

FAIR STATIONS

Future Secure and Accessible Rail Stations

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Prepared by:	Emmanuel Matsika [UNEW]
Contributors:	Umberto Battista [STAM]
Verified by:	Umberto Battista [STAM]

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The FAIR Stations project consortium

No	Partner organisation	Short Name	Country
1	STAM SRL	STAM	Italy
2	UNIVERSITY OF NEWCASTLE UPON TYNE	UNEW	United Kingdom
3	METRO DE MADRID SA	MDM	Spain
4	TECHNISCHE UNIVERSITAET WIEN	TU Wien	Austria
5	SIIT SOCIETA CONSORTILE PER AZIONI SIGLABILE SIIT SCPA	SIIT	Italy
6	APF SOLUCIONES DE GESTION SL	APF	Spain
7	ILUNION ACCESIBILIDAD, ESTUDIOS Y PROYECTOS S.A.	ILUNION	Spain
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Executive Summary

This deliverable D1.2 addresses WP1 objective 'to ensure and monitor the overall consortium objective is met with high quality, on time and within budget'. It provides a report on the reviews by the Project Advisory Board (PAB) who provided expert external advice and steering to the project. Two review meetings held. The first one took place in Vienna on 20th April 2018 (M8), and the second was held in Genoa on 9th July 2019 (M23). The outcomes of these meetings are reported in form of minutes.

The first meeting was rather limited in what the PAB could provide guidance, since only one technical work package had significant results to report (WP2: Passenger Needs & and Human Factors). All the three WP tasks reported the results. In WP3 (Benchmarking of Station Designs and Accessibility) of the three tasks, only T3.1 (Review of past research and projects - EU and international). The second PAB meeting covered extensive technical work packages. Subsequently, all the remaining WPs reported the results. In WP3 only T3.3 Gap Analysis was emphasised since T3.1 and T3.2 were presented in details during the first PAB meeting in Vienna. Overall the WPs presented with varying levels of completeness were WP3, WP4, WP5 and WP6.

To enhance feedback from the PAB, they participated in the stakeholder questionnaire which was administered after presentation of the prototypes which took place in Genoa, Italy, on 10th July 2019. Here, the stakeholders listened to the presentations of the project outcomes in general, and saw the PTI system prototype (scale 1:4) in operation.

Very early on in the project life, FAIR Stations set up the advisory board (PAB). The benefits were significant as the guidance provided by the PAB members proved valuable. Below are the key notes emerging from the PAB:

- As planned, two project advisory meetings took place during the project life.
- They provided beneficial feedback which provided guidance to the project activities.
- During the two meetings (and when necessary via email or phone), the PAB provided guidance in all WPs, and therefore helped to shape the exploitable outputs of the project (namely crowd flow model, independent boarding system and detection technologies).
- Having a representative from PIVOT and IN2STEMPO was very beneficial as this facilitated well informed FAIR stations design-well synchronised with the activities in S2R complementary projects.
- Outcomes of the stakeholder survey show that the FAIR Stations independent boarding system largely addressed the main PTI challenges (safety, dwell time, universal design and independence when boarding). However, some suggested that a full scale system needs to be tested and/or validated in subsequent projects.

List of abbreviations

EC	European Commission
EU	European Union
PIBS	PTI Independent Boarding System
FMECA	Failure Mode, Effects & Criticality Analysis
PRM	People with Reduced Mobility
PTI	Platform Train Interface
PAB	Project Advisory Board

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1. INTRODUCTION

This deliverable D1.2 addresses WP1 objective ‘to ensure and monitor the overall consortium objective is met with high quality, on time and within budget’. It provides a report on the reviews by the Project Advisory Board (PAB) who provided expert external advice and steering to the project. Two review meetings held. The first one took place in Vienna on 20th April 2018 (M8), and the second was held in Genoa on 9th July 2019 (M23). Appendices A and B provide a list of attendees and the meeting agendas, respectively.

The FAIR Stations project results were presented to the PAB for their comment, advice and steering. Following each PAB review meeting a report in form of minutes was made on the PAB comments and advice that should be made to the project (Battista 2018; Battista, 2019). The members of the PAB cover the following railway areas, research; infrastructure manager; vehicle manufacturer; passenger interest group; and policy makers. A full list is provided in Appendix C.

2. FIRST PROJECT ADVISORY BOARD MEETING (VIENNA, 20/04/2018)

The first meeting was rather limited in what the PAB could provide guidance since only one technical work package had significant results to report (WP2: Passenger Needs & and Human Factors). All the three WP tasks reported the results. In WP3 (Benchmarking of Station Designs and Accessibility) of the three tasks, only T3.1 (Review of past research and projects - EU and international). Two other work packages made their kick-off presentations:

- WP4 Crowd Flow Analysis
- WP5 Design and Conceptualisation

Although WP6 was presented, it was due to commence the second year. One aspect which was immediately relevant though was T6.5. It aimed at assessing and ensuring FAIR Stations outputs were aligned to the complementary projects IN2STEMPO and PIVOT.

Table 1 summarises the feedback.

Table 1 First PAB Meeting feedback.

Work Package	Question/Comment
WP2 Passenger Needs & Human Factors	<ul style="list-style-type: none"> • Need to have a common and consistent signage for way finding. • Address difficulties with exiting old stations, which have neither lifts nor escalators.
WP3 Benchmarking of Station Designs and Accessibility	<ul style="list-style-type: none"> • Confirmation that FAIR stations project can use the DoA of IN2STEMPO for its D3.1. • Modularity is desirable. This would be taken into account for new stations, but it's not possible for old ones.
WP4 Crowd Flow Analysis	<ul style="list-style-type: none"> • As under WP2, need to have a common and consistent signage for way finding. • Would the crowd model help with evacuation procedures? Yes, the project team responded. • On whether the model can be used for real-time applications, the team responded affirmatively. It all depends on the defined inputs.
WP5 Design and Conceptualisation	<ul style="list-style-type: none"> • IN2STEMPO shall take up the solution developed by FAIR Stations. • Designs that do not comply with existing standards should be considered (with a view to guide modification or updating of standards). The FAIR stations solution covers the 2 platform standards in EU. • Independence of PRMs is the most important aspect to be incorporated in

Work Package	Question/Comment
	the design.

3. SECOND PROJECT ADVISORY BOARD MEETING (GENOA, 9/07/2019)

The second PAB meeting covered extensive technical work packages. Subsequently, all the remaining WPs reported the results. In WP3 only T3.3 Gap Analysis was emphasised since T3.1 and T3.2 were presented in details during the first PAB meeting in Vienna. Overall the following WPs were presented with varying levels of completeness.

- WP3 Benchmarking of Station Designs and Accessibility
- WP4 Crowd Flow Analysis
- WP5 Design and Conceptualisation
- WP6 Evaluation and Validation of Concepts Developed

Table 2 summarises the feedback collected.

Table 2 Second PAB Meeting feedback.

Work Package	Question/Comment
WP3 Benchmarking of Station Designs and Accessibility	<ul style="list-style-type: none"> • In the gap analysis questionnaire, the word 'safety' needed to be well defined and clarified. • The gap analysis questionnaire was generic. It was recommended that it should be separated into two; one for retrofit and the other for new builds. • Gap analysis should produce recommendations.
WP4 Crowd Flow Analysis	<ul style="list-style-type: none"> • The floor dynamic lighting system would be hard to see when people are packed (though not applied in FAIR Stations). • Simulations can be really valuable to test procedures, processes and location of machines/equipment. • It was proposed to take validation recordings after the holiday period, in order for the data to be significant for the validation.
WP5 Design and Conceptualisation	<ul style="list-style-type: none"> • Ensure the angle of inclination also covers manually propelled wheelchairs. • Static electricity needs to be taken into account, with the boarding system blade touching the floor of the train. • FMECA analysis was recommended, however, it was observed that it was outside the scope of the project.
WP6 Evaluation and Validation of Concepts Developed	<ul style="list-style-type: none"> • Include among the benefits the improved customer experience and the

Work Package	Question/Comment
	<p>fact that the society becomes older.</p> <ul style="list-style-type: none"> • Highlight who are the beneficiaries for each of the technologies. • It was suggested to replace the word “climatology” with “station environmental management”, as the former term is confusing. • It was suggested to have a look at the BREEAM certification, which includes security, accessibility and environmental quality.

4. STAKEHOLDER FEEDBACK FROM THE GENOA DEMONSTRATION

To enhance feedback from the PAB, they participated in the stakeholder questionnaire which was administered after presentation of the prototypes. The outcomes are partly also reported in Deliverable D6.2 (Naso Rappis, et al, 2019).

As one of its main outcomes, the FAIR Stations project has designed and developed a “PTI independent boarding system” (PIBS) which incorporates automatic operation. Two events were conducted to present the results to the stakeholders, and also get feedback on their views about the design and its operation. The first event (reported in this deliverable) took place in Genoa, Italy, on 10th July 2019. Here, the stakeholders listened to the presentations of the project outcomes in general, and saw the PTI system prototype (scale 1:4) in operation. The second event is reported in D6.2. as the PAB did not participate.

The Genoa event was attended by both consortium members from the 8 partners and 7 external stakeholders. Out of the 7, 6 completed the feedback form shown in Appendix D, and comprised consultants, infrastructure managers, disability interest groups, and metro/light rail operators. Results are presented in the following pages.

Figure 1 shows that most stakeholders thought that the PIBS addresses the PTI safety and crowd flow challenges that are being faced EU-wide.

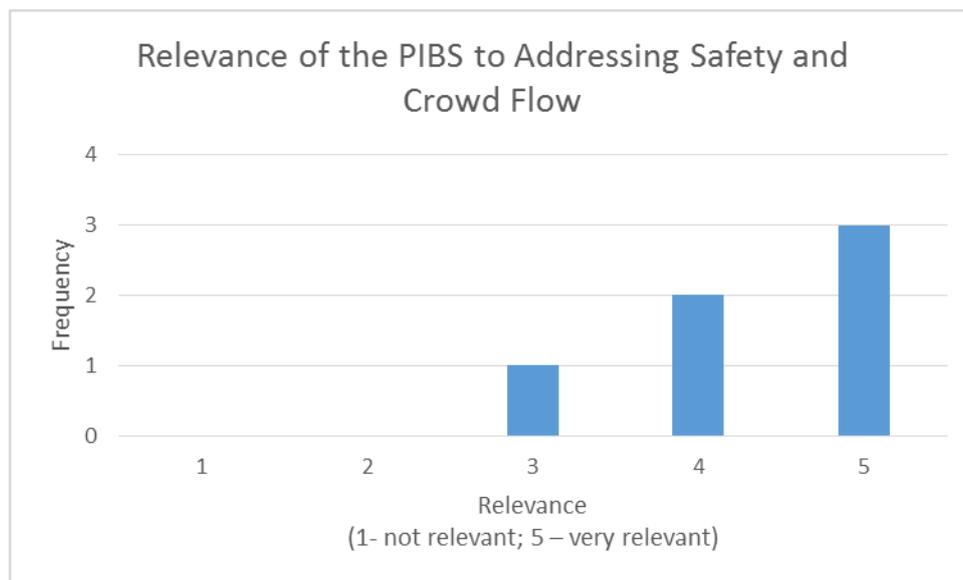


Figure 1 How the PIBS addresses PTI and crowd flow challenges.

Shown in Figure 2 is an outcome that indicates that most stakeholders think that the PTI problem as a result of horizontal and vertical differences between the train floor and platform are significant.

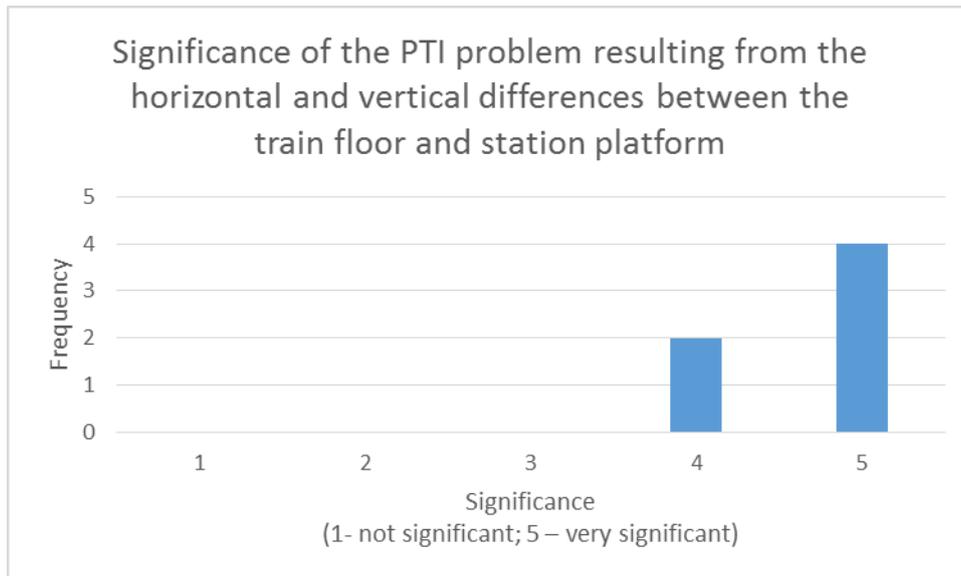


Figure 2 Significance of the PTI problem.

One of the critical questions tried to capture the extent to which the automatic boarding system had addressed the PTI problem. Figure 3 shows that most participants felt that the problem had been largely addressed, while one felt it had not been adequately addressed.

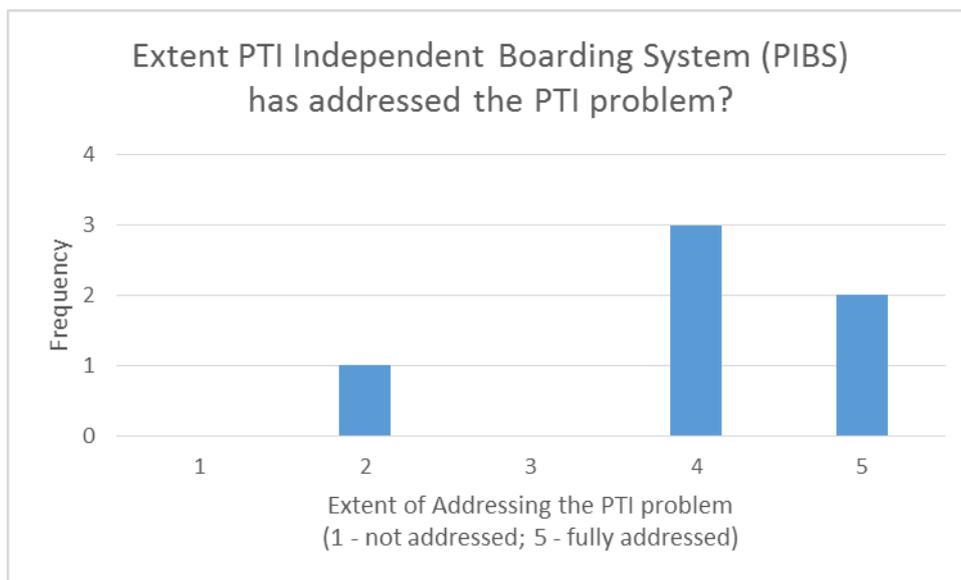


Figure 3 PTI Independent Boarding System (PIBS) addressing the PTI problem.

There are specific areas of concern for which the system has been designed. One of them being safety. Figure 4 strongly shows that even though most participants felt that the systems largely addresses safety concerns, only one indicated that it fully does so. Some expressed concern that the system had not been tested and/or validated, and therefore would not be deemed to have the capability to address safety concerns fully.

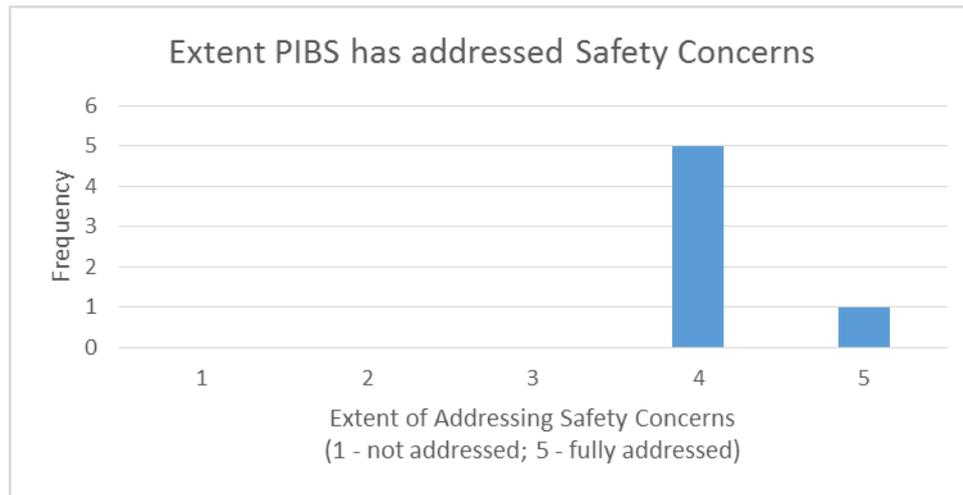


Figure 4 Extent to which PIBS has addressed safety concerns.

Reduction of the dwell time is an important KPI for the FAIR Stations project. Although more participants felt that the dwell time had been reduced significantly, it is worth noting that two did not feel the reduction was significant. This could be partly because in as much as the prototype showed that the PIBS operates within less than 30 seconds, the full scale system may take longer.

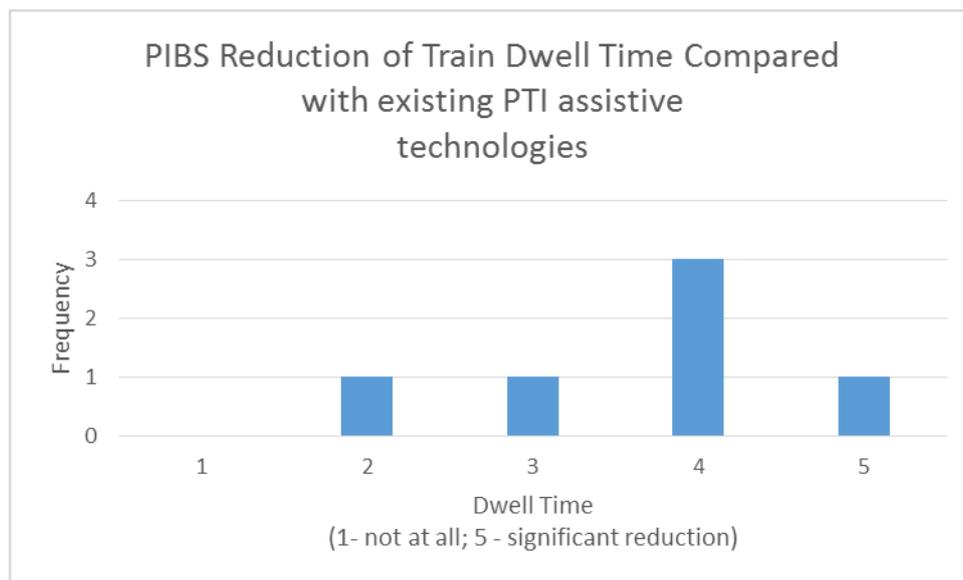


Figure 5 Reduction of the train dwell time, compared with existing PTI assistive technologies.

Indirectly linked to dwell time is the ease of boarding and disembarking. Although the participants strongly felt that the PIBS would largely improve the ease of boarding and disembarking rail vehicles, none felt that the extent was large.

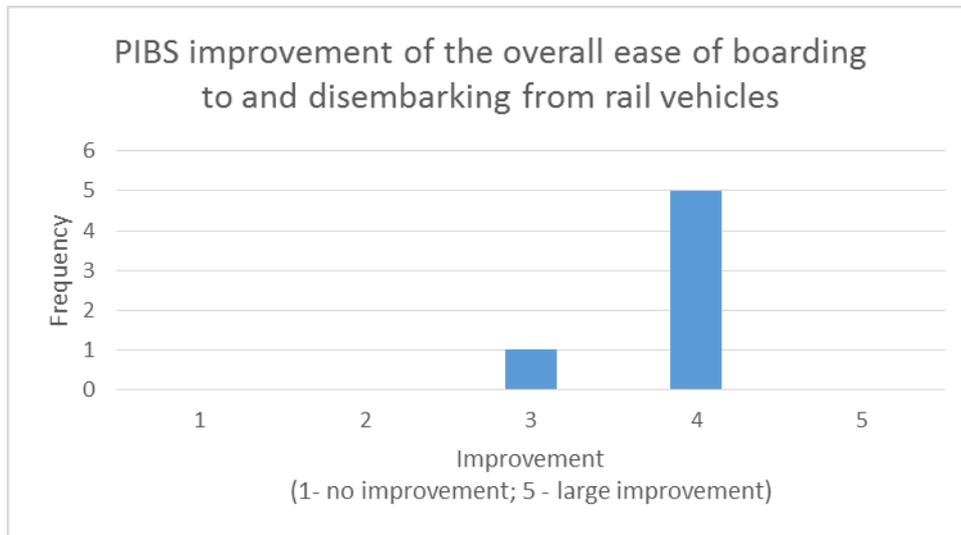


Figure 6 PIBS Improvement of the overall ease of boarding and disembarking.

The premise of the FAIR Stations project is to ensure that the station designs can be widely accessed and used by both the general public and PRMs. There was a strong feeling among the participants that the system does largely meet the requirements of design for all or universal design. This is demonstrated by the fact that PRMs as well as the general public have the safe access to use the ramp and lift sections of the system.

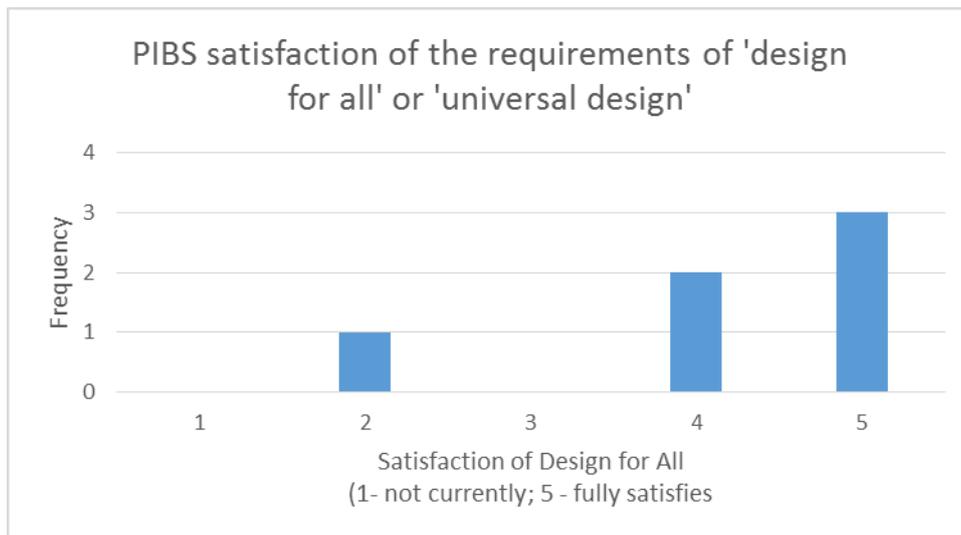


Figure 7 Satisfaction the requirements of 'design for all'.

Some shortcomings were identified by participants. Table 3 shows the shortcomings and proposed solutions. These form the basis for the project team to improve the PIBS design.

Table 3 Identified shortcomings of the PIBS and proposed solutions.

Shortcomings	Solutions
Those with disabilities use a different route on the system, and is therefore not design	<ul style="list-style-type: none"> Need for a passenger notification system when the train arrives.

for all	<ul style="list-style-type: none"> • Avoid obstacles and safety traps created by the mechanism itself, covering all disabilities.
The prototype cannot show impacts of real life cases (needs validation and testing covering all KPIs)	<ul style="list-style-type: none"> • Further studies needed with full scale design, and a large variety of users (i.e. passengers boarding and disembarking, with and without luggage). • FMEA to be completed. • Analysis of impact of weather (rock salt) vibration and degradation/maintenance.
Ensuring that there is a 90° relationship between the boarding direction and train entrance	Consider reviewing the width of the 'moving system'.
The system lacks a manual override system as a safety measure	Design for system failure so that a manual system can be applied.
The integration of the system with the platform is not clear. The components of the PIBS may create obstacles for passengers	The system should retract into the platform to minimise obstructions.

5. CONCLUSIONS

Very early on in the project life, FAIR Stations set up the advisory board (PAB). The benefits were significant as the guidance provided by the PAB members proved valuable. Below are the key notes emerging from the PAB:

- As planned, two project advisory meetings took place during the project life.
- They provided beneficial feedback which provided guidance to the project activities.
- During the two meetings (and when necessary via email or phone), the PAB provided guidance in all WPs, and therefore helped to shape the exploitable outputs of the project (namely crowd flow model, independent boarding system and Platform detection technologies).
- Having a representative from PIVOT and IN2STEMPO was very beneficial as this facilitated well informed FAIR stations design-well synchronised with the activities in S2R complementary projects.
- Outcomes of the stakeholder survey show that the FAIR Stations independent boarding system largely addressed the main PTI challenges (safety, dwell time, universal design and independence when boarding). However, some suggested that a full scale system needs to be tested and/or validated in subsequent projects.

References

- Battista U (2018): EC FAIR Stations Project General Assembly Meeting #1 Vienna, 19-20/04/2018. Release date: 21/05/2018.
- Battista U (2019): EC FAIR Stations Project General Assembly Meeting #5 Genoa, 08-09/07/2019.
- De Santiago Laporte A, Battista U, Naso Rappis PG, Matsika E (2019): Draft Deliverable D6.2 Validation: Stakeholder Feedback and Experimental and Virtual Testing of the Developed Concept. EU FAIR Stations Project. NUMBER 777636 — IP/ITD/CCA — IP1, IP3.

APPENDIX A ATTENDEES AND AGENDA OF THE FIRST PROJECT ADVISORY BOARD REVIEW MEETING (VIENNA, 20/04/2019)

Attendees

Name	Partner
Umberto Battista (UB)	STAM
Mony Khosravi (MK)	STAM
Emmanuel Matsika (EM)	UNEW
Mark Robinson (MR)	UNEW
Antonio de Santiago Laporte (ASL)	MDM
Helmut Lemmerer (HL)	VUT
Takeru Shibayama	VUT
Bernhard Rüger (BR)	VUT
Benjamin Schmutz (BS)	VUT
Pier Giuseppe Naso Rappis (PGNR)	SIIT
Cristobal Medina (CM)	APF
Daniel Fernández (DF)	ILUNION
Daria Kuzmina (DK)	UITP
PIVOT and IN2STEMPO representatives	
Thierry Montanié (TM)*	FAIV
Garry Bosworth (GB)**	NR
Project Advisory Board members	
Manuel Rancés Jofre (MRJ)	CERMI
Cristina Carnevali (CC)	UNIGE
Jon Veitch (JV)	TALGO
Julien Torres (JT)	SGP
Özgür Akpınar (OA)	WL
Marco Ghisi (MG)	LEON
<i>Enrico Bellavita (EB) – excused</i>	<i>FNM</i>

*for PIVOT

**for IN2STEMPO

Agenda

Venue	Contacts
Vienna University of Technology Kontaktraum, 6th Floor Gusshausstrasse 27-29. 1040 Wien	Helmut Lemmerer

20 April 2018 – General Assembly Meeting Day #2	
09:00	Arrival and coffee – TUW
09:15	Meeting and project introduction – STAM/UNEW
09:25	Introduction of Project Advisory Board members
09:35	Introduction of PIVOT and IN2STEMPO projects
09:45	WP2: Passenger Needs & and Human Factors – TUW <ul style="list-style-type: none"> • Overview of tasks • Progress and results to date (M1-7) • Status of deliverables and milestones • Next steps to finalize the WP (M8)
10:45	Coffee break
11:00	WP3: Benchmarking of Station Designs and Accessibility – MDM <ul style="list-style-type: none"> • Overview of tasks • Progress and results to date (M1-7) • Status of deliverables and milestones • Next steps (M8-9)
12:00	Light lunch
13:00	WP4 Kick-Off: Crowd Flow Analysis – STAM <ul style="list-style-type: none"> • Overview of tasks • Tasks detailed description • Deliverables, milestones and timescales • Next steps (M8-12)
14:00	WP5 Kick-Off: Design and Conceptualisation – UNEW <ul style="list-style-type: none"> • Overview of tasks • Tasks detailed description • Deliverables, milestones and timescales • Next steps (M8-12)
15:00	Coffee break
15:15	WP6: Evaluation and Validation of Concepts Developed – STAM <ul style="list-style-type: none"> • Overview of tasks • Cooperation aspects and status of COLAs • Next steps
16:00	Open discussion – ALL <ul style="list-style-type: none"> • Feedback from Project Advisory Board members • Feedback from PIVOT and IN2STEMPO representatives
17:00	Close and departure

APPENDIX B ATTENDEES AND AGENDA OF THE SECOND PROJECT ADVISORY BOARD REVIEW MEETING

Attendees

Name	Partner
Umberto Battista (UB)	STAM
Mony Khosravi (MK)	STAM
Mark Robinson (MB)	UNEW
Emmanuel Matsika (EM)	UNEW
Antonio de Santiago Laporte (ASL)	MDM
Takeru Shibayama	VUT
Bernhard Ruger	VUT
Pier Giuseppe Naso Rappis (PGNR)	SIIT
Massimo Massa (MM)	SIIT/AITEK
Stefano Delucchi (SD)	SIIT/AITEK
Ennio Ottaviani (EO)	SIIT/ONAIR
Enrico Barelli (EB)	SIIT/ONAIR
Alfonso Mantero (AM)	SIIT/SWHARD
Egon Carusi (EC)	SIIT/SWHARD
Javier Garcia Salas (JGS)	APF
Daniel Fernández (DF)	ILUNION
Corentin Wauters (CW)	UITP
Yves Amsler (YA)	UITP/AMSLER
Project Advisory Board members	
Laurent Colin (LC)	Société du Grand Paris
Manuel Rances Jofre (MRJ)	CERMI
Garry Bosworth (GB)	Network Rail
Marco Ghisi (MG)	Leonardo
Andrea Passarelli (AP)	FNM
Thierry Montaine (TM)*	Wabtec

*via Skype

Agenda

Venue	Contacts
SIIT - Ligurian Technological District Via Greto di Cornigliano 6r 16152 Genoa, Italy	Umberto Battista Pier Giuseppe Naso Rappis

9th July 2019 – General Assembly and Project Advisory Board Meeting (Day #2)	
09:00	Arrival and coffee – SIIT
09:15	Meeting Introduction – STAM/UNEW <ul style="list-style-type: none"> Recap of Project Advisory Board members Recap of PIVOT and IN2STEMPO projects Introduction to Stakeholders workshop
09:30	WP3: Benchmarking of Station Designs and Accessibility – MDM/UITP <ul style="list-style-type: none"> Wrap-up and close Outputs and deliverables Q & A
10:15	Coffee break
10:30	WP4: Crowd Flow Analysis – STAM <ul style="list-style-type: none"> Review and progress on tasks Outputs and Deliverables Timescales and next steps Q&A
11:30	WP5: Design and Conceptualisation – UNEW <ul style="list-style-type: none"> Review and progress on tasks Outputs and Deliverables Timescales and next steps Q&A
12:30	Open discussion – ALL <ul style="list-style-type: none"> Feedback from the Project Advisory Board Members
13:00	Lunch (provided in the meeting room)
14:00	WP6: Evaluation and Validation of Concepts Developed – STAM <ul style="list-style-type: none"> Review and progress on tasks Outputs and Deliverables Timescales and next steps Q&A
15:00	WP7: Dissemination – UNEW <ul style="list-style-type: none"> Review and progress on tasks Outputs and Deliverables Timescales and next steps Q&A
15:45	Coffee break
16:00	Open discussion and AOB – ALL <ul style="list-style-type: none"> Feedback from the Project Advisory Board Members wrap-up
16:30	Close

APPENDIX C FAIR STATIONS PROJECT ADVISORY BOARD MEMBERS

Name	Organisation Type	Organisation	Function
Enrico Bellavita	Infrastructure manager and operator	FNM	Mobility service provider
Manuel Rancés Jofre	Passengers interest group	CERMI	Spanish PRM Association
Cristina Carnevali	University	University of Genova	Transport engineering, system engineering, electronics, TLC, informatics
Jon Veitch	Vehicle manufacturer	Talgo	Rail vehicle systems integrator
Julien Torres	Infrastructure manager	Société du Grand Paris	Station owner
Özgür Akpınar	Metropolitan railway operator	Wiener Linien	Urban transport provider
Marco Ghisi	Security organisation	Leonardo	Developer and provider of security systems
Thierry Montanié	Door manufacturers	Faiveley	PIVOT representative
Garry Bosworth	Infrastructure manager	Network Rail	IN2STEMPO representative

APPENDIX D STAKEHOLDER PROTOTYPE WORKSHOP
FEEDBACK FORM



**Stakeholder Workshop (10/7/19) - Feedback
 (Views of stakeholders on the project prototypes)**

Sponsor:

The European Commission

Title of EU Project:

Future Secure and Accessible Rail Stations (**FAIR Stations**)

Title of Research Activity:

Stakeholder Feedback on the FAIR Stations Platform Train Interface (PTI) Independent Boarding Prototypes

Introduction

As one of its main outcomes, the FAIR Stations project has designed and developed a PTI independent boarding mechanism which incorporates automatic operation. Having listened to the presentations of the project outcomes and seen the PTI system prototype, you as a stakeholder are requested to provide feedback using this form.

1. How would you describe yourself (tick whatever applies)?

- Infrastructure manager
- Mainline rail provider
- Metro/light rail operator
- Policy maker/Government
- Disability group/organisation (national or international?)
- Passenger interest group
- Vehicle builder
- Consultant
- Other please specify.....

2. How relevant do you think the FAIR Stations project is in addressing PTI safety and crowd flow challenges? (1- not relevant; 5 – very relevant)

- [1] [2] [3] [4] [5]

3. How significant is the PTI problem resulting from the gap and height differences between the train floor and station platform? (1- not significant; 5 – very significant)

- [1] [2] [3] [4] [5]

4. To what extent has the FAIR Stations project PTI Independent Boarding System (PIBS) addressed the PTI problem? (1- not addressed; 5 – fully addressed)

[1] [2] [3] [4] [5]

5. Has the PIBS addressed the safety concerns at the PTI? (1- not addressed; 5 – fully addressed)

[1] [2] [3] [4] [5]

6. Do you think the PIBS can reduce the train dwell time? (1- not at all; 5 – significant reduction)

[1] [2] [3] [4] [5]

7. Does the PIBS improve the overall ease of boarding and alighting to and from rail vehicles? (1- no improvement; 5 – large improvement)

[1] [2] [3] [4] [5]

8. Does the PIBS satisfy the requirements of 'design for all' or 'universal design'? (1- not currently; 5 – fully satisfies)

[1] [2] [3] [4] [5]

9. What do you think are the shortcomings of the PIBS?

10. What in your opinion should be done to address the shortcomings you identified in question 9?

Thank you for your feedback