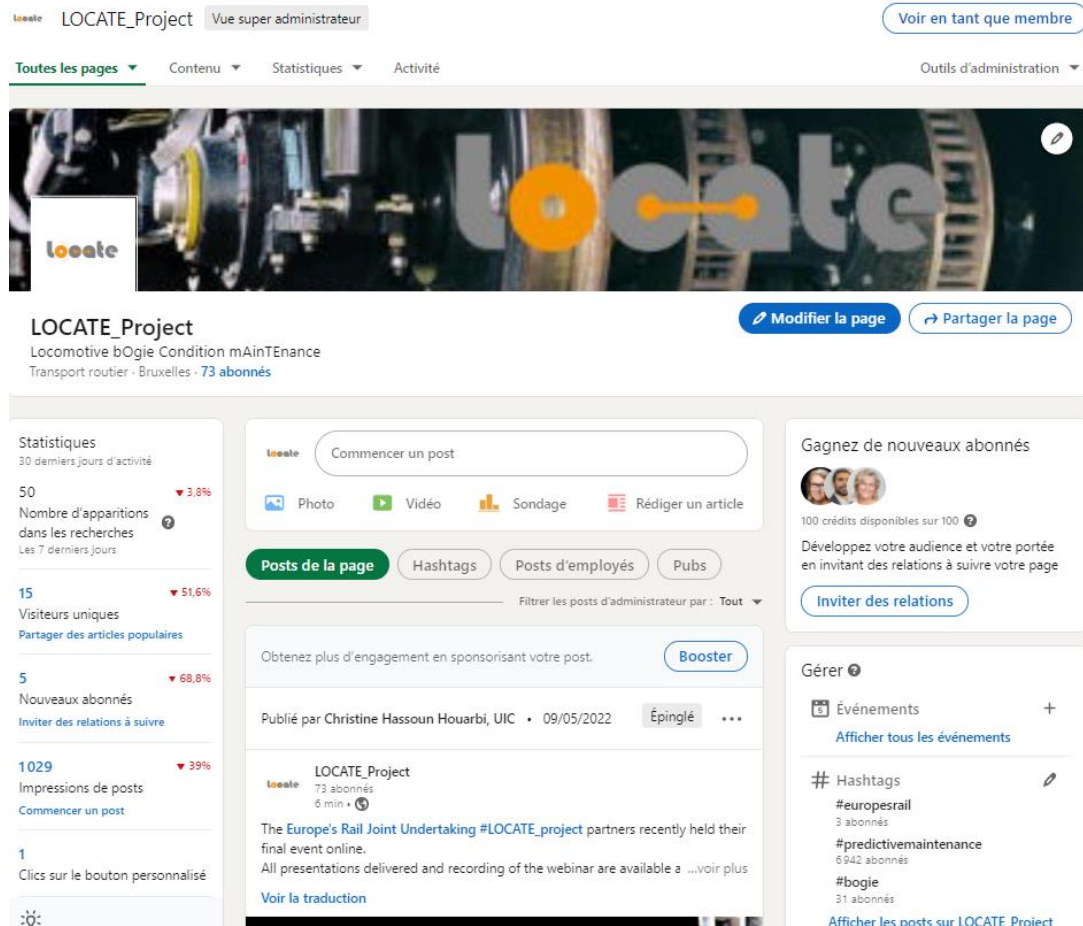


Figure 6 LOCATE LinkedIn Page

6.7. Videos

Three videos have been prepared throughout the life of the project. They were disseminated via the project website and social media.

6.7.1. Project presentation video

As a complement to the project flyer, a video was prepared to communicate on the project background, objectives and expected outcomes, as well as facts and figures and the list of partners at the kick-off date.

This video was made available on the UIC YouTube channel (<https://www.youtube.com/watch?v=XBsBeWCgOsI>) and has been disseminated via an article on the project website:

<https://locate-project.eu/2021/10/06/locate-locomotive-bogie-condition-maintenance-video/>

To date, the video has had more than 200 views.

6.7.2. LOCATE Demonstrator video

A second video was prepared by Vibratéc to present the LOCATE Demonstrator displayed on a train of the Ferrocarrils de la Generalitat de Catalunya (FGC): <https://www.youtube.com/watch?v=27CsNoKE1bA>. This video was disseminated via LinkedIn and twitter.

6.7.3. LOCATE Final webinar recording

The recording of the LOCATE final webinar was made available on the UIC YouTube channel (<https://www.youtube.com/watch?v=c-hGbMxe7aY&t=14s>) and was disseminated via an article on the project website:

<https://locate-project.eu/2022/05/05/a-webinar-was-held-on-29-april-2022-to-present-the-main-results-from-the-shift2rail-ju-funded-ip5-locate-project/>

6.8. Participation in international conferences and forum

In the first months of the project, plans had been made to attend the Transport Research Arena “TRA” in Helsinki, Finland in April 2020 and the TEN-T Days which were to be held in Sibenik (Croatia) in May 2020.

Due to the COVID situation, these events were first postponed then cancelled. Project partners however participated to several international events:

Online presentation of a paper entitled: "Future Rail Vehicle Maintenance: Condition-Based And Automated Asset Management" at the Smart Fleet Maintenance Summit on 16 November 2021/

<https://www.metisconferences.com/sfm360>

Presentation entitled “A Framework for Locomotive Bogie Condition-based Maintenance (LOCATE)” at the World Congress of Railway Research “WCRR 2022”, to be held in Birmingham, UK on 6-10 June 2022:

<https://ieeexplore.ieee.org/document/9178019>

6.9. publications/articles

Several peer-reviewed articles have been published by LOCATE project partners all along the project life:

Article in a Journal entitled: "Assessing the performance of different devices in railway wheelset inspection" published on 1 December 2020 in Science Direct, Elsevier, Volume 165, #108145:

<https://www.sciencedirect.com/science/article/abs/pii/S0263224120306837?via%3Dihub>

Paper in proceedings entitled “A Framework for Locomotive Bogie Condition-based Maintenance (LOCATE)” at the World Congress of Railway Research “WCRR 2022, to be held in Birmingham, UK on 6-10 June 2022:

<https://locate-project.eu/2022/02/07/locate-project-at-wcrr-2022-birmingham-6-10-june-2022/>

An article will be published in the June 2022 Edition of the quarterly R+D+i Newsletter of the Government of Catalonia. It will be entitled: "FGC's International Projects and Consultancy area hosts the LOCATE European project meeting".

6.10. Advisory board

LOCATE’s partners established an Advisory Board (AB) for the project. It comprised a high-level international panel of experts from different areas of knowledge that have provided an additional form of quality control, advice, and validation of the vision, global impact, and outreach of the project. The AB members have communicated with the STC throughout the project lifetime and has made use of their networks to disseminate and exploit the project results, at the European and International level.

The representatives of the AB were invited to attend all LOCATE consortium and AB Meetings along with consortium members.

Three AB meetings were organised:

- 04/02/2020, mainly focused on the project ambition, specifications
- 12/ 05 /2021, mainly focused on the Operational Behaviour (WP5)
- 31/03/2022, presenting the main project results and demonstrator visit, at FGC depot.

6.11. Cooperation with other relevant S2R and EU activities

LOCATE Project Coordinator participated to the S2R Project Coordinators Info Day on 25 November 2019 in Brussels.

Several LOCATE members participated in the FR8RAILIII kick-off meeting which was held on 12-13 December 2019 in Frankfurt, Germany. LOCATE project coordinator presented the objectives and main features of the project on that occasion.

The LOCATE Advisory Board includes members of FR8HUB (GA 777402) and FR8RAILIII (GA 730617).

LOCATE partners signed a Collaboration Agreement with FR8RAILIII. Cooperation with FR8HUB was out of scope as project was near end, but synergies were discussed.

6.12. Project final brochure

A recommendation brochure has been issued with the lessons learned from the project. In addition to having the general information about LOCATE, it provides more detailed information about the project's results acting as a means of exploitation. This brochure was produced at project end and disseminated through targeted mailing as well as relevant workshops, conferences and other face-to-face interactions with the target group members. A pdf version is available for download on the project website. Social media has and will be used intensively to promote this document.

6.13. Project final events

The LOCATE project partners organised a final hybrid event both physically in FGC premises in Barcelona Spain and online. The project results were presented to the Advisory Board members. The meeting begun by a presentation of all technical work package followed by interesting discussions on the lessons learned and innovation highlights. Onsite participants enjoyed an instructive visit of the demonstrator in FGC Martorell workshop. Below the agenda of the meeting.

Time	Topic	Moderator
09.00 -09.15	Welcome	EVOLEO/ FGC
09.15 – 09.45	WP5 – Operation Behaviour	HUD
09.45 – 10.15	WP4 – Reference Behaviour	IST
10.15 – 10.45	WP3 - Measured Behaviour	Vibratec
10.45 – 11.00	LOCATE vision and innovation highlights	EVOLEO
11.00 – 12.00	Advisory Board discussion / Lessons learned	EVOLEO
12.00 – 14.00	Visit to the demonstrator in FGC Martorell Workshop	FGC
16.00 – 17.00	Debriefing session / Next steps / Future developments	EVOLEO

Table 4 LOCATE Final Advisory Board Agenda

To reach a larger audience, the consortium partners decided to organise an additional 2-hour online event open to the Public. The online LOCATE final event was held on 29 April 2022. This event was attended by more than 30 participants. The event was announced in advance and largely advertised via the project website, and via e-mails and social media. It will be possible to reach a wider audience afterwards as all presentations and the recording of the event were made available on the website at:

<https://locate-project.eu/2022/05/05/a-webinar-was-held-on-29-april-2022-to-present-the-main-results-from-the-shift2rail-ju-funded-ip5-locate-project/>

Within a month, the video shows already more than 50 viewers.



Figure 7 Twitter post to announce final webinar



Christine HASSOUN
@Chassoun1



🔊 Recording and presentations delivered at the @EURail_JU #LOCATE_Project 🇪🇺 final webinar are available at:
[▶ bit.ly/393GKyO](https://bit.ly/393GKyO)

Have a look! 👁️👁️
[#Railways](#) [#bogie](#) [#Maintenance](#) [#freight](#)

[@EvoleoTech](#) [@VibraTecSA](#) [@IRRHud](#) [@istecnico](#) [@uic](#)
[@FGCcorporatiu](#)

[Traduire le Tweet](#)

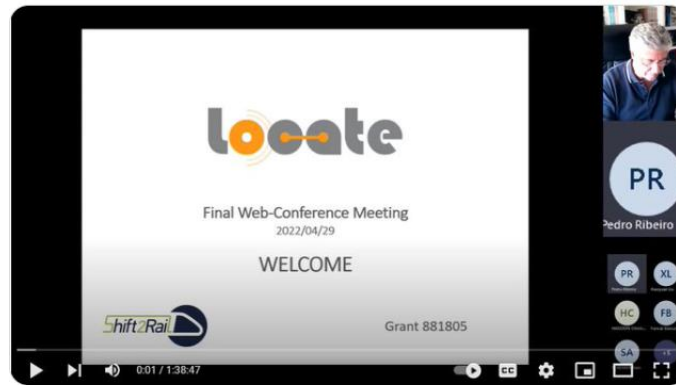
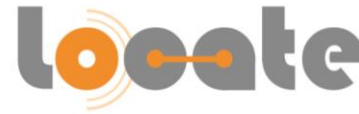


Figure 8 Twitter post to disseminate final webinar material



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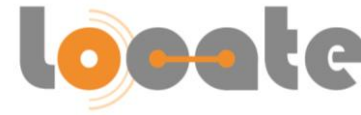
6.14. Table of LOCATE main dissemination actions

Categories	Date	Location	Name of action / Short description	Link
Press release	12 November 2019	UIC eNews #668	Article in the UIC Enews: "LOCATE kick-off meeting held from 4 – 5 November 2019 at EVOLEO in Porto"	https://uic.org/com/enews/nr/668/article/locate-kick-off-meeting-held-from-4-5-november-2019-at-evoleo-in-porto
Article	13 November 2019	LOCATE website	Article in the project website: "LOCATE kick-off meeting held from 4 – 5 November 2019 at EVOLEO in Porto"	https://locate-project.eu/2019/11/13/locate-kick-off-meeting-held-from-4-5-november-2019-at-evoleo-in-porto/
Collaboration with Shift2Rail activities	25 November 2019	Brussels	S2R Project Coordinators Info Day	https://rail-research.europa.eu/wp-content/uploads/2019/12/INFODAY2020_Morning_FINAL.pdf
Collaboration with Shift2Rail activities	12-13 December 2019	Frankfurt, Germany	Participation of LOCATE members to FR8RAIL3 kick off meeting	N/A
Press release	December 2019	UIC website	Presentation of the project	https://uic.org/projects/article/locate
Website	08 January 2020	LOCATE website	Launch and running of LOCATE website	https://locate-project.eu/
Collaboration with Shift2Rail activities	February 2020	With foreseen parties and FR8RAIL3 members	Creation of LOCATE Advisory Board	N/A
Organisation of a workshop	04 February 2020	Online	Advisory Board meeting with use cases workshop	N/A
Flyer	July 2020	LOCATE flyer	Preparation of LOCATE flyer and upload on LOCATE website	https://locate-project.eu/
Collaboration with Shift2Rail activities	October 2020	Online	Signature of collaboration Agreement with FR8RAIL III	N/A

Categories	Date	Location	Name of action / Short description	Link
Scientific paper	01 December 2020	Science Direct, Elsevier, Volume 165, 1 December 2020, 108145	Article in Journal: "Assessing the performance of different devices in railway wheelset inspection"	https://www.sciencedirect.com/science/article/abs/pii/S0263224120306837?via%3Dihub https://doi.org/10.1016/j.measurement.2020.108145
Organisation of a workshop	12 May 2021	Online	Organisation of a project Advisory Board on LOCATE Impact and Results Weminar	N/A
Social media	August 2021	LinkedIn	Creation of a project LinkedIn page	https://www.linkedin.com/company/72758829/admin/
Project video	September 2021	YouTube Channel	Creation of a video to present the project objectives and main figures	https://www.youtube.com/watch?v=XBsBeWCgOsl
Article	06 October 2021	LOCATE website	Article in the project website: "LOCATE (Locomotive bOgie Condition mAINTenance) Video"	https://locate-project.eu/2021/10/06/locate-locomotive-bogie-condition-maintenance-video/
Participation to a conference	16 November 2021	Smart Fleet Maintenance Summit, Online	Presentation of a paper entitled: "Future Rail Vehicle Maintenance: Condition-Based And Automated Asset Management"	Smart Rail Fleet Maintenance Summit, Metis Conferences, November 2021 London
Participation to a conference	16-18 November 2021	Tomorrow.Mobility World Congress, Barcelona, Spain	FGC showed at the Tomorrow.Mobility World Congress its contribution to boost the mobility of the future. At the FGC stand, the attendants were able to learn about the technological commitment to improve the quality of services in terms of efficiency and sustainability.	https://www.linkedin.com/posts/ferrocarrils-de-la-generalitat-de-catalunya_tmwc2021-smartmobility-smartcities-activity-6866653026053091328-rulb/?utm_source=linkedin_share&utm_medium=member_desktop_web
Article	07 February 2022	LOCATE website	Article in the project website: "LOCATE Project at WCRR 2022, Birmingham, 6 – 10 June 2022"	https://locate-project.eu/2022/02/07/locate-project-at-wcrr-2022-birmingham-6-10-june-2022/
Article	10 March 2022	LOCATE website	Article in the project website: "LOCATE Final demo successfully installed in FGC premises"	https://locate-project.eu/2022/03/10/locate-final-demo-successfully-installed-in-fgc-premises/



Categories	Date	Location	Name of action / Short description	Link
Organisation of a workshop	31 March 2022	Final Advisory Board	hybrid meeting organised in FGC premises in Barcelona.	N/A
Social media	March-April 2022	Partners LinkedIn pages	Presence and sharing in the LinkedIn posts related to the LOCATE demonstrator activities (installation, F2F visit and deinstallation)	https://www.linkedin.com/company/72758829/admin/
Article	06 April 2022	LOCATE website	Article in the project website: "Europe's Rail-funded IP5 LOCATE project final webinar to be held on 29 April 2022 from 10.00 am to 12.00 pm CET"	https://locate-project.eu/2022/04/06/europes-rail-funded-ip5-locate-project-final-webinar-on-29-april-2022-morning/
Organisation of a workshop	29 April 2022	Final online event	Europe's Rail funded IP5 LOCATE project final webinar - 30 online participants + 44 views of the recording	https://www.youtube.com/watch?v=c-hGbMxe7aY
Article	05 May 2022	LOCATE website	Article in the project website to disseminate the "Europe's Rail funded IP5 LOCATE project final webinar" results (presentations + recording)	https://locate-project.eu/2022/05/05/a-webinar-was-held-on-29-april-2022-to-present-the-main-results-from-the-shift2rail-ju-funded-ip5-locate-project/
Collaboration with Shift2Rail activities	All along the project life	Online	Participation of project coordinator to IP5 meetings	N/A
Social media	May 2022	LOCATE LinkedIn page	73 followers - Regular posting to announce project documents, news and events	https://www.linkedin.com/company/79762935
Social media	May 2022	Twitter accounts of project partners	several tweets to announce project documents and events	(#LOCATE_Project)
Participation to a conference	6-10 June 2022	WCRR Conference, Birmingham, UK	Presentation of a paper entitled: "A Framework for Locomotive Bogie Condition-based Maintenance (LOCATE)"	https://www.wcrr2022.co.uk/website/938/
Video	31/03/2022	Online	LOCATE Demonstrator at Ferrocarrils de la Generalitat de Catalunya (FGC)	https://www.youtube.com/watch?v=27CsNoKE1bA
Article	17 March 2023	LOCATE webpage	Assessing Reliability and Availability under Correlated Failures in Railway Locomotive	https://locate-project.eu/2023/03/17/assessing-reliability-



			Bogies	and-availability-under-correlated-failures-in-railway-1-locomotive-bogies/
Scientific Paper	30 January 2023	Multibody System Dynamics, Volume 58, issue 1, May 2023	Flexible multibody formulation using finite elements with 3 DoF per node with application in railway dynamics	https://link.springer.com/article/10.1007/s11044-023-09875-y

The scientific articles were published with the project and grant agreement acknowledgements but without the disclaimer and logos. We contacted the publisher entities where the scientific articles were published requesting the updated to include the disclaimer and logos but unfortunately it is not possible to proceed with the changes.

On the preparation of the reporting period, it was realised that it was published an article not in open access. Despite the efforts to reverse the situation, it was not possible to change the article to open access. The work-around adopted to mitigate the situation was to publish a similar article with the same peer-reviewed content (“Assessing Reliability and Availability under Correlated Failures in Railway Locomotive Bogies”) in the project website.

6.15. Dissemination and communication activities reach

The estimated number of persons reached, in the context of all dissemination and communication activities are based essentially on three main sources and respective users' analytics:

- Scientific published papers outreach, main driver for the scientific community category (around 1200 views)
- Project Website for general outreach (1800 users)
- UIC newsletter, potential outreach of 4000 contacts which are segmented into different categories:
 - o 230 of them belong to the policy maker category which covers, among others, contacts at European Commission bodies, National Ministries, National Safety Authorities, National regulatory agencies, National Transport organising authorities, etc.
 - o Around 3000 industry members.
 - o Around 160 entities related to maintenance businesses and stakeholders.

The overall estimated numbers for the outreach per category are broken down into the following numbers:

Scientific Community (Higher Education, Research)	1250
Industry	3190
Civil Society	20
General Public	30
Policy Makers	230
Media	10
Investors	0
Customers	160
Other	0

Table 5 - Dissemination and communication activities reach

7. Exploitation

This chapter presents the identified key project results and derived product concepts.

For each product concept is explained the exploitation interest and respective exploitation strategy by the respective partner.

7.1. Key Project Results

The project LOCATE achieved a set of results that were classified as key project results, described in the following table.

Key project result	Description
Sensor Set and Monitoring Strategy	The types of sensors and sensors disposition, localization, and installation to provide the means for a bogie monitoring strategy for the different components.
FMECA Analysis	Analysis of the failure modes and assessment of the impact of the different failure modes
Framework of Maintenance Scheduling and Predictive Maintenance Program implementation	Methods of decision making, and scheduling analysis and the tailoring needed for implementing Predictive Maintenance Programs.
Computational Models and Digital Twin	Design of Computational Experiments based on data collections and Vehicle dynamic simulations for the digital twin modelling.
Monitoring and Threshold rules Specification	Threshold rules to be used together with the digital model for the component status monitoring.
Predictive Maintenance Framework	End-to-end framework of the bogie monitoring system in a comprehensive integration and deployment description.

Table 6 LOCATE Key Project Results

7.2. Product Concepts and Exploitation Strategy

The potential product concepts derived from the LOCATE key project results are listed in the following table. For each entry, the interested partner and exploitation interests are described, as the specific exploitation strategy.

Product Concept	Interested Partners	Product Concept Exploitation Interests	Exploitation Strategy
Sensors Set and Acquisition System for Bogie Monitoring	Vibratec	Sensors set and sensor acquisition system that can be deployed in similar locomotives and adapted to similar bogie monitoring programs.	Performance of different sensors trialled during LOCATE will support sensor selection in future monitoring projects. Implementation of measurement systems on a longer-term measurement campaign.
Edge Computer for Bogie Monitoring	EVOLEO	Computer that can be used for managing the communications with the cloud and execute the onboard computations since it provides a generic software and fully configurable. It can be used for other customers and similar types of monitoring systems.	EVOLEO is a player in the condition monitoring market and the Edge computer will be a technology brick that will leverage and consolidate the value proposition at the onboard railway condition monitoring for predictive maintenance.
Predictive Bogie Monitoring Software	EVOLEO	Software as a service for other customers and its generic configuration can be adapted for other systems for predictive maintenance programs.	EVOLEO will integrate the software in the portfolio of products and services, being a new and seemed type of products, the software as a service for predictive maintenance decision support.
Digital Twin	IST HUD	Vehicle dynamic digital twin and simulation setup to be reused in other projects and vehicle types. Application of TDI and RLS techniques for detection of component failures. Sensitivity of input parameters to TDI/RLS to support future applications.	Further development and implementation based on lessons learnt during LOCATE on other projects. Journal articles based on use of demonstrator data in TDI/RLS techniques, to support future applications. Further synthesis between reference model and measured data to support future

Product Concept	Interested Partners	Product Concept Exploitation Interests	Exploitation Strategy
			application.
Simulated Reference Library	IST	Reference Library for reusability in other installations and adapted for other vehicles for predictive bogie maintenance.	Technology transfer for other research projects.
Measured Reference Library	Vibratec	Reference Library for reusability in other installations and adapted for other vehicles for predictive bogie maintenance.	Technology transfer for other projects and installations.
Predictive Maintenance Framework	HUD	Consulting, knowledge leverage for other projects Review of techniques for prediction maintenance of locomotive bogies. Development of improved knowledge of maintenance requirements to support exploitation of the LOCATE system.	Journal article on predictive maintenance framework to support future applications. Applying techniques to new research projects.
End to End Framework Approach	UIC	Consulting, promoting, and knowledge leveraging for other global rail research projects and members.	UIC will raise awareness among all members about the potential benefits of CBM using the results from LOCATE project. Use the technical and operation results from the LOCATE project as inputs for a new standardization activities.
LOCATE Demonstrator	FGC	Integration and Implementation of Bogie Predictive maintenance	Implementation as end user.

Table 7 - LOCATE Product concepts and Exploitation Strategy

The exploitation plans are captured on the following table:

Project partner	Exploitation plans
EVOLEO	<p>LOCATE enabled the development of condition monitoring system, integrated with software platform to manage the computational models, data processing pipelines and user interfaces. EVOLEO will pursue the development focused on a go-to market solution for bogie condition monitoring for predictive maintenance, having a consolidated product roadmap that is being executed.</p> <p>EVOLEO is exploring commercial contacts in Portugal and Germany, with very good relations and interactions on the product development to gain access to demonstrations and freemium services.</p>
IST	<p>The results of the LOCATE project are being explored by IST in the frameworks of support to the Portuguese and European industry and in development of new research and technical development opportunities. Both the methodologies for the development of digital twins and new maintenance strategies, as obtained in this project, are being used to develop digital twins for the monitoring of other systems for other partners. Currently, IST is starting to exploit the LOCATE results and methods developed an industrial Portuguese project, CENTAVO, and expecting to integrate other industrial actions in which further exploitation actions will take place. In the framework of new research and technical developments the methods and tools developed here for supporting both monitoring and maintenance of assets are expected to serve as the basis for further advances with which IST can better support industrial and research partners.</p>
HUD	<p>Consulting, knowledge leverage for other projects. Review of techniques for prediction maintenance of locomotive bogies. Development of improved knowledge of maintenance requirements to support exploitation of the LOCATE system. Journal article on predictive maintenance framework to support future applications. Applying techniques to new research projects.</p>
UIC	<p>UIC will raise awareness among all members about the potential benefits of CBM using the results from LOCATE project.</p> <p>Use the technical and operation results from the LOCATE project as inputs for new standardization activities.</p>
Vibratec	<p>Technology transfer for other projects and installations.</p> <p>Performance of different sensors trialled during LOCATE will support sensor selection in future monitoring projects.</p> <p>Implementation of measurement systems on a longer-term measurement campaign.</p>

Table 8 - LOCATE Exploitation Plans

7.3. FR8RAIL III project collaboration

The LOCATE project collaborated closely with the FR8RAIL III project, with the workshops on the beginning of the projects, participation at the Use Cases workshop, advisory board meetings participation and final workshop for results and insights exchange.

There were particular interests on the concepts of reference behaviour libraries, computational models' specifications, sensors set and layout and integrated software tools, the lessons learned from each project was an interesting sharing experience.

The deliverables were shared between both projects.

There were identified strong synergies and valuable shareable knowledge between the projects, as identified potential opportunities for future work based on the compounded results.

8. Conclusions

This report has provided a list of the main dissemination and communication activities carried out during the project duration and has described the approach, actions, materials and strategies used for external communication, along with the engagement and uptake of the results by relevant stakeholders and Shift2Rail IP5.

Dissemination activities and events have been carefully planned and defined in the scope of the Dissemination Plan (Deliverable D7.1) which was used as an initial strategy further updated and reviewed on a regular basis during the lifetime of the project. The results of the activities of Work Package 7 and the impact achieved have been monitored by the work package leader (UIC) with the help of all project partners.

Dissemination included a wide range of traditional information channels, such as project brochure, social media posts and publication of news regarding the project, but also through the partners' own channels, in order to inform all kind of stakeholders interested in the railway and power supply domain.

The LOCATE website (<https://locate-project.eu/>) was designed to be evolutive and dynamic, and all documents and deliverables published by the project partners have been made available for download.