

This project has received funding from the Shift2Rail Joint Undertaking under the European Union’s Horizon 2020 research and innovation programme under grant agreement no. 777594 (OptiYard)

Optimised Real-time Yard and Network Management

D 7.3 Report on Dissemination, communication & exploitation activities

Due date of deliverable: 30/09/2019

Actual submission date: 06/03/2020

Leader of this Deliverable: UIC

Reviewed: Yes

Project funded from the European Union’s Horizon 2020 research and innovation programme		
Dissemination Level		
PU	Public	X
CO	Confidential, restricted under conditions set out in Model Grant Agreement	
CI	Classified, information as referred to in Commission Decision 2001/844/EC	

Start date of project: 01/10/2017

Duration: 24 months

DOCUMENT STATUS

Document status		
Revision	Date	Description
1	24/09/2019	First issue for comments
2	06/03/2020	Update of the exploitation part

EXECUTIVE SUMMARY

OptiYard's work-package 7 (WP7) covers the dissemination, communication and results exploitation of the project. WP7 has been coordinated by UIC. Six of the partners have contributed specifically to the work-package activities and all thirteen partners have disseminated and implemented the results in their future activities as infrastructure managers, contractors, consultants or universities/institutes. All dissemination material has been approved in advance by the partners to ensure that the promised commitments have been fulfilled and that confidential information has been protected. However, OptiYard is a very open EU-project and nearly all scientific deliverables are public. Dissemination has been a carefully planned process.

After the project end, the research in OptiYard project will be used by all partners to develop further the knowledge gained during the 24-month duration of the project. It is and will of course be used in several Shift2Rail projects, like its complementary project FR8HUB with whom contacts have been established early and intensively and which will end in August 2020.

This deliverable will briefly present the dissemination actions made during the lifespan of the project as they have been amply explained in deliverable D7.2. An update will be made on the latest deliveries, such as:

- Organisation of OptiYard mid-term and final events;
- Publication of newsletters, press releases, etc.;
- Cooperation with other relevant S2R and EU activities;
- Intensive use of social media, particularly twitter;
- Dissemination in international rail events.

The last chapter of this report will be dedicated to the exploitation measures that have been undertaken during the past two years. It will also detail the exploitation plan of the project partners for the near future.

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LIST OF ACRONYMS

GA	Grant Agreement
IM	Infrastructure Manager
IP	Innovation Programme
IRJ	International Railway Journal
MY	Marshalling Yard
OptiYard	Optimised Real-time Yard and Network Management
RU	Railway Undertaking
S2R JU	Shift2Rail Joint Undertaking
SP	Service Provider
TD	Technology Demonstrator
TRA	Transport Research Arena
UIC	Union Internationale des Chemins de Fer
WP	Work Package

BACKGROUND

OptiYard “Optimised Real-time Yard and Network Management” is a 24-month project, funded by the Shift2Rail JU under the European Union Horizon 2020 Research and innovation programme. This project is a S2R JU IP5 project (Technologies for Sustainable & Attractive European Rail Freight). The results of this project will directly contribute to the S2R Technology Demonstrators TD5.2.

This document “Report on Dissemination, communication & exploitation plan” D7.3 is the third and last deliverable within the OptiYard project Work Package 7 (WP7) ‘Dissemination, communication and results exploitation’ (Grant Agreement No. 777594).

WP7 involves three tasks, as follows:

Task 7.1 – Data Management Plan

Task 7.2 – Dissemination and Exploitation Plan and tools aligned with Shift2Rail

Task 7.3 – Industrial dissemination activities

1. OBJECTIVES

The core objective of this work package is 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. The main focus of the work package has been the full utilisation of the results and findings during and after the end of the project. OptiYard partners in WP7 have been committed first to raise awareness, engage external stakeholders and then disseminate and exploit the project's results within and beyond Shift2Rail JU.

As outlined in the OptiYard description of work, the dissemination objectives are to:

- Establish a dissemination platform to facilitate wide-spread information transfer amongst and beyond the members of the consortium (and beyond the life of the project);
- Set up communication channels with OptiYard and other S2R projects to ensure a permanent link/communication with the relevant S2R activities;
- Ensure that the project outputs reach targeted stakeholders;
- Ensure that appropriate dissemination strategies are applied.

The dissemination of OptiYard 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 OptiYard 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 and newsletters);
- The intensive use of social media to communicate efficiently on the project;
- The organisation of a mid-term and a final conference;
- The cooperation with other Shift2Rail projects;
- The complete list of disseminated OptiYard activities at event such as workshops, seminars, conferences and internal meetings.

It will also detail the exploitation measures that have been undertaken during the past two years and present the exploitation plan of the project partners for the near future.

2. PROJECT TARGET GROUPS

The target groups were carefully defined at the very early stage of the project. Dissemination and communication activities have been tailored to reach all of the targets mentioned below.

The OptiYard consortium has identified the main stakeholders according to seven categories:

- Infrastructure managers
- Freight operators and RUs
- Service providers
- Scientific community
- Public bodies and organisations
- Freight partnerships
- Shift2Rail JU

The OptiYard consortium represents most of the above-mentioned stakeholders which ensures a good exploitation of the project results.

The definition of the key stakeholder categories takes into account the different ways that OptiYard outputs can be used, considering that in Europe there are several different organisational structures concerning the entities involved in marshalling yards.

For example, the repartition of the activities regarding infrastructure management and shunting operations can take several different forms. For instance:

Infrastructure Management	Shunting	Case
IM	IM	Wien Zentralverschiebebahnhof
IM	RU/SP	Česká Třebová
RU/SP	RU/SP	Private yards

Trieste Campo Marzio, one of the two case studies of OptiYard, is even more interesting, as the organisation changed in the recent years, and part of the infrastructure is owned by the Port Authority:

	National Infrastructure management	Port Infrastructure management	Shunting on National Infrastructure	Shunting on Port Infrastructure
Until 2016	IM (Rete Ferroviaria Italiana)	SP (Adriafer)	IM (Rete Ferroviaria Italiana)	SP (Adriafer)
From 2016	IM (Rete Ferroviaria Italiana)	SP (Adriafer)	SP (Adriafer)	SP (Adriafer)

Freight Operators and Railway Undertakings are involved as their operations can be significantly improved thanks to the better integration between yard and the surrounding Infrastructure, thanks to OptiYard interfaces.

The scientific community will get valuable inputs from OptiYard process analysis, potentially leading to improvements in the design or redevelopment of Marshalling Yards, as well as a clear overview on the global interrelations concerning the yard eco-system.

Public bodies and organisations will manage to perform a deeper technical evaluation by applying OptiYard simulation and optimisation process, to target future investments on infrastructural improvements.

Freight Partnerships are transversal organisations that aggregate actors in the Rail Freight industry, and thus impacted by the same aspects concerning the above-mentioned categories.

3. DISSEMINATION MATERIAL

Several actions presented below have already been amply explained in deliverable D7.2. We will therefore only sum them up and update them all with the latest deliveries (such as the OptiYard social media use, mid-term and final conference, press releases and latest publications).

3.1 PROJECT IDENTITY

A project identity has been created at the beginning of the project. It included:

- Logo
- Templates for presentations and reports,
- a project brochure,
- and a project roll-up.

The project identity has been used all over the lifetime of the project and has helped dissemination activities and ensured a consistent communication of the project concept, objectives and results.

3.2 PUBLIC WEBSITE

A dedicated website has been set up at the beginning of the project. The website (www.optiyard.eu) is publicly accessible, with a section where visitors can register their interest. It is divided into two parts: the public portal and the cooperation tool (member's area).

The public portal is open to the public and displays the key project information, partners, results, news/events and links to the partners' websites. All documents prepared for the project (flyer, newsletters, presentations at mid-term and final conference, etc.), as well as all public deliverables have been published on the website, announced via twitter and are still available for download.

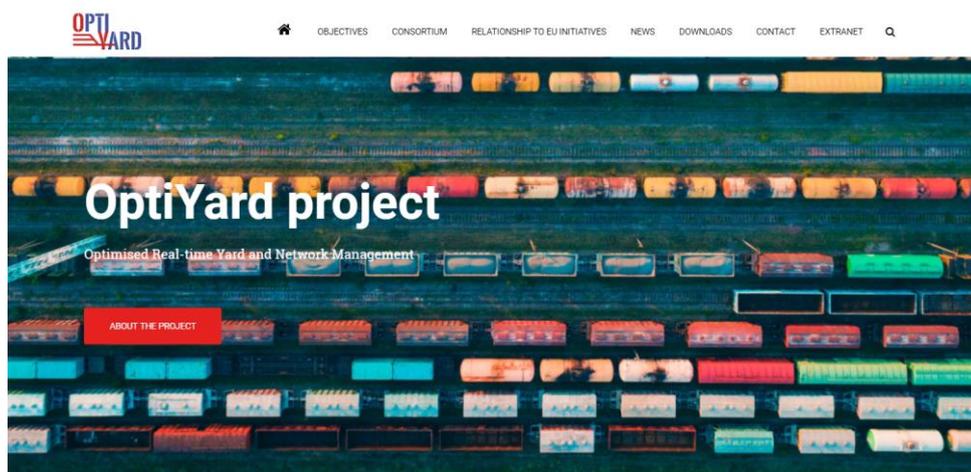


Figure 1: Homepage of OptiYard public website

The OptiYard website was visited by about 1500 unique users who viewed more than 4500 pages.

To facilitate the document and information sharing, all OptiYard members of the consortium have used the OptiYard private area, so-called “OptiYard workspace” or “extranet”.

The “OptiYard workspace” was created in the UIC collaborative Tool “OVIDENTIA” which is an open source content management and collaborative platform based on a large community of users. This OptiYard Workspace enables users:

- to share and store documents;
- to organise meetings;
- to manage directories and contacts;
- to discuss special issues online.

The OptiYard workspace is accessible via the OptiYard’s public website at <http://extranet.uic.org>. Figure 2 below shows the home page of the workspace with the latest uploaded documents and files.

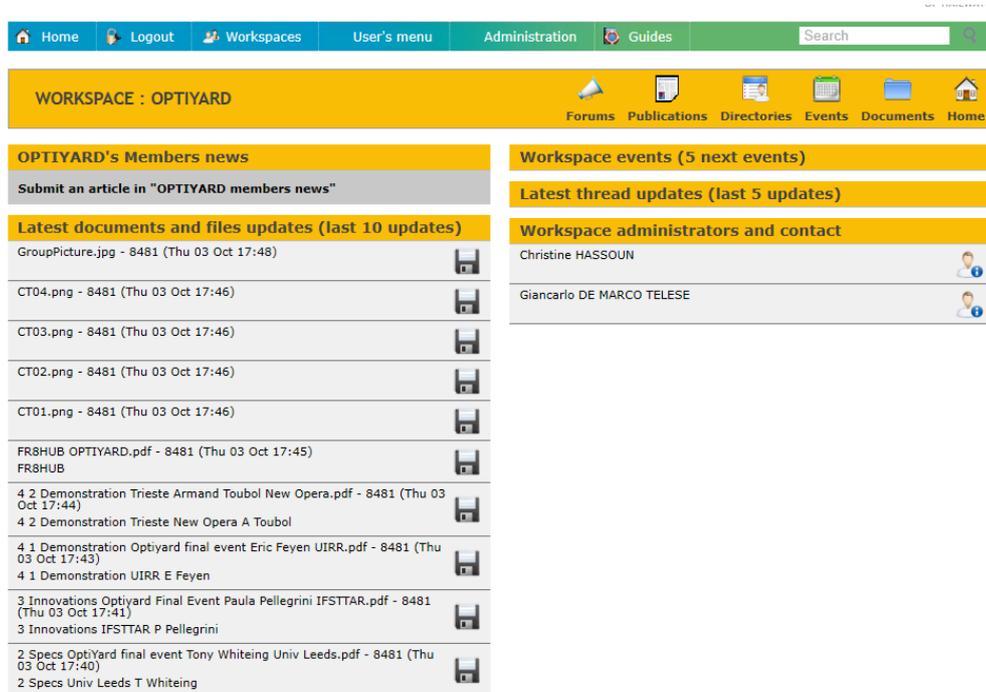


Figure 2: Homepage of OptiYard Workflow tool

Figure 3, below, depicts the file structure currently within the Workflow tool. This has been adapted and amended to suit the project and partner’s requirements as delivery occurred.

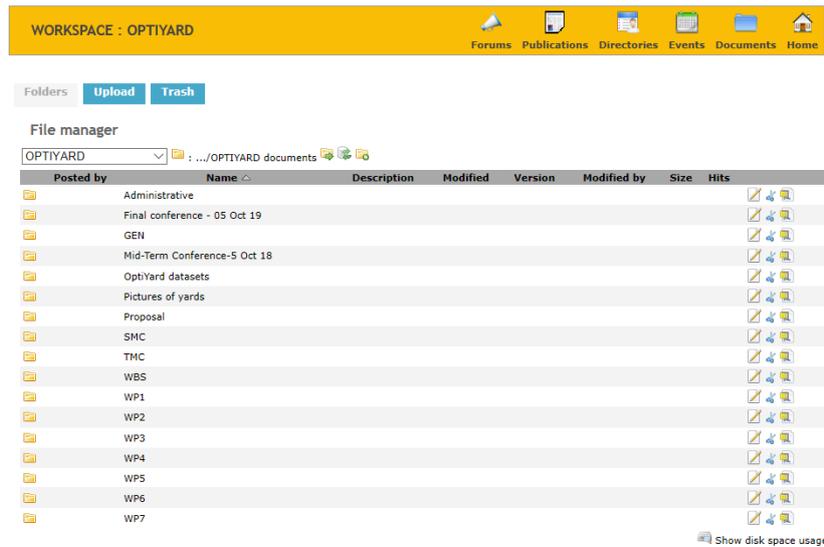


Figure 3: Structure of the OptiYard workflow tool

3.3 SOCIAL MEDIA

An OptiYard twitter account (@OptiYard) has been launched in December 2017. It has been used intensively all along the life of the project to inform followers about the developments in the project (such as the presentations made at the mid-term and the final events, the publication of the OptiYard newsletters) but also to convey messages from the project partners, the Shift2Rail JU and the EU.

At time of writing this deliverable, about 100 tweets or retweets have been posted, more than 100 tweets were liked and the twitter account has now more than 200 followers (see twitter account homepage below). The effect of the OptiYard twitter account is demultiplied by the retweets made by the S2R JU, and by the project partners which have a large number of followers in the railway domaine and beyond.



Figure 4: Homepage of OptiYard twitter account

3.4 PROJECT BROCHURE

The OptiYard brochure was released in month 6 of the project. This flyer was designed to present OptiYard project objectives and expected outcomes as well as its organisation and partners.

It has been distributed at several international transportation events, such as TRA 2018, TEN-T Days and UIC Global Freight Conference 2018, at the joint mid-term conference and then largely shared by the consortium partners to their contacts to reach as many people as possible in the targeted audience identified in chapter 2 of this document.

3.5 NEWSLETTERS

The project has produced a newsletter. The first newsletter has been released in month 17. It consists of eight pages covering the activities carried out during the first half of the project. The online version has been put on the website and has been advertised via twitter. A printed version has also been made and has been distributed among the consortium, and at various transportation events, as well as among UIC members.

An updated electronic edition of this newsletter has been published in May to reach more people. It also gave the project partners the opportunity to communicate the date of the final conference to attract more participants.

At time of writing this report the second project newsletter is still in preparation and will be released right after the project ends. An electronic version of the newsletter will be amply shared.

3.6 PROJECT EVENTS

The OptiYard consortium partners have organised two main public events at UIC in Paris:

The OptiYard mid-term conference

This event was held on October 5th, 2018 at UIC in Paris, France. Nearly 30 participants attended this meeting which offered the partners the opportunity to present the first results and gain a wider visibility. The programme of the conference was sent out on a large scale by the project partners and largely advertised via twitter and via the UIC e-News (https://uic.org/com/spip.php?page=kiosque_eneews&recherche=optiyard).

All presentations given during this event were made available on the event website right after the conference. Participants were informed by mail that all presentations could be downloaded. A tweet was also pinned on the twitter profile to enable interested people to find the presentations.



The OptiYard final conference

The OptiYard final event was held at UIC in Paris on 25th September 2019. This final event was attended by more than 40 participants from 10 countries across the European railway community and beyond. The event was announced in advance and largely advertised via the UIC website, the UIC e-Newsletter, via e-mails and twitter.



Final event group picture

The conference ended with the presentation of the Shift2Rail JU funded IP5 complementary Project FR8HUB. Jan Bergstrand, coordinator of the project at Trafikverket, and Nicklas Blidberg from Lindholmen Science Park highlighted the close links between the two projects and the good cooperation established all along the lifetime of OptiYard. This will ensure the continuity of work done in OptiYard.

As for the mid-term conference, presentations were made available on the event website just after the event. Participants were informed by mail that all presentations could be downloaded. A pinned tweet still informs the followers that final event presentations are available on the website.

3.7 PARTICIPATION IN CONFERENCES

Apart from the mid-term event and final conference, some other conferences and public events have been and will be targeted where OptiYard can be presented and communicated to a wide audience.

OptiYard has been presented during high-level EU events, such as:

- ROADEF 2018 (Lorient, France, 21/02/2018)
- TRA 2018 (Vienna, April 2018)
- The Global Rail Freight conference (Genoa, Italy, June 2018)
- The European Conference on Operational Research (Valence, Spain, July 2018)
- The 4th International Conference on Railway Technology -Railways 2018- (Sitges, Spain, September 2018)
- InnoTrans 2018 (Berlin, Germany, September 2018)
- VII. International Scientific Conference of the Faculty of Transport Engineering (Pardubice, Česká republika, September 2018)
- SIDT annual conference -Board of Italian transport academics- (Salerno, Italy, 12 September 2019)
- 6th ISROR symposium - International Symposium on Railway Operations Research, (Beijing, China, 26-27/10/2019)

The dissemination partners especially, have been active in the promotion and dissemination, by joining these and other major events and conferences and presenting results and achievements of the project.

3.8 PUBLICATIONS & PAPERS/JOURNALS

IFSTTAR presented a paper entitled “Optimiser une gare de triage en temps réel“. This paper was published in the conference proceedings of the Roadef 2018 held in Lorient, France on 21 February 2018 and can be found at: <https://hal.archives-ouvertes.fr/hal-01813414>.

Résumé : Dans le cadre du projet européen OptiYard, nous voulons concevoir un outil d'optimisation qui a vocation à être adapté aux gares de triage en Europe pour le transport de marchandises. Provenant du réseau ferroviaire dit "classique", les trains arrivent et sortent respectivement par le faisceau de réception (ang. receiving tracks) et par le faisceau de départ (ang. departure tracks). Les wagons des trains réceptionnés sont recombinaisonnés de façon à former les trains attendus en sortie. Contrairement aux trains de passagers, l'ordre des wagons a ici de l'importance et c'est grâce aux allers-retours des wagons entre la butte de triage (ang. hump) et les voies de classification que les bonnes combinaisons sont obtenues. La butte sert à limiter l'énergie utilisée "à l'aller" pour envoyer un à un les wagons dans le faisceau de réception grâce à la force de gravitation, alors qu'"au retour", c'est un moteur qui sera utilisé pour remonter tout un ensemble de wagons d'une voie de classification vers la butte.

A paper entitled “Interface for operational management System in marshalling yards” was orally presented and published in the conference proceedings of the VII. International Scientific Conference of the Faculty of Transport Engineering 2018 that was held in Pardubice, the Czech Republic, on 6–7 September 2018. This paper can be found at: http://isc.upce.cz/download/ISC_2018_Pardubice_en.pdf (ISBN 978-80-7560-152-0, pages 217-224).

Abstract: This paper considers existing procedures that are performed in marshalling yards with empiric measured times of duration of main operations. In the first part of the paper are mentioned sources which are used for performing of the operations with inbound and outbound trains that are analysed afterward. Following part describes circumstances of non-optimised decisions and the reasons for them. In last part of the paper is stated proposal of data interface which is necessary for improvement of data flow in marshalling yards and is a base for development of considered marshalling yard management system.

DICEA presented a paper entitled: "Integrating yard, network and optimisation models towards real-time optimisation of rail freight yard operations" at the XXIII Seminario Scientifico SIDT – Società Italiana Docenti di Trasporto (Board of Italian transport academics, Salerno, Italy on 12 September 2019. The paper has been accepted for publication by Ingegneria Ferroviaria, the journal of the board of Italian railway engineers.

Abstract: Rail freight yards are key elements of the rail system. Their operations affect the overall effectiveness of the door-to-door transport chain of any goods that use the rail mode. In order to contrast the decline in Europe of the use of the railmode for freight transport, and in particular that of Single Wagon Load transport, it is thus extremely important to streamline operations as much as possible, decreasing if possible their duration but above all improving their regularity, thus enabling a strong improvement in the performance of the rail mode and attracting traffic that otherwise would go mainly by road.

Within this context the OptiYard project (2017-2019) funded by SHIFT2RAIL is addressing the real-time management capabilities of yard simulation and optimisation tools. For each yard three software packages are developed: a microscopic yard model, a microscopic network and the corresponding optimisation algorithms. It is the findings regarding the interactions between the abovementioned models and with the IT systems connected to the yard and the railway network that are described in this paper. These findings are expected to lead to the development of a highly innovative yard management Decision Support System (DSS), capable of generating optimal disposition decisions and recommendations for resource utilisation in real time. In parallel with the on-going innovation in real-time network management, this will allow in turn to improve decision-making in ad-hoc timetable planning to optimise operational processes that connect freight traffic in yards and terminals with timetable slots to and from the network.

A presentation of the project was made by IFSTTAR at the sixth ISROR symposium (International Symposium on Railway Operations Research), on 26-27 October in Beijing, China. This presentation entitled "OptiYard: Optimised Real-Time Yard and Network Management" aimed at describing the objective and results of the OptiYard European project.

Abstract: OptiYard optimises processes for managing marshaling yards and terminals, considering their interaction with the network. The processes considered are those that must be performed in real-time, to guarantee on-time delivery and operational efficiency, for single wagon and blocktrain transport.

OptiYard addresses critical operational points of the transport chain (both rail marshalling yards or as transfer points to other modes) to improve capacity and reliability. Most importantly, these improvements will enhance competitiveness whilst increasing service reliability and customer satisfaction by providing accurate and updated information. Real-time interaction between yard and relevant network IT systems will allow for software-based planning and ultimately optimisation of single wagonload and blocktrain operational processes.

3.9 MAIN DISSEMINATION ACTIVITIES

Table 2 below recapitulates the main dissemination actions that have been made by the project partners throughout the lifetime of the project.

Categories	Date	Location	Name of action / Short description	Link
Press release	20/06/2017	UIC eNews #553	Article in the UIC eNews: "UIC to coordinate OptiYard"	https://uic.org/com/uic-e-news/553/
Website	25/10/2017	Oltis website	Presentation of the project	https://www.oltis.cz/oltis-group-jednim-z-resitelu-projekt-optiyard/
Oltis website	25/10/2017	Oltis website	List of projects	https://www.oltis.cz/o-nas/projekty/
IFSTTAR website	01/11/2017	IFSTTAR website	List of projects	https://www.leost.ifsttar.fr/linstitut/cosy/s/laboratoires/leost-ifsttar/projets-de-recherche/projets-collaboratifs/europeens/
IFSTTAR website	01/11/2017	IFSTTAR website	Presentation of the project	https://www.estas.ifsttar.fr/linstitut/cosy/s/laboratoires/estas-ifsttar/projets-de-recherche/internationaux/
IFSTTAR website	02/11/2017	IFSTTAR website	List of projects	https://www.estas.ifsttar.fr/linstitut/cosy/s/laboratoires/estas-ifsttar/projets-de-recherche/
EURNEX website	02/11/2017	Eurnex website	Presentation of the project	http://www.eurnex.org/projects/#1550584733360-f27c1a48-bbc2
Facebook post	15/11/2017	Oltis	Presentation of the project	https://www.facebook.com/oltisgroup/photos/oltis-group-je-jednim-z-řešitelů-projektu-optiyardnaše-společnost-se-podílí-na-p/174068059337496/
Eurolog website	15/11/2017	Oltis	Presentation of the project	https://www.eurologport.sk/oltis-group-je-jednym-z-riesitelov-projektu-optiyard/
Press release	20/11/2017	Newrail newsletter	Article in the Newrail newsletter: "OptiYard project - Kicks-off"	https://www.ncl.ac.uk/media/wwwncl.ac.uk/engineering/newrail/files/NewRail%20Newsletter%20-%20November%202017.pdf
Press release	28/11/2017	UIRR Newsletter issue Q3.2017	Article in the UIRR Newsletter: "OptiYard project to improve marshalling yards"	http://www.uirr.com/fr/media-centre/newsletters/2019/mediacentre/913-uirr-newsletter-issue-q32017.html
Social media: twitter	Dec. 2017	Twitter	Launch and running of OptiYard twitter account	@optiyard
Participation to a Conference	21/02/2018	Roadef 2018, Lorient, France	IFSTTAR presented: "Optimiser une gare de triage en temps réel"	https://hal.archives-ouvertes.fr/hal-01813414
Website	February 2018	OptiYard website	Launch and running of OptiYard website	https://optiyard.eu/
Flyer	Feb-April 2018	OptiYard flyer	Preparation and printing of OptiYard flyer	https://optiyard.eu/downloads/
Distribution of OptiYard flyers	16-19/04/2018	TRA 2018, Vienna, Austria	Networking and distribution of flyers	N/A
Press release	24/04/2018	UIC eNews #595	Article in the UIC Enews: "Seventh edition of Transport Research Arena (TRA) in Vienna: UIC steps forward once more"	https://uic.org/com/uic-e-news/595/
Distribution of OptiYard flyers and networking	24-27/04/2018	TEN-T Days, Ljubljana, Slovenia	Networking and distribution of flyers	N/A
Distribution of OptiYard flyers	April-Sept 2018	UIC	Distribution of flyers at reception and on various UIC meetings	N/A
Participation to a workshop	29/05/2018	Stockholm, Sweden	ARCC Workshop Yard management and Network management	N/A
Organisation of a Workshop Participation in activities organised jointly with other H2020 projects	13/06/2018	Rome, Italy	FR8HUB-OptiYard Workshop	N/A

Categories	Date	Location	Name of action / Short description	Link
Organisation of a Workshop	14/06/2018	Rome, Italy	Seminar: Wagon load transport: research and perspectives	N/A
Distribution of OptiYard flyers	26-28/06/2018	Genoa, Italy	UIC Global Rail fret conference: Networking and distribution of flyers	N/A
Participation to a Conference	10/07/2018	Valencia, Spain	European Conference on Operational Research: "Optimizing the shunting yards"	N/A
Press release	28/08/2018	UIRR Newsletter issue H1.2018	Article in the UIRR Newsletter: "OptiYard Project introduction"	http://www.uirr.com/fr/media-centre/newsletters/2019/mediacentre/995-uirr-newsletter-issues-q1-q2-2018.html
Participation to a Conference	04/09/2018	Railways 2018, Sitges, Spain	4 th International Conference on Railway Technology	N/A
Press release	04/09/2018	UIC eNews #612	Article in the UIC Enews: "The OptiYard Mid-Term Conference project will be held at UIC in Paris on Friday 5 October 2018"	https://uic.org/com/uic-e-news/612/
Participation to a Conference	06-07/09/2018	VII. International Scientific Conference of the Faculty of Transport Engineering, Pardubice, Česká republika	ČD Cargo presented: "Interface for operational management system in marshalling yards"	http://isc.upce.cz/download/ISC_2018_Pardubice_en.pdf
Press release	18/09/2018	UIC eNews #614	Article in the UIC Enews: "The OptiYard Mid-Term Conference project will be held at UIC in Paris on Friday 5 October 2018"	https://uic.org/com/uic-e-news/614/
Distribution of OptiYard flyers and networking	22-25/09/2018	Innotrans 2018, Berlin, Germany	Innotrans 2018	N/A
Organisation of a Workshop	04/10/2018	UIC, Paris	Organisation of the OptiYard mid-term conference in Paris	Presentations downloaded at: https://optiyard.eu/downloads/
Organisation of a Workshop Participation in activities organised jointly with other H2020 projects	07/02/2019	Stockholm, Sweden	IP5 TD2 FR8Hub, OptiYard and ARCC workshop	N/A
Participation in activities organised jointly with other H2020 projects	18/06/2019	Munchen, Germany	ARCC, FR8RAIL, FRBHUB, SMART, FFL4E, MO, INNOWAG final event: Distribution of OptiYard newsletter with announcement of OptiYard final conference	N/A
Press release	11/07/2019	OptiYard website	Article in the news tab of the website: The Shift2Rail Funded IP5 project OptiYard to hold its final event on 25 September 2019 at UIC in Paris	https://optiyard.eu/2019/07/11/the-shift2rail-funded-ip5-project-optiyard-to-hold-its-final-event-on-25-september-2019-at-uic-in-paris/
Press release	16/07/2019	UIC eNews #655	Article in the UIC Enews: "The Shift2Rail Funded IP5 project OptiYard will hold its final event on 25 September 2019 at UIC in Paris"	https://uic.org/com/uic-e-news/655/
Press release	30/07/2019	UIC eNews #657	Article in the UIC Enews: "The Shift2Rail Funded IP5 project OptiYard will hold its final event on 25 September 2019 at UIC in Paris"	https://uic.org/com/uic-e-news/657/
Press release	03/09/2019	UIC eNews #658	Article in the UIC Enews: "The Shift2Rail Funded IP5 project OptiYard will hold its final event on 25 September 2019 at UIC in Paris"	https://uic.org/com/uic-e-news/658/

Categories	Date	Location	Name of action / Short description	Link
Participation to a Conference	12/09/2019	XXIII Seminario Scientifico SIDT – Società Italiana Docenti di Trasporto (Board of Italian transport academics, Salerno, Italy)	Presentation by DICEA entitled: "Integrating yard, network and optimisation models towards real-time optimisation of rail freight yard operations"	N/A
Organisation of a conference	25/09/2019	UIC, Paris	Organisation of the OptiYard final conference in Paris	Presentations downloaded at: https://optiyard.eu/downloads/
Press release	30/09/2019	OptiYard website	Article in the news tab: "Final Conference of the Shift2Rail IP5 OptiYard Project held on 25 September 2019 at UIC"	Final Conference of the Shift2Rail IP5 OptiYard Project held on 25 September 2019 at UIC
Social Media	30/09/2019	Twitter	100 tweets - 140 likes - 200 followers	@Optiyard
Press release	01/10/2019	UIC eNews #662	Article in the UIC Enews: "Final Conference of the Shift2Rail IP5 OptiYard Project held on 25 September 2019 at UIC"	https://uic.org/com/uic-e-news/662/
Press release	06/10/2019	Optiyard website	Article in the news tab of the website: "Optiyard held its mid-term conference at UIC in Paris on 4th October 2018"	https://optiyard.eu/2018/10/06/optiyard-mid-term-conference-at-uic-in-paris-on-4th-october-2018/
Participation to a Conference	26-27/10/2019	6th ISROR symposium (International Symposium on Railway Operations Research), Beijing, China	IFSTTAR presented: "OptiYard: Optimised Real-Time Yard and Network Management"	N/A
Participation to a Conference	29/10/2019	Stockholm, Sweden	IFSTTAR presented: "OptiYard: Optimised Real-Time Yard and Network Management" at the IP5 TD2 Yard and Network management	N/A
Article	To be published	Trajectoire le magazine - Ifsttar	Title: "Un logiciel pour optimiser la gestion des trains de fret"	N/A
Article	To be published	ČD Cargo, a.s.	Summary of project results	N/A
Article	To be published	Ingegneria Ferroviaria, the Journal of the Board of Italian railway engineers	Paper entitled: "Integrating yard, network and optimisation models towards real-time optimisation of rail freight yard operations"	N/A

Table 1 Table of main OptiYard dissemination actions

This project has received funding from the Shift2Rail Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement no. 777594 (OptiYard)

3.10 COOPERATION WITH OTHER RELEVANT S2R AND EU ACTIVITIES

Several OptiYard partners were present at the TEN-T days in Ljubljana in April 2018. Contacts were made with interested partners on the OLTIS stand.

A collaboration agreement was signed between OptiYard and the complementary project FR8HUB.

Several Shift2Rail IP5 workshops were organised during the life time of the project. Participants from ARCC, OptiYard and FR8Hub met in May 2018 and February 2019 to increase knowledge by sharing experience and results and to discuss the projects current research status, topics, knowledge results and possibilities to information exchange and co-operation. A workshop was also organised by FR8HUB and OptiYard partners in Rome in June 2018.

Several OptiYard partners participated in the ARCC, FR8RAIL, FR8HUB, SMART, FFL4E, MO, INNOWAG final event in München, Germany on 18 June 2019. The OptiYard updated version of the newsletter was distributed and the date and location of the OptiYard final event was announced.

4. EXPLOITATION PLAN

4.1 OBJECTIVES

This document summarises the beneficiaries' strategy related to the exploitation of the project results during the project's life and afterwards. It also summarises the actions that were made within OptiYard to ensure the sustainability of the results for a long period. It also makes sure that the impact of the project outcomes are maximised; the use of results in further research other than those covered by the OptiYard action concerned is ensured, the development, creation and marketing of any further products, services or processes and standardisation activities are aware of and constructively use the project results, ensuring an efficient transfer of results between OptiYard and Shift2Rail, and ensuring that OptiYard results will be presented to the relevant regulation and standardisation bodies where possible.

This part also makes the bridge with the dissemination & communication activities presented in this document, i.e., strategies and measures which have been followed by the OptiYard project consortium in order to raise awareness to optimise the marshalling yards.

Another objective is to fill in the existing gaps between (a) research and development, (b) practical implementation and utilisation of the results, and (c) end users' decision-making. The document, therefore, summarises the approach, that allowed the end-users to adapt their utilisation and deployment decisions to their specific operational requirements. End-user adoption of the innovative technologies developed in the project is of primary importance, which provides important opportunities for novel methods in the marshalling yard field. OptiYard plans its results to be quickly integrated into the Shift2Rail JU development roadmap by several means; OptiYard has among others, contributed to set a reference for further developments that will be further exploited within Shift2Rail's IP5: "Technologies for Sustainable & Attractive European Rail Freight". In that sense, OptiYard signed the Collaboration Agreement with the CFM IP5 project FR8HUB and several workshops were organised in common with several partners of these two projects.

4.2 EXPLOITATION MEASURES

Exploitation strategy covers the exploitation actions during the project life and the plans for exploitation after the project end.

Concerning the exploitation measures that have been used during the project, the following list summarises the key actions that were undertaken in OptiYard:

- list of the existing interfaces between stakeholders in marshalling process was made in the specifications;
- the requirements for data from optimised processes in marshalling yard were listed;
- data flow schematics and proposal of changes and extensions of information contents for efficient planning and managing of marshalling yard processes were implemented;
- development of a standardised demonstration plan useable by the case studies; the demonstration plan includes all the specifications and the requirements needed from the real-field activities of the business cases. The expected standardisation impact from OptiYard project is expected to be in line with the ERRAC (European Railway Research Advisory Council) agenda regards the IT standardisation through a standardised fleet monitoring system; in this perspective there might be a possible harmonisation between TD3.7 “rolling stock data model for status exchange” and OptiYard through Rail-ML language;
- Uptake of OptiYard results through cooperation with other Shift2Rail project formalised by the following means:
 - Developed and signed a Collaboration Agreement with the Shift2Rail IP5 project FR8HUB;
 - Ensured a smooth transfer of OptiYard results to the corresponding CFM project FR8HUB, as well as with several other Shift2Rail IP5 CFM projects, such as ARCC and FR8RAIL, through the organisation of technical workshops on specific subjects identified;
 - Had regular interaction with the S2R JU, through the IP5 Steering Committees, where possible issues can be resolved between all the project coordinators.

All this exchange of information has enabled OptiYard partners to provide feedback to the relevant stakeholders in Shift2Rail, but also to collect suggestions that could be relevant for the on-going activities of the project.

4.3 EXPLOITATION BY INDIVIDUAL PARTNERS

For an efficient market uptake, exploitation measures have to be customised for each typology of stakeholders in the valued chain relating to marshalling yards operations. The following list of specific exploitation measures by OptiYard partners illustrates the wide range of actions which have been activated during the project life and that will be undertaken in the near future.

UIC

During project life:

UIC, as the worldwide professional association representing the railway sector and promoting rail transport, has no commercial purposes but has strong dissemination capabilities and a very important network of experts from rail infrastructure managers and operators.

OptiYard knowledge was integrated in the overall activities of the UIC freight and rail system departments. The project findings, results and recommendations were presented in the relevant meetings of those bodies and to the expert groups working on technical issues and business cooperation such as Operation Study Group and Combined Transport Group.

UIC has promoted the results of the project in related international events (organised by UIC or where UIC is participating). All the UIC dissemination capabilities have been used, namely the electronic newsletter (UIC e-News) that globally reaches about 5000 email addresses, the UIC dedicated website, the social media accounts and the UIC network of experts.

After project end:

UIC will use the OptiYard results in the works of two internal expert groups who are specifically dealing with operations in yards and cooperations with neighbouring stakeholders.

On the first hand with the “Operation Study Group” which purpose is to harmonise operational processes, requirements and regulations. This is the basis for a seamless international and border crossing freight traffic. Some obvious issues to be tackled in this group linked with OptiYard’s results are:

- Accompanying the TAF TSI implementation process on certain matters
- Cooperating with other organisations like RNE, CER and FTE in the field of operations

On the second hand with the “Combined Transport Group” which objective is to develop cooperation at international and Community level between Railway Undertakings with a view to advancing and promoting intermodal techniques and making them reliable, competitive and better-suited to the requirements of the market and the environment.

To this end, the CTG shall implement and coordinate discussions and joint actions in the field of combined transport by carrying out any necessary studies, taking any necessary decisions and initiating any necessary actions in the following areas:

- productivity improvements
- communication
- business facilitation
- market knowledge

Optiyard's results are all about improving productivity, enhancing communication between stakeholders (Yard Manager, Railway Undertaking and Infrastructure Manager), facilitating business and improving the market knowledge. In that perspective, the CTG will use Optiyard's results and recommendations as tools to develop cooperation in yard management.

On top of this, the European freight CEOs, united in the CEO Task force, gathered to discuss the next steps of the Rail Freight Forward initiative, organised by the Community of European Railways (CER) and UIC.

The pan-European Rail Freight Forward initiative started in early 2018 with the aim of increasing rail freight's modal share to at least 30% by 2030.

End of 2019, the European Commission presented the European Green Deal in which rail is considered as the backbone for European mobility. The rail freight sector should make a significant contribution to Europe's roadmap for green transition, helping it become the world's first climate-neutral continent by 2050.

The CEO Task Force stressed the opportunity for the freight railway sector to contribute to the European Green Deal.

As a next step, a roadmap with a concrete deployment plan will be developed. This plan will be proposed as a strong sector initiative to the European Commission.

The realisation of the roadmap relies, in addition to these stakeholders, on policy-makers, authorities, and financial measures taken in the context of the Green Deal. And the Optiyard's results will be submitted to the roadmap team in order to contribute to the innovation programme.

The top-level endorsement of this innovation programme is a clear confirmation of the freight sector's commitment to act as a driver behind modal shift and more environmentally friendly mobility for the future.

UIC will keep on presenting OptiYard results to relevant UIC forums.

UIC will go on promoting the results of the project in related international events, such as WCRR, TRA and Innotrans.

IFSTTAR

During project life:

IFSTTAR has added yard-specific knowledge to the portfolio of expertise of its operations research and artificial intelligence group. This knowledge integrates the remarkable experience of the group concerning the optimisation of the exploitation of railway capacity.

Moreover, IFSTTAR has promoted the results of the project in scientific international events.

IFSTTAR has also participated to a work group including Trafikverket, Linköping University and Sapienza Università di Roma. The activity of this group aimed at ensuring the consistency of OptiYard and the other Shift2Rail projects focusing on similar problems (namely ARCC and FR8HUB).

After project end:

IFSTTAR will pursue the investigations on suitable methods for optimising yard management, based on the results of OptiYard. Specifically, it will keep working on yard optimisation designing and assessing alternative algorithms, based on different technologies which could not be tested within the project. For example, the pertinence of using Mixed-Integer Linear Programming techniques will be assessed. The additional findings which will result from the new investigations will be made available to the community through scientific publications.

Furthermore, IFSTTAR will keep promoting the achievements of OptiYard in international conferences (e.g., ORBEL2020, ROADEF2020).

Finally, IFSTTAR will keep participating in the work group including Trafikverket, Linköping University and Sapienza Università di Roma to possibly integrate the OptiYard framework in a network-wise perspective, which is the main focus of the FR8HUB project. Future collaborations, based on future funding opportunities, may allow the concretisation of this integration into a fully functional software demonstrator.

UIRR

During project life

UIRR was leader of the WP6 on business case test and validation of the two selected demonstrators in Czech Republic and Trieste.

As official representative of the terminal operators in Europe, UIRR regularly informed its member companies through infoletters and through its working structure, in particular the UIRR Terminal Interest Group. One of the UIRR members based in Trieste (EMT) was also involved in the dissemination of the results and is one of the key players that could benefit from the optimisation results.

UIRR published regularly information related to the project in its public newsletters (more than 2,000 recipients), public website and annual report. UIRR reported on the OptiYard activities at various events, fairs and conferences related to terminal efficiency improvements and digitalisation of Combined Transport.

After project end

The results of the project will be addressed in the next UIRR Terminal Interest Group, newsletter and annual report. Furthermore, UIRR will keep promoting the achievements of OptiYard in several international conferences, such as UIRR General Assembly, InnoTrans, UIRR 50-year celebration. The intention of UIRR is also to exploit the outputs in the next revision of the TAF TSI, which has been enlarged to the first and last mile operations (including yard and terminal facilities).

UNIVERSITY OF NEWCASTLE

During project life

The University of Newcastle performed an analysis whether existing models and data standards (like TAF TSI and TAP TSI) can cover the whole operating process in the yards and in the rail network, and identifying the gaps and studied the development of data model for closing the gaps preferably by extending existing standards (please refer to D2.1 “Definition and selection of suitable methods for real-time data analytics”). The University of Newcastle worked closely with the project coordinator UIC in communicating outcomes to the S2R JU, through the IP5 Steering Committees. Within the project, UNEW worked with MY at Česká Třebová and München, Mannheim and Hallsberg freight companies as case studies.

After project end

Beyond the end of the OPTIYARD project, UNEW intends to continue engaging with MY at Česká Třebová and München, Mannheim and Hallsberg freight companies. This is with a view to exploring opportunities of improving their TAF/TAP TSI messaging systems. Further continued engagement is also planned for the CFM project FR8HUB which finishes on 31/08/2020. Regardless of the imminent end of FR8HUB, opportunities will be sought with other future Shift2Rail IP5 CFM project. An article/publication is earmarked too. It is targeted at an EU-wide audience (open source), particularly meant for freight companies and policy makers. It would also be published on the author partner websites.

UNIVERSITY OF LEEDS

During project life:

Professor Liu attended the 4th International Conference on Railway Technology “Research, Development and Maintenance” held at Sitges (Spain) in September 2018 and presented a paper on functional specifications for integrated and real-time yard and network management.

Professor Liu discussed the relevance of the OptiYard approach to practical yard operations during a technical visit to the Hallsberg Marshalling Yard whilst visiting Sweden in June 2019 for the Rail Norrkoping conference (<https://www.railnorrkoping2019.org/>).

After project end:

The OptiYard project has provided significant additional critical mass to the Univleeds programme of rail research, representing both a broadening and deepening of analytical capabilities. This has contributed strongly to the recent establishment of a formalised Rail Research Centre within the Institute for Transport Studies at the university, in which the developments towards the digital railway will be a major theme.

Research papers based on OptiYard project outputs are being developed in co-operation with other project partners. A further research paper is being prepared which will explore the scope the OptiYard principles to be applied in other transport sectors, most notably to the management for automotive Ro-Ro (Roll-on/roll-off) shipping terminals.

ČD CARGO

During project life

Within the project, network models of two busy European railway stations were created, namely of the Italian port terminal Trieste Campo Marzio and of the marshalling yard Česká Třebová in the Czech Republic. The models served as one of the inputs for digital optimisation of processes in the respective stations with further implicit potential of its wider application to stations of similar types globally.

ČD CARGO was active in providing the data for the real-environment cases, organising two on-site meetings directly on the marshalling yard premises and providing other partners and the academia with the necessary knowledge (construction data, technological procedures and processes) and real-world constraints on the solutions (infrastructure constraints, limitations induced by safety rules).

After project end

The outcomes of the project are of significant benefit for a Railway Undertaking transporting mixed trains composed of single wagons and performing wagon sorting and marshalling activities in general. By simulating processes pursuant to numerous inputs and then optimising them, i.e. by selecting the best option of a number of ones available at a given moment, it will be possible to provide digital support for the operational decision-making of the relevant employees.

ČD CARGO is going to utilise the experiences and results of this project in the nearest pertinent update of its production information system. It is envisaged it will be implemented as part of the operational decision support system, i.e. to be utilised by the decision-making employees (dispatchers) in their day-to-day activities in steering of marshalling yards and the inflow and outflow of trains to and from the railway node under non-standard operation conditions both in cases of minor irregularities as well as during large scale disturbances. As an example can be used a delay of individual trains arriving into a yard and its impact on the outbound trains and how to neutralise its negative effect on railway operation in the most efficient way or how to cope with a major interruption of transport on a part of the network in emergency conditions (e.g. in cases similar to the Rastatt tunnel collapse in 2017).

OLTIS

During project life:

The results of OLTIS Group work in project helped to define and set up usable data flow schematics and propose changes and extensions of information for efficient planning and managing marshalling yards processes.

Given that the proposal fully respects existing legislation and is based on existing standards - mainly the European Union Regulation on technical specifications of interoperability TAF - the OLTIS Group company as a participant of the project OptiYard and as software developer for Railway undertakings and infrastructure managers, has been able to modify existing software and to start development of the new software. The mentioned software development is carried out on the basis of results gained during the research and proposal testing within OptiYard project.

The acquired knowledge and experience gained within a solution of the OptiYard project are applied in development of a new software (component, function), with a wider scope than marshalling yards. The methods from OptiYard are used for work in train formation station of freight transport, marshalling yard, etc.

Specifically, it concerns modifications of the control and command software both the ČDC freight railway undertaking and the SŽ (formerly SŽDC) infrastructure manager. The new software using advanced algorithms for optimised train control is currently under development. Compared to the OptiYard project outputs, it also includes algorithms to improve the commanding of station workers. Outputs of the OptiYard project could be used for the dynamic rail transport planning and operation including SWL.

Moreover, within the dissemination, students of the Faculty of Transport Engineering at the University of Pardubice, are acquainted with the project outputs.

NEW OPERA

During project life:

The result of the work of NEWOPERA contributed to transferring some experience to responsible people of yard management hesitating to use TIS informations, thus anticipating the arrival of the trains in their yard to gain in efficiency of their operations and to use a screen view of traffic movements enabling to propose to infrastructure possible change of departures to study in case of unexpected delay. Simultaneously NEWOPERA suggested to yard responsible staff to use the simulation tool slightly adapted to train and facilitate dispatcher decisions by visualising certain proposals.

OptiYard was quoted and commented in the session moderated by NEWOPERA at Smart Rail congress in Munich in June 2019 attended by many stakeholders.

After project end:

The possibilities of OptiYard solutions will be enhanced by the progressive development of the ELETA project which final event occurred last year and the development of the ongoing project of RNE trying to give more accurate results for the estimated time of arrival. NEWOPERA promotes indirectly in the Digital Transport & Logistics Forum (DTLF) better integration of data to be able in the future to fluidify the data transfer between train management and all logistics activities, thus contributing to a possible integration of all along the supply chain involving yards and terminals

SIMCON

During project life:

In order to simulate the railway operation on expected level of detail, several detailed data collections during real operation were executed in both modelled yards (Česká Třebová and Trieste). During the project, Simcon has also gathered experience with modelling of this two specific yard types. Modelling the operation of Česká Třebová provided valuable insight to the details of operation of large marshalling yards. Modelling of Trieste brought new experience with the operation of harbor terminals.

Simcon has presented the simulation models at the IP5 TD2 FR8Hub, Optiyard and ARCC workshop hosted by Trafikverket in Stockholm in February 2019 and in October 2019.

After project end:

The implemented enhancements of simulation software Villon enable support for external providers of decisions that the simulation model has to make (e.g. track or personnel assignment). This enables the simulation software to ask for and accept decisions from external sources - be it optimisation module (as was the case within OptiYard project), human-in-the-loop or even local information system of the yard (in case of real-time simulation model reflecting the state of the yard in real-time) - thus providing a general platform for development of various decision making tools. In cooperation with University of Zilina and its PhD students, Simcon company is planning to research further on this topic, especially in the field of real-time simulation models (used as a decision support tools) and employment of artificial intelligence techniques (e.g. neural networks) to enhance the quality of simulation models.

As a part of the project, a communication server software has been designed and implemented. This software acts as an intermediary between heterogeneous systems and allows them to communicate in standardised manner (using WebSockets and standard JSON data exchange format). Simcon expects further utilisation of this software in our research and possibly also in commercial projects.

The experiences gained during the OptiYard project are valuable for further development of simulation models. Modelling the operation of Ceska Trebova provided valuable insight to the details of operation of large marshalling yards. Modelling of Trieste brought new experience with the operation of harbor terminals. These experiences will be utilised during work on forthcoming simulation projects.

TU DRESDEN

During project life:

TU Dresden focussed on data handling as basis for yard process optimisation. Therefore this partner attended several railML conferences in order to get up-to-date information regarding this Open Source standard and the loosely coupled RailTopoModel. Additionally, these opportunities were used to inform the conference community about current OptiYard findings.

Furthermore, the progress provided by OptiYard and its findings were discussed at the RailNorrköping conference in June 2019 with research and industrial partners from the railway sector.

TU Dresden had major provisions in Deliverable “D2.1 Data Analytics Structure” that provides information for FR8HUB project partners as well as and public readers.

After project end:

TU Dresden is going to further transfer OptiYard results into its teaching as for students and for PhDs. New project proposals will be based on the findings of OptiYard in order to develop solutions for a sustainable freight railway system.

Furthermore, TU Dresden will go on promoting the results of the project in related international events, such as Innotrans. The findings regarding data structure standards are also of relevance for RailML conferences and the development of the RailTopoModel and will be discussed in these contexts.

Data structures and standards are one of the research areas of TU Dresden. The findings of the OPTIYARD project will be the base for further research projects that have to be developed. These projects will be used to spread the findings of the OptiYard project even more.

ADRIAFER

During project life:

During project life, the development of Villon software allowed ADRIAFER to have a graphic view of all operations involving the Train station and the Port Area.

Using this software in coordination with TIS (Train Information System) which shows the running advices of the trains planned to arrive to the train station, ADRIAFER had the possibility to have a clear view of the operations with all the connected details (time for every single operations, time for decoupling locos, etc.), which helped a lot ADRIAFER's control room to have more info in order to support the priority of the shuntings.

After project end:

The growth of the rail Traffic in Trieste in the last 5 years was considerable. ADRIAFER shunted 5048 trains in 2015 and 8911 trains in 2019. The infrastructure that connects the 3 terminals in the new port area, the train station, the industrial part of the port (Servola) did not receive big updates in these years, which forced the shunting companies and the train dispatchers to make one step forward in their organisations, using all possible tools in order to plan and manage all the activities and then perform the shunting in order to allow the scheduled train departures.

Starting from 2020, both infrastructure managers (Port and national IM) have planned big infrastructure works in order to support the growth of the rail traffic. In 2023 Trieste Campo Marzio train station will have a new layout with the possibility to receive 750 m trains, which means that during the infrastructure works ADRIAFER will suffer a reduction of the usable tracks for arrival/departures and also for shunting activities.

Villon software and OptiYard algorithm will be very useful to make simulations in order to allow IM to build the new tracks without reducing too much the total capacity of the train station, because it is clear that the port will not have the possibility to stop most of the rail traffic to allow the construction of new tracks.

DICEA

During project life:

DICEA played a leading role in the interaction with FR8HUB, developing a significant part of the conceptual work on yard-network interaction and presenting it in the IP5 TD2 FR8HUB, OptiYard and ARCC workshop hosted by Trafikverket in Stockholm on 7th February 2019. The discussions during the workshop inspired the work for the rest of the project which led to a presentation at the XXXIII Scientific Seminar of the Italian Society of Transportation Academics (SIDT) on Transportation Systems for Smart, Sustainable, Inclusive and Secure Communities, held at Salerno, Italy on 11th-13th September 2019.

After project end

The yard-network interaction work performed in the OptiYard project is considered as a basis for future research developments. One PhD student will follow up on this work, to be included in the broader research theme of modelling capacity of yards and networks in interaction with each other. The work is informed through the channel with IP5 established during OptiYard, which will be active at regular intervals to discuss progress. The findings of the project have been reported, and are to be reported, in periodic department workshops and seminars. In line with the research-based teaching approach, the findings will inform teaching in the module Railway Engineering in the Master Degree in Transport Systems Engineering and in two modules (traffic management, passenger and freight terminals) in the IISF Master (2nd level master in railway infrastructure and systems).

EURNEX

During project life:

As a non-profit oriented, EURNEX does not intend to exploit project results in a commercial manner. However, OptiYard findings have been used according to EURNEX objectives, namely the promotion of research and development of the European rail system. In order to achieve this, project results have been disseminated under EURNEX's members as well as through social media and the participation in trades and conferences. Project results have been also used in our activities to promote rail research as part of ERRAC Steering Committee. In addition, project results have been the basis for the submission of a scientific publication in the form of an abstract to the TRA2020 in Helsinki, where it will be presented in poster format.

After project end:

Project results will be used in the same manner in the future as during the project. That will include the possible elaboration of additional scientific publications or project results presentations in conferences and trades. It is also expected to use the gained knowledge during OptiYard project to facilitate the participation of EURNEX in future projects. Project results will also be used in the future for educative purposes in different formats (e.g. workshops, lectures).

5. CONCLUSION

This report contains a condensed summary of information and dissemination activities of the OptiYard project. In short, the means to achieve this objective includes a wide range of traditional information channels, such as project brochure, newsletters, and publication of news regarding the project in the UIC e-News, but also through the partners' own channels, in order to inform all kind of stakeholders interested in the railway domaine.

The OptiYard website (<https://optiyard.eu/>) was designed to be evolutive and dynamic, and all documents and deliverables published by the project partners have been and will be made available as soon as finalised. The OptiYard twitter account was used intensively to inform the target groups of all kind of developments achieved and documents published by the project partners. The effect of the OptiYard twitter account was demultiplied by the retweets made by the S2R JU, and by the project partners which have a large number of followers in the railway domaine and beyond.

OptiYard was presented at major international rail events and during several relevant S2R and EU initiatives.

Throughout the lifetime of the project, partners were aware of the importance of the efficient exploitation of the results. The organisation of the OptiYard mid-term and final events at UIC in Paris was of great importance to inform the pre-defined targeted groups.

The dissemination of results benefits from the good representativeness of the project target groups, including railway undertakings, freight operators, service providers, industry, rail associations and academia which ensures a large and effective spreading of the information and implementation of the results in the different sectors.

OptiYard participated and organized several IP5 Shift2Rail workshops to work in cooperation and share results. Most of the partners in OptiYard are also contributing to other EU-funded projects which ensures continuity of the work done in OptiYard.