



Deliverable D5.2

Communication Activities

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|---------------------------------|-----------------------|
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Abbreviations and acronyms

| Abbreviation / Acronyms | Description |
|-------------------------|-----------------------------------|
| PARK | Park Signalling |
| TECN | Technolution |
| TUBS | Technical University Braunschweig |
| TUD | Technical University Delft |
| UoB | University of Birmingham |

Executive Summary

This document constitutes Deliverable D5.2, “Communication Activities” of the Shift2Rail project MOVINGRAIL in the framework of Shift2Rail IP2. This document reports all communication activities during the MOVINGRAIL project, as outlined in Deliverable D5.4, “Dissemination and Communication Plan”.

The MOVINGRAIL project, “MOving block and VIRTUAL coupling New Generations of RAIL signalling,” aimed to identify operational procedures and testing methods for Moving Block signalling and assess communication technologies and the impact of Virtual Coupling on different segments of the railway market. In parallel with the four scientific work packages was Work Package 5: *Dissemination, Communication and Exploitation*, which was to inform a wide audience and promote the findings of the project and the partners’ expertise and capabilities.

The communication activities are divided in the three categories: Scientific Dissemination, Exploitation, and Marketing, as outlined in Deliverable 5.4, *Dissemination Plan*. Through both formal and informal routes, the WP5 team endeavoured to develop links across Academia and Industry, and to engage in knowledge exchange with other Shift2Rail and national and international projects.

Dissemination activities included meetings and events; web-based information; and publications. These included a dedicated website; social media activity; project meetings; industry events; scientific papers and conferences; and project-specific publications. A wide range of audiences was attracted, including academia, industry, government, research funding bodies and trade publications. A global reach was achieved, with stakeholders ranging from UK, EU to the US and China.

Using an integrated approach to online communications: coinciding timing of news and updated content to the website with social media, achieved wide engagement with these platforms. Scientific dissemination, similarly, engaged with academia on a world-wide basis, where 9 scientific papers have been presented in academic journals and conference proceedings, and one industry article. Overall, the project achieved a balanced audience of approximately 50% academic and 50% non-academic categories.

The dissemination plan had not foreseen the impact of the Covid-19 lockdown, which prevented originally-planned events taking place during 2020. Instead, outputs were achieved using online formats. One planned dissemination event, Innotrans 2020, was cancelled but the project will be displayed at the 2022 event. Other events, which were required to change from in-person to online, were able to reach a wider audience due to the greater level of accessibility of the webinar format. Over the course of the project duration, of the order of 600 incidents of event-based participation and 16,000 engagements online, via the website and social media, were achieved.

1. Introduction

Work Package 5: *Dissemination, Communication and Exploitation* aimed at communicating the knowledge gained during this project and exploiting any potential uptake by the rail industry. Dissemination actions were targeted towards stakeholders across the international transportation industry, academia and the general public. This document provides all scientific dissemination, exploitation and marketing activities that have been executed during the European Commission Horizon 2020 Shift2Rail project MOVINGRAIL.

In accordance with Deliverable 5.4: Dissemination Plan, the following activities were planned:

1. The inclusion of project results on the partners' web sites and internal newsletters;
2. Presentation of the results on the project website, which has links back to the partners' websites;
3. Publication of project results in technical papers, trade journals and conferences.
4. Initial dissemination of information through a project brochure to relevant associations and organisations;
5. Attendance and dissemination at industry trade events (e.g. Innotrans) and conferences;
6. The publication of case studies (demonstration scenarios) resulting from the project;
7. Exploitation of other online communication tools, e.g. social media, contribution to blogs, to reach appropriate audiences.

Target stakeholder audiences were:

- Researchers in industry and academia – in project teams' own institutions
- Researchers in industry and academia – in other institutions
- Rail industry businesses and industry, including industry trade press
- Regional authorities and infrastructure managers
- Policymakers at regional, national and EU-level
- General public
- Project advisory board

In order to reach and hold the interest of each audience, the outcomes of each planned activity were anticipated, in order to ensure the interest of each audience type was satisfied.

Dissemination aimed to reach interested stakeholders using a range of tools, including scientific publications; participation in relevant academic and industry conferences; workshops and open events; dedicated project website; social media activity; and project leaflets. The overview of the dissemination plan is outlined in Figure 1.

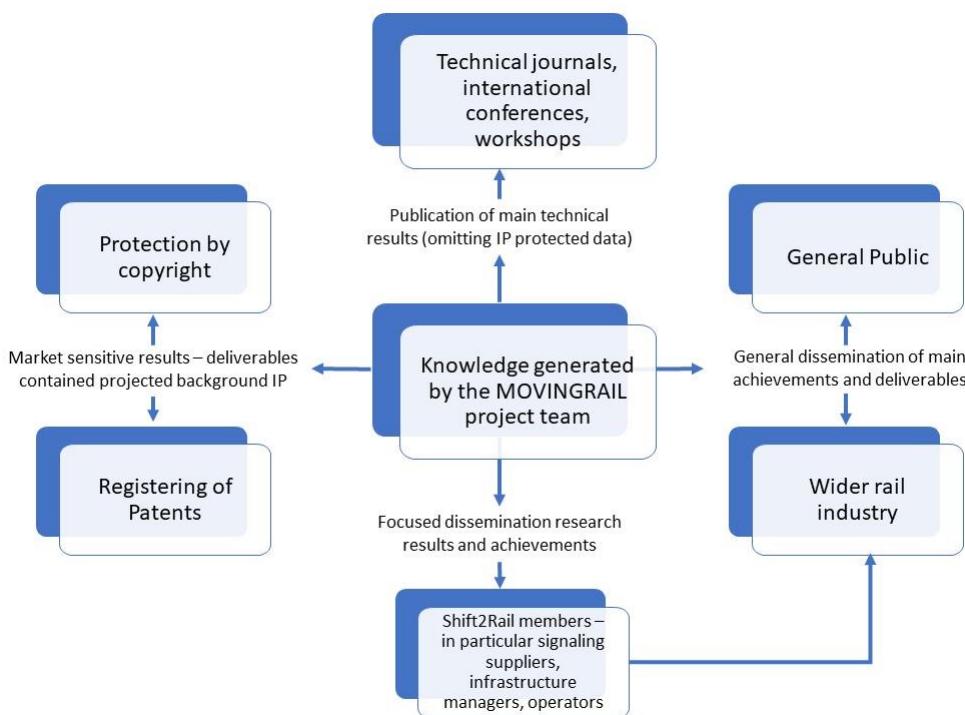


Figure 1: Overview of the MOVINGRAIL dissemination plan (D5.4)

Dissemination tools and activities were planned and anticipated, to reach audiences as follows:

| Dissemination tool | Audience | Themes of interest |
|---|---|--|
| Academic papers and scientific journals | Academic and industrial researchers | Technical and scientific outputs |
| Workshops and meetings | Academic and industrial researchers Rail industry business Infrastructure managers Policymakers Advisory board | Technical and scientific outputs Exploitation opportunities News Information sharing Idea generation |
| Conferences | Academic and industrial researchers Regional authorities Infrastructure managers Policymakers | |
| Trade events | Rail industry business Regional authorities Infrastructure managers Advisory board Trade press | |
| Project website | Rail industry business Regional authorities Infrastructure managers Policymakers General public Advisory board Trade press | Technical and scientific outputs News Project information |
| Focussed news releases and articles in industry press | Academic and industrial researchers Rail industry business Infrastructure managers Regional authorities Advisory board Trade press | News Project information |

| | | |
|----------------------------------|--|--|
| Social media (Twitter, LinkedIn) | Rail industry business Regional authorities Infrastructure managers Policymakers General public Advisory board Trade press | News Project information Idea sharing Comment, influence and opinion Online conversation with stakeholders |
| Blogs | Rail industry business Regional authorities Policymakers General public Advisory board | |
| Newsletters and project flyers | Rail industry business Regional authorities Infrastructure managers Policymakers Advisory board | |

The aim of all these communication activities was to spread the outputs of the project among interested parties. They involve the communication of the project's results to European railway Infrastructure managers, operators and signalling suppliers, as well as the wider industrial and scientific community.

Further to the cancellation of third-party events, in particular Innotrans 2020, some of the planned communication activities will take place in the future: RailBeijing 2021 and Innotrans 2022, for example. However, the opportunity arises to communicate the project in its entirety.

2. Scientific Dissemination Activities

Scientific dissemination includes all activities to communicate and publish the research results on a scientific level. Over the course of the project, conferences and academic papers were contributed to the scientific community, as outlined below. The main audience for these activities was the academic community.

| Date | Authors | Title | Journal / Conference | Location / Type |
|----------------------|--|---|---|--|
| 2019 | G. Bosse, M. Scheidt | Übergreifender Ansatz zur Definition eisenbahnbetrieblicher Funktionen: Prozesslandschaft Bahnbetrieb (in German) https://doi.org/10.2435/dbbs.084-201907031315-0 | Deutsche Bahn, 3, 22-27 | Professional journal |
| 17-20 June 2019 | E. Quaglietta, M. Wang, R.M.P. Goverde | A multi-state train-following model for the analysis of Virtual Coupling railway operations http://resolver.tudelft.nl/uid:15af4b3c-10cc-4c76-9836-983554c202ff | Proceedings 8th International Conference on Railway Operations Modelling and Analysis (RailNorrköping 2019) pp1382-1401 | Norrköping, Sweden Conference proceedings |
| 22-24 October 2019 | E. Quaglietta, R.M.P. Goverde | Exploring Virtual Coupling: operational principles and analysis http://resolver.tudelft.nl/uid:5f6e3050-3050-4bfd-a3e1-5f0aa02210e0 | ASPECT 2019, Institution of Railway Signal Engineers (IRSE) | Delft Conference proceedings |
| 12-16 January 2020 | J. Aoun, E. Quaglietta, R.M.P. Goverde | Investigating market potentials and operational scenarios of Virtual Coupling railway signalling (updated and published in 2020 – see below) | The 99th Transportation Research Board Annual Meeting | Washington Conference proceedings |
| 12-16 January 2020 | E. Quaglietta, R.M.P. Goverde | A comparative analysis of Virtual Coupling Railway operations http://resolver.tudelft.nl/uid:ebb4548f-aeba-46dd-872b-00a07865ac4d | The 99th Transportation Research Board Annual Meeting | Washington Conference proceedings |
| 20-23 September 2020 | J. Aoun, E. Quaglietta, R.M.P. Goverde | Exploring Demand Trends and Operational Scenarios for Virtual Coupling Railway Signalling Technology http://resolver.tudelft.nl/uid:be9fa851-8358-412e-926e-0b1cf2731f32 | 23rd IEEE International Conference on Intelligent Transportation Systems (ITSC 2020) | Online conference |
| 4 March 2020 | R.M.P. Goverde | Trends and developments in the automation of heavy rail | Global Railway Review | Online article |

| | | | | |
|-------------------|--|---|--|-------------------------------------|
| | | operations https://www.globalrailwayreview.com/article/97734/trends-developments-automation-heavy-rail/ | | |
| 2020 | J. Aoun, E. Quaglietta, R.M.P. Goverde | Investigating market potentials and operational scenarios of Virtual Coupling railway signalling https://doi.org/10.1177/0361198120925074 | Transportation Research Record, 2674(8), 799-812 | Scientific journal (Open Access) |
| 2020 | E. Quaglietta, M. Wang, R.M.P. Goverde | A multi-state train-following model for the analysis of virtual coupling railway operations https://doi.org/10.1016/j.jrtpm.2020.100195 | Journal of Rail Transport Planning & Management, 15, 100195 | Scientific journal (Open Access) |
| 3-7 November 2021 | M. Scheidt, J. Pachl | TikZ-trackschematics: a symbology compilation towards a universal graphical description for operational scenarios in railway research | Proceedings 9th International Conference on Railway Operations Modelling and Analysis (RailBeijing 2021) | Beijing Conference proceedings |

3. Exploitation Activities

Exploitation activities include all activities to communicate and work with the rail industry and other interested parties. Exploitation would usually also include commercial exploitation of the research results. However, due to the low Technology Readiness Level (TRL) of Virtual Coupling, no possible commercial cases were identified.

As planned, the project was either the focus of, or contributed to the content of workshops, meetings, seminars, conferences and industry events. Audiences were taken from across academia, industry, government and an opportunity arose to present the project within university courses, to students of the TUD MSc programme in Railway Traffic Management. All events, conferences, workshops and courses planned after January 2020 were not able to take place in-person due to the Covid-19 lockdown and subsequent closure of countries, mass gatherings and such events. Innotrans 2020 was first postponed and finally cancelled, meaning the planned dissemination to multiples of thousands of visitors was not possible.

Instead, each event took place using webinar and online tools. As a result, it was possible to reach a wider audience in some cases, due to participants not needing to travel. However, the valuable networking and conversation about project themes and outcomes was relatively limited.

| Date | Type | Description | Partner | Audience | ~participants |
|--------------------|------------|---|----------|---------------------------------|---|
| 30 January 2019 | Meeting | MOVINGRAIL Kick-Off Meeting with Advisory Board | All | Advisory Board | 20 participants |
| 23 May 2019 | Workshop | European workshop on train-centric railway signalling systems: How will the railways of the future look like? London, UK | TUD, UoB | European rail industry | 32 participants |
| June 2019 | Conference | 8th International Conference on Railway Operations Modelling and Analysis (RailNorrköping 2019), Sweden | TUD | Transport industry and academia | 50 participants |
| 18 July 2019 | Seminar | Seminar on next-generation signalling systems to IFSTTAR, Lille, France | TUD | Research institution | 20 participants |
| October 2019 | Conference | Institution of Railway Signal Engineers (IRSE), ASPECT 2019, Delft | TUD | Transport industry Academia | 200 participants in session presented |
| 11 November 2019 | Workshop | Workshop on Freight Train Platooning, Port of Rotterdam, Rotterdam | TUD | Rail industry | 6 industrial participants |
| 3 December 2019 | Meeting | MOVINGRAIL M12 Meeting with Advisory Board | All | Advisory Board | 15 participants |
| 17 December 2019 | Workshop | Presentation of the first developments of a Virtual Coupling simulation environment to the Dutch infrastructure manager ProRail at Delft University of Technology | TUD | Rail industry | 30 participants |
| 12-16 January 2020 | Conference | The 99th Transportation Research Board Annual Meeting, Washington. | TUD | Transport industry and academia | Conference attendance: 1500 50 session |

| | | | | | participants |
|----------------------|-------------------|---|----------------------------------|--|--|
| 6 May 2020 | Workshop | Workshop on Roadmap and Business Risks for Virtual Coupling | TUD, UoB | Rail industry | 23 participants |
| 28 May 2020 | Workshop | Presentation and feedback of the core manoeuvres of railway operation and the process map of railway operation to DB | TUBS | Infrastructure managers | 4 participants |
| 12 June 2020 | Meeting | MOVINGRAIL M18 Meeting with Advisory Board | All | Advisory Board | 20 participants |
| June 2020 | University course | Introduction of some of the most representative results on Virtual Coupling from WP4 in the MSc course on Railway Traffic Management | TUD | Engineering students | 20 participants |
| June 2020 | Seminar | Online Seminar to academics of Beijing Jiaotong University (China) on Operational Principles and Impact assessment of Virtual Coupling signalling | TUD, Beijing Jiaotong University | Engineering students | 20 participants |
| 20-23 September 2020 | Conference | 23rd IEEE International Conference on Intelligent Transportation Systems (ITSC 2020), Virtual Conference. | TUD | Transport industry and academia | 20 session participants Plus access to recorded content |
| 28 October 2020 | Workshop | Exchanging results between the MOVINGRAIL and X2Rail-3 consortium on VCTS | TUD, UoB, PARK | Transport industry and academia | 5 participants |
| 3 November 2020 | Workshop | Exchanging results between the MOVINGRAIL and X2Rail-3 consortium on Moving Block and zero-onsite testing | UoB, TUD | Shift2Rail X2RAIL-3 | 16 participants |
| 8 December 2020 | Workshop | Final Event MOVINGRAIL | All | Advisory Board Rail Industry Academia Industry press | 65 participants |
| 3-7 November 2021 | Conference | RailBeijing 2021, Beijing. | TUB | Transport industry and academia | 50 anticipated session participants. Anticipated conference participants: 300 |
| September 2021 | Exhibition | Railtex/Infrarail, 2021, Birmingham | UoB | UK rail industry, industry press | Anticipated visitor numbers: ~200 |
| September 2022 | Exhibition | Innotrans industry fair, Berlin: showcasing results to date | UoB, TUD | Transport industry European rail industry Academia Industry press | Anticipated visitor numbers: ~2000 to UoB exhibition stand. |

4. Other Dissemination Activities

The remaining activities took place over the course of the project duration and maintained communications with the project's audiences and to promote news, events and outputs.

| Date | What | Actions | Status | Participants |
|------------------------------|--|---|-------------|---|
| March 2019 | Website movingrail.eu | Publishing of project results, newsflashes and Deliverables. | Online | ~2000 website visits: 50% academia, 25% industry, 20% government/ research council, 5% others (e.g. press). |
| May 2020 | Social Media feed Twitter LinkedIn | Communication about project activities | Active | 50 followers: 50% academia, 25% industry, 20% government/ research council, 5% others (e.g. press). |
| 2020 | Blogs – UoB | Various blogs published by UoB | Published | 186 views, estimated 60% academia, 40% industry |
| Dec 2020/Jan 2021 | Flyer – TUBS, TUD, UoB | Flyers about the in WP and project results | In progress | 100 to be contacted directly: stakeholders who registered for final event in December 2020: 45% academia, 45% industry, 10% government/ research council/ press Plus downloads from website |

4.1. Website

The project website, www.movingrail.eu, was created, with pages including Project Overview; Glossary of Terms; News; and Project Outputs.

The website attracted visitors from across the globe, in particular the US, China and throughout Europe, as shown in the website's visitor map analysis:

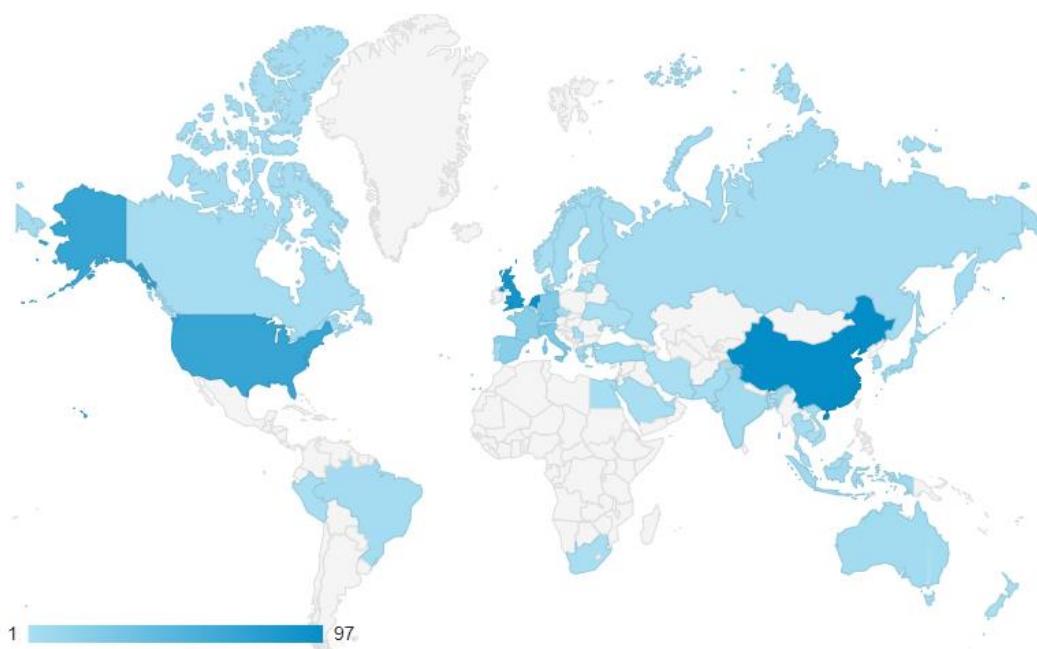


Figure 2: Website visitors (darker blue - greater numbers)

The website was updated on a regular basis, according to news and events taking place, publication of deliverables and to ensure it maintained compliance to EU and S2R requirements.

Of particular interest, as well as the home page, were the pages relevant to the Deliverables, Events, and News, as outlined below.

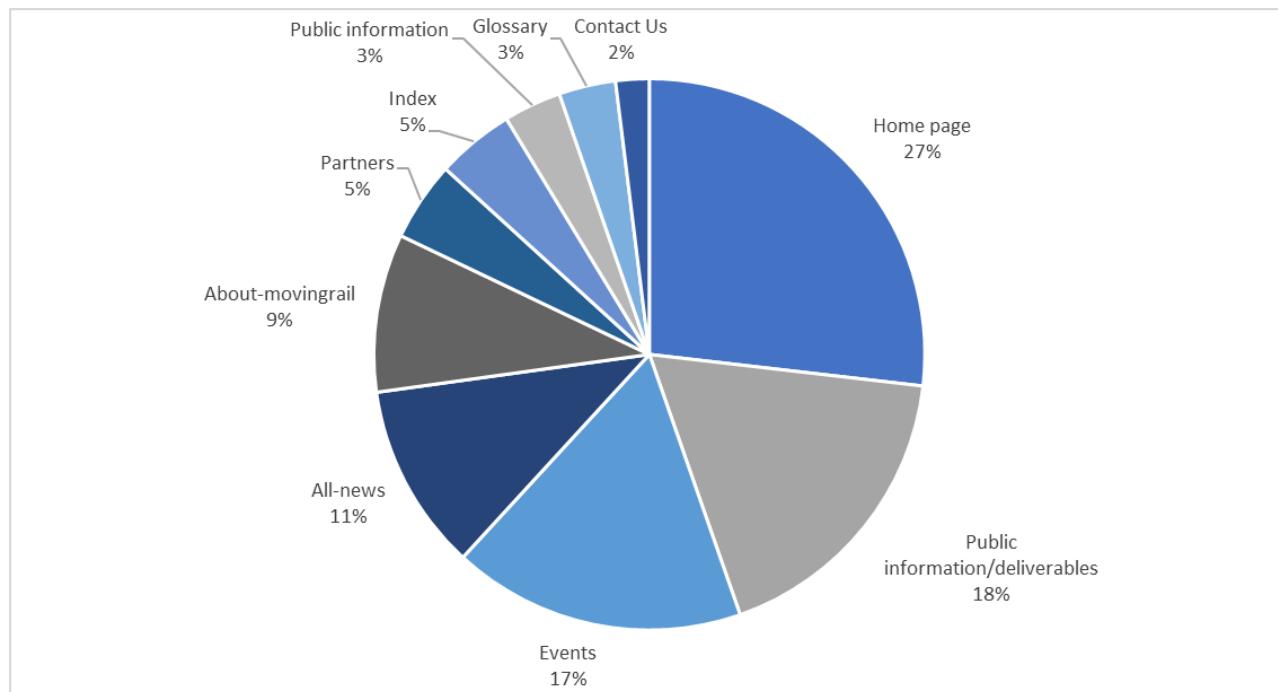


Figure 3: movingrail.eu visitor summary

4.2. Social Media

The Twitter account, @movingrail, was created and tweets relevant to the project and the project team were sent, according to newsworthy activity. Engagement with Twitter increased during the second half of the project when the project team participated more heavily with social media and while more activities took place online. After a quiet first half of the project, over 13,500 impressions and 273 profile visits were achieved between May and December 2020.

Project team members used their own LinkedIn accounts and accounts associated with their research groups, e.g. the UoB (<https://www.linkedin.com/company/bcre>) to distribute news. Clear data for these engagements is therefore not available.

4.3. News Flashes and Industry Press Articles

Meetings, events and key activities were published on the www.movingrail.eu website to announce newsworthy moments and promoted using social media. Coinciding with these, engagement with the website was seen to increase.

The dissemination plan had anticipated at least one article in the rail industry trade press, in order to reach a wider industry audience. TUD published an article in Global Railway Review (see Para2) which is reported to have attracted 25 shares via social media and 2 comments posted on the publication's website. There remain additional publication opportunities in the future and the overall theme of the MOVINGRAIL project will be incorporated into future publications.

However, the reach of other dissemination activities, including blogs and news items, promoted via social media channels, enabled much of the desired outcome towards a wider industry readership to be achieved.

4.4. Blogs

Where possible, project team members published informal blogs on their project activities. Members typically used their own blog pages for these; one such blog was written by Dr Samra of UoB, published on <https://blog.bham.ac.uk/bcrre/2020/07/27/the-railway-is-full-how-can-we-increase-its-capacity/>. This item achieved 186 blog views, having been accompanied by a tweet from the sister @bcrre twitter account to promote it.

4.5. Project flyers

PDF soft-copy flyers have been prepared as a legacy of the project outcomes which summarise the overall project and the four technical work packages. They include contact details for the reader to follow up points of interest and will be able to be printed for distribution at future in-person events such as [Innotrans 2022](#) and [Railtex 2021](#).

These will be disseminated via email to the stakeholders who have expressed interest in the project. They will also be available to download on the project website.

5. Conclusions

The MOVINGRAIL project has disseminated its activities and results using a range of tools, from high-level social media activities through to detailed scientific papers, as a result of which it has reached the wide audience planned. It has reached an audience stretching from China to the US which is made up of a balance between academia and industry, together with members of Government, research funding bodies and the rail industry trade press. Almost 600 incidents of event-based participation and approximately 16,000 engagements online, via the website and social media, are recorded.

This has been achieved despite the challenges brought by the Covid-19 pandemic and resulting cancellation of in-person events for the majority of 2020. However, opportunities arose to disseminate more widely, as the accessibility of online events and meetings enabled participation from across the world.

The MOVINGRAIL project has contributed to the academic scientific body of work by publishing 9 papers in journals and conference proceedings. It has organised or participated in 18 successful events, accessed or attended by a total of 600 participants (some may be duplicated individuals). One industry article was published for a global audience. The project's website has disseminated information and results to a global audience and its social media feeds, similarly, have reached the general public, industry bodies, research funders, students, academics and members of the international rail industry.