



Deliverable D 1.2

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1. Executive Summary

Although the single European market was established at the beginning of the nineties, the railway sector is still confronted with major cross border issues, language differences being one of them. The concept of the Translate4Rail project is to offer drivers a fully comprehensive set of predefined standardised messages (PDMs) which encompass all they have to exchange with an infrastructure manager traffic controller (signaller) in normal or exceptional operational situations in a country where they do not understand nor speak the local language.

Besides the list of agreed PDMs a digital tool using these messages will be implemented to enable the driver and the traffic controller to make the communication easier and ensure they understand each other even though each of them speaks in his/her native language.

The work on predefined messages was initiated by UIC and RNE and led to a gradual and iterative improvement of these messages in terms of quality and usability for the concerned stakeholders (RUs and IMs).

The methodology to elaborate the PDMs relied on several building blocks. Starting from TSI OPE 2019/773¹ and the communication content of its Annex C, the list of situations and messages was further enriched so to include the broader range of real operational situations.

National rules to cover further specific communication requirements of train drivers and traffic controllers were also reflected in the list of messages. This communication includes the safety-critical tasks and tasks of authorizing the train movement. The main focus was given on the principles for safety-related communication between train driver and traffic controller.

With field testing being planned for 2021 the prototype model being developed in the context of Translate4Rail needs to take into account specificities stemming from national rules as these still exist and won't be removed in the timespan of the project. Once full interoperability is in place in Europe on the basis of the TSI then these national specificities will no longer be needed and can easily be removed from the prototype model albeit they would not generate any hinderance to it if they were kept as it is the TSI OPE requirements which prevail.

Finally, the enhancement work was completed with an increasing range of languages to be proposed, so to fully support a wide geographical uptake of the concept developed in the context of this project.

Once the first robust list of predefined messages was elaborated as described above, it was further improved in terms of organization and content. The list was sorted, messages clustered and dialogues between driver and traffic controller elaborated.

¹ COMMISSION IMPLEMENTING REGULATION (EU) 2019/773 of 16 May 2019 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system within the European Union and repealing Decision 2012/757/EU

The applicability of PDMs was tested during the preparation of operational scenarios. These scenarios were designed to cover routine, degraded and emergency situations and all will be tested in laboratory situation with the T4R Language Tool, as well as in the field phase afterwards. Laboratory testing with the T4R tool, which is key to prepare the field testing scheduled for the Spring of 2021, enabled further refinement of the the PDMs.

The selection of sentences including variable railway jargon words significantly enhanced the applicability of PDMs without reaching an enormous quantity of messages (with general messages PDMs and variables an enormous number of cases are covered), however covering all required situations.

- A robust list of PDMs was developed, during the development of the scenarios.
- During the process of developing scenarios in which the PDMs were used, the experts were able to enormously enhance the PDMs. Additional messages were added and others, which were assessed to be redundant, were deleted. The aim pursued was to have a limited set of messages that is applicable for all necessary situation during operations and also offering the opportunity with variables (eg. <reason>) to give and integrate further details in the messages.
- Since October the tool is tested in laboratory conditions which is leading to further improvements.
- These improvements come from application of messages in dialogues/scenarios, during this process redundancies and improvements are uncovered and simultaneously reduce the number of messages hence making the concept even more agile and user friendly.

The expert selected railway variables (words) and the priority was given, in the language tool, to internal procedure of speech recognition. This approach allows to describe the various situations, locations, requests with a reduced number of predefined messages, keeping them exact, clear and commonly acceptable. This feature enables to cover more situations with fewer PDMs. Such an enhancement of messages used in the electronic device reinforces its versatility in daily railway cross border operation.

As explained, the scenarios can be taken as evidence that PDMs cater for daily operational needs whilst allowing reduced language proficiency requirements from drivers and signallers in cross border operation. The first outcomes of the laboratory testing led to further finetuning of the messages and it is foreseen that the field testing and testing on different routes may provide even further enhancement elements.

These are the main areas addressed by this T4R deliverable.

2. Abbreviations and acronyms

Abbreviation / Acronyms	Description
CEO	Chief Executive Officer
CFL	Société Nationale des Chemins de Fer Luxembourgeois
ETCS	European Train Control System
IM	Infrastructure Manager
IRS	International Rail Solution – UIC technical document
LP	Language Programme; the dedicated RNE work structure
MÁV	MÁV Magyar Államvasutak Zrt. (Hungary)
ÖBB	ÖBB Infrastruktur AG
PDM(s)	Predefined message(s)
RNE	Rail Net Europe
RU	Railway Undertaking
SNCF Réseau	Infrastructure manager in France
sWG	sub-Working group
TSI OPE	Technical specification for Interoperability – Operation and traffic management subsystem Acronym referring to TSI OPE 2019/773 and the communication content of its Annex C
T4R	Translate4Rail
UIC	Union Internationale des Chemins de Fer
WO(s)	Written order(s)
WP	Work Package
Xborder	UIC project and work structure dedicated to the issue of improving cross border operation

3. Background

Overcoming language barriers is not a new quest and became more urgent after the Rastatt incident in August 2017. The need for safe train circulation on European network without language barriers will help to significantly reduce the impact of such an incident as Rastatt was. Beside that serious train driver shortages in Europe coupled with the high-cost burden of language training stemming from the European requirement stipulating that drivers need to have a language proficiency at the level of B1. This significantly emphasised the urgency of the action as illustrated by figure 1 below.

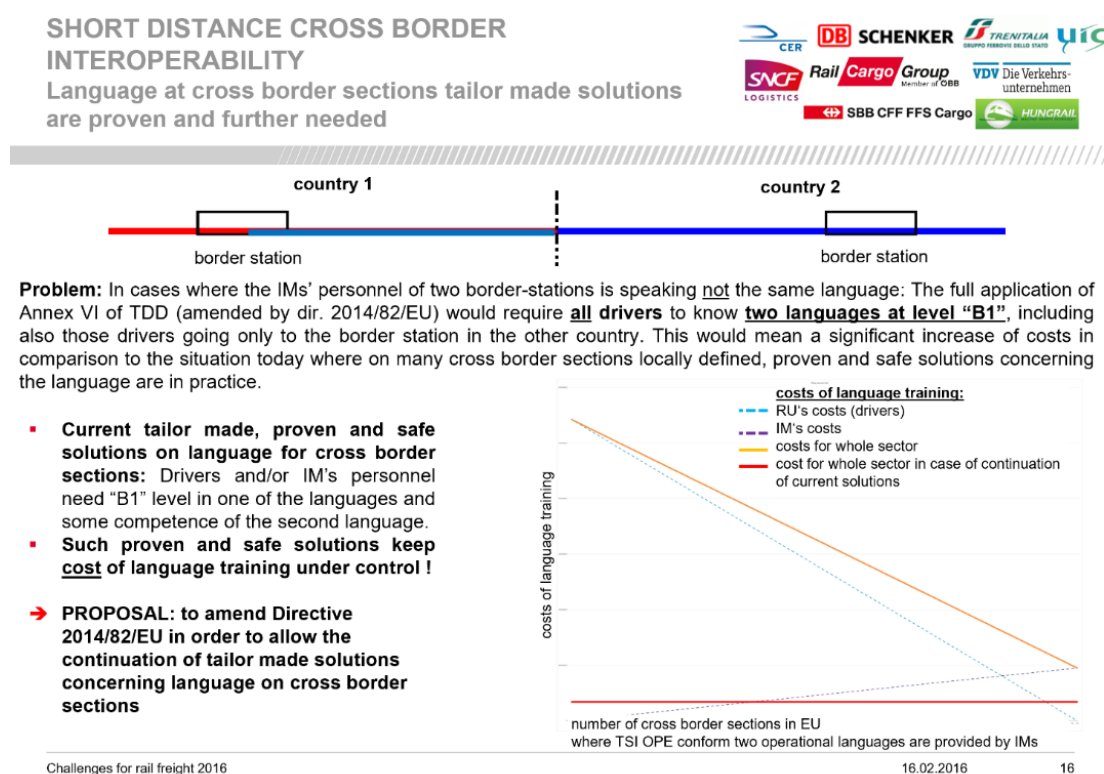


Figure 1 Cost impact of the driver language issue in cross border traffic

The present document constitutes the Deliverable D1.2 "Enhanced list of predefined messages" in the framework of the T4R project. This report is one of the first two deliverables of the WP1.

The aim of this subtask of the T4R project is to enhance and fine-tune a list of already prepared predefined messages for the communication between train driver and traffic controllers and make a necessary adaptation for using them with electronic device. Predefined messages represent standard messages exchanged in routine, degraded and emergency operational situations with a strong focus on TSI OPE requirements.

The use of PDMs is prepared in a sense to keep the fluent railway operation and ensure to maintain the required degree of the safety of operational communication with reduced train driver language competences.

4. Objective/Aim

This document has been prepared to provide the foundation for the project. It will explain the rationale behind the use of predefined messages and the methodology used to prepare the required deliverable. It will also present how to use predefined messages in the context of Translate4Rail.

The objective of this subtask is to explain:

- The rationale behind the need to have predefined messages;
- The steps undertaken and methodology used to elaborate the list of predefined messages;
- The specific work accomplished since the launch of Translate4Rail;
- The overall achievements;
- The foreseen next steps.

5. Elaboration of predefined messages

The subject of overcoming cross-border issues by developing an agile and safe solution for the language hurdle is being worked on both by IM's and RU's.

In this chapter are explained the early stages of the initiatives undertaken by RU and IM's. We go through the different approaches and methodologies which were used.

The next step will provide a deep dive into the current state of play with the joint RU-IM message list.

The focus of the last part of this section will be the work carried within Translate4Rail and will provide additional insights into the delivery of the enhancement from messages to "Driver-Signaller dialogues scenarios" and the process to support a wider European uptake with additional European languages.

As early as 2017/2018, freight Railway Undertakings, member of UIC, decided to look into ways of improving cross border operation and were initiating concrete actions to promote a "drive-through" approach for international freight. The Xborder project was therefore launched with the aim to investigate operational issues and also the driver language topics, the importance of which came even more to the fore with the Rastatt disaster.

The common subject of overcoming cross-border communication issues by developing an agile and safe solution for the language hurdle is being worked on both by IM's and RU's sides.

In parallel, infrastructure managers members of RNE together with sector organisations joint in Language Programme began to look into the same topic from a general standpoint. It therefore quickly became clear that these initiatives needed to work hand in hand, what they eventually did.

5.1. IM specific work leading to and IM specific List

5.1.1. The process

The Language Programme was initiated by RNE in December 2017. During 2018 the programme defined distinct situations to focus on:

- IM-IM communication at a national level;
- IM-RU operational communication;
- IM-IM communication at a regional level;
- RU-RU operational communication.

At the start of the initiative, it was proposed that IM-IM communication at a national level and **IM-RU operational communication** would be the initial focus of the programme.

The regulations in EC Directive 2007/59/EC are crucial for train driver's language requirements operating across borders. The directive defines the requirements for train drivers operating across borders to be fluent in the IM language of the foreign country at level B1. As Europe is multinational this leads to higher costs and is time-consuming for train driver preparation for cross border operation for the Railway Undertakings. Besides that, there is also a general lack of train drivers across Europe. To improve the current situation and be able to recruit more drivers and to facilitate cross border operation, **it is important to find a solution which removes this obstacle and helps the railway industry better compete** with other modes of transport in Europe.

The main goals of the Language Programme are to:

- Improve interoperability;
- Lower costs;
- Keep the system safe;
- Contribute to increase cross border traffic.

5.1.2. Methodology for elaborating the IM list

Within a Language Programme from August 2018, three sub-working groups

- Pre-defined Messages;
- Translation Tool;
- Ergonomics;

were defining the possible technical solutions that help remove the language barriers in cross border train operation.

The methodology for elaborating the list of predefined messages relied on rules for safety-related communication between driver and signaller and was structured accordingly as follows:

- Indication of location;
- Statement of function and information about the needed action;
- Checking the message correctly received and repeat it back.

The main pillars of such communication were kept based on the TSI OPE requirements.

The requirements of Regulation (EU) 2019/773 **relating to operation, staff and driver documentation were taken into the account to support and follow the interoperability implementation. Predefined messages were prepared also based on existing Driver's rule books.**

Besides that PDMs include the operational principles and rules to be applied throughout the European Union railway system specified in Appendices A (ERTMS operational principles and rules) and B (common operational principles and rules) in Regulation (EU – 2019/773).

5.1.3. The output

By the end of 2018, 10 lists of predefined messages coming from ÖBB / Trafikverket / Banenor / Infrabel / Prorail / CFL / SNCF Réseau / MAV / Litrail / Slovenske železnice – Infrastruktura were analysed. This work represented a list of over 900 oral and written messages. This list was later matched against the one elaborated by RUs in the context of the Xborder project and common list of railway sector PDMs were prepared. Further improvements have been done under the sector Language Programme, later on approved by RNE General Assembly as an output of the CEF project², and prepared PDMs were handed over to the Translate4Rail project for the further enhancement.

5.2. RU specific work leading to an RU specific List

5.2.1. The process

In 2017 European Rail Freight CEOs organised in the UIC led task force, set, as a priority, the need to work on removing the crossborder barriers. This led to the launch of the Xborder project in 2018.

The work focused on operational issues, with the analysis of 3 border points: Venlo-Kaldenkirchen, Modane-Bardonecchia and Forbach-Saarbrücken regarding the whole handing over the process for freight trains and their actors involved but also dived into the language issue from the perspective of these 3 borders.

5.2.2. Methodology for the elaboration of the UIC XBorder list of predefined messages

In order to receive qualitative input, the UIC XBorder project members elaborated a survey the aim of which was to identify the main operational situations (basic, regular, disturbance, emergency) in which the RU drivers and the IM traffic controllers have to establish contact and the associated verbal exchanges.

This was done on the basis of:

- the content of TSI OPE;
- existing handbooks;
- the analyses of the 3 section of the Xborder project (Venlo-Kaldenkirchen, Modane-Bardonecchia and Forbach-Saarbrücken).

The typical messages and conversation pattern used on a border section were collected through that survey. RU drivers and IM traffic controllers involved in the daily operation were targeted to answer the survey to ensure the quality and reliability of the information provided.

² “Implementing Telematic Applications for European Interoperability” action number 2018-EU-TM-0063-S

As it is mentioned above, the TSI OPE was one of the bases for the methodology for elaboration of the UIC XBorder list of PDMs. Here, needs to be clarified the timeline of the XBorder list creation, which start in 2018 and TSI valid at that time.

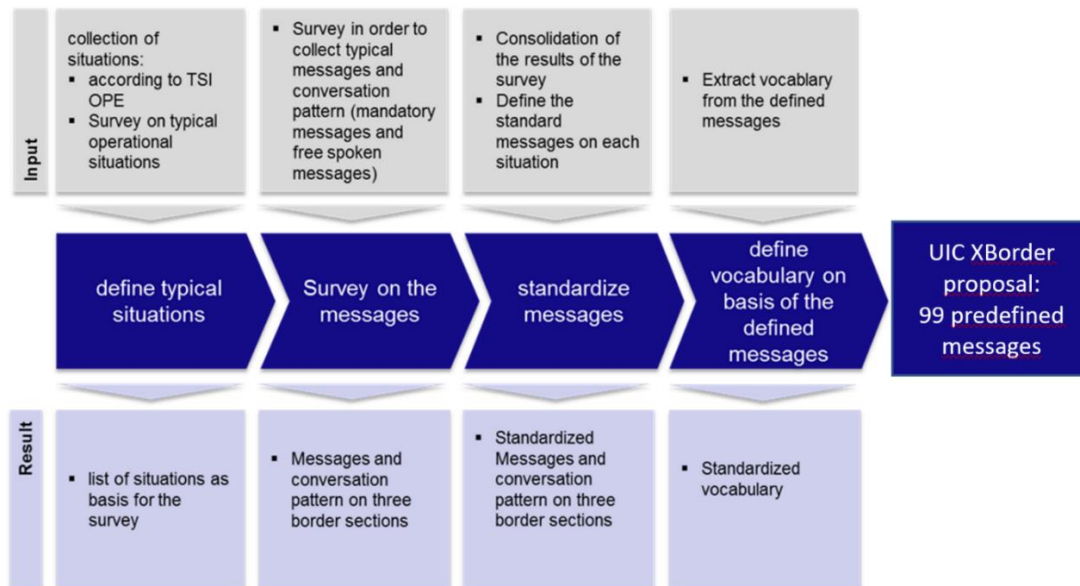


Figure 2 Methodology of UIC's Xborder project

5.2.3. The output

At the end of 2018, a final list of 99 predefined messages was established. These messages were, at that stage, available in 4 languages, French, German, Italian and Dutch. To simplify the comparison and allow a common understanding, all sets of predefined messages subsequently translated into English. This output processed to sector Language Programme for further development.

5.3. Common RU-IM list

The regular exchanges between RNE, UIC and sector organisation participating on Language Programme, led to the need to elaborate common sector list of PDMS. Following this and in order to maximise overall work efficiency, the Language Programme adapted its working structure as illustrated by the chart below.

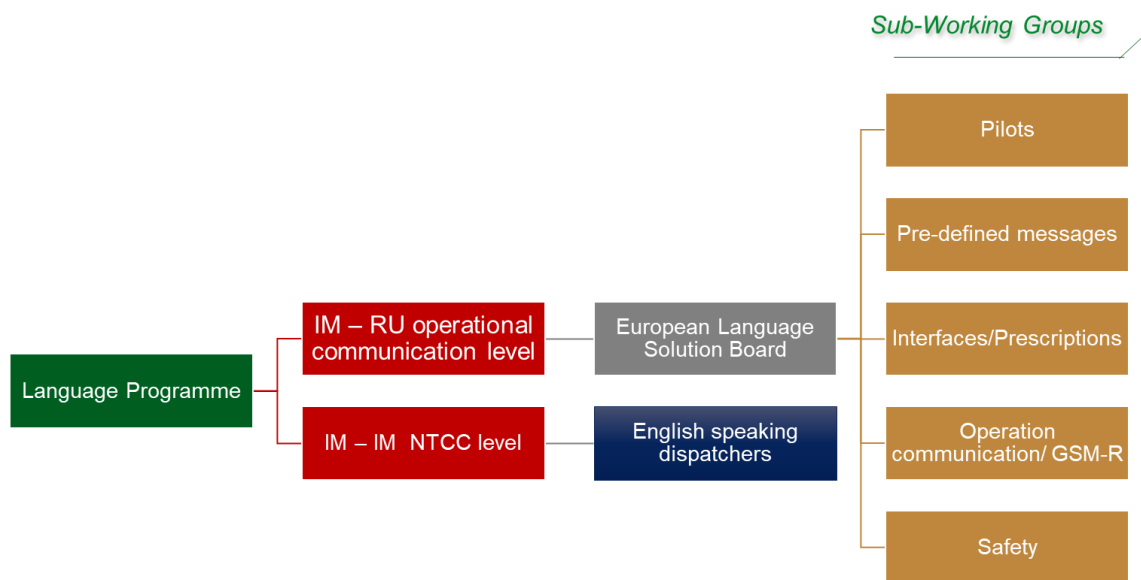


Figure 3 Structure of sector Language Programme

The elaboration process within the Language Programme has got a clear set of basic rules:

- the communication principles shall be applied as a standard to each message or where it applies; the principles have to be used in addition to the messages in the list message opening procedure: who is speaking to whom;
- message repeating procedure: the message has to be repeated (based on national rules) by the receiving party;
- message ending procedure: by this, the message is finished, and communication closed;
- message registration number (if mandatory): the number for identification of the message has to be transmitted.

The list of Predefined messages contains not only the basic messages and the clusters but also the description of the operational situation in which the message should be used and identification of the person who is speaking the specific message.

The structure of the list of PDM is described in figure 4 below:

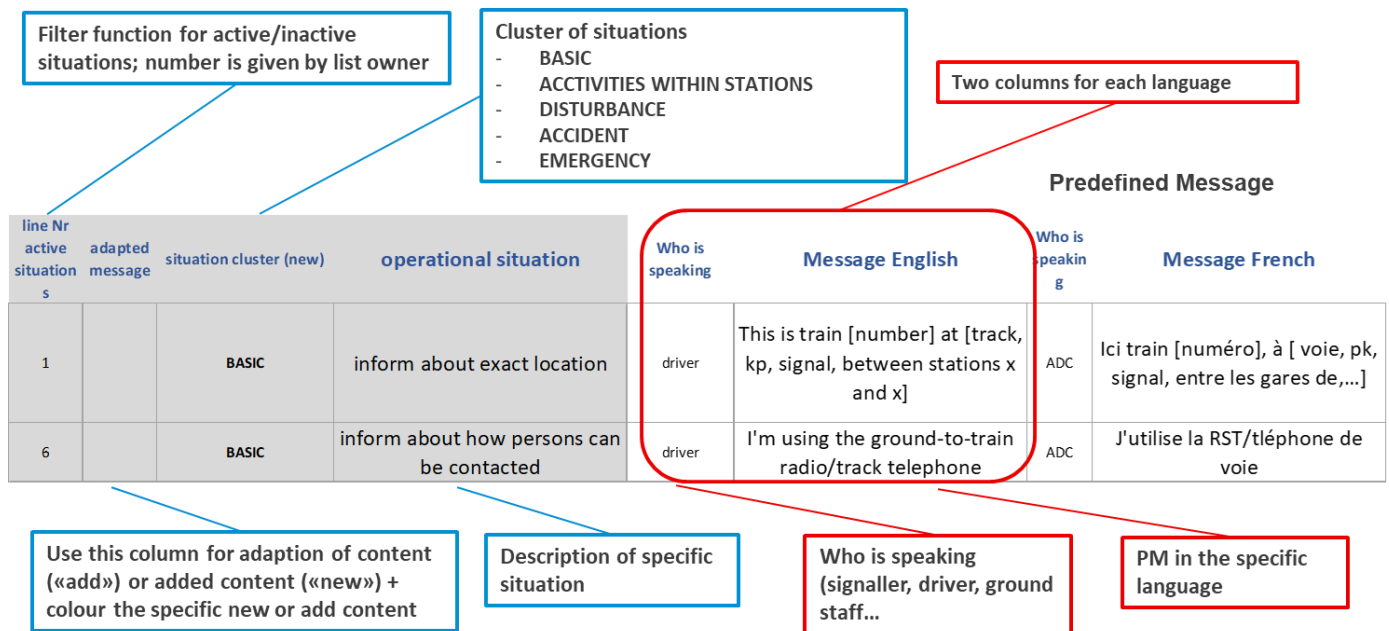


Figure 4 PDM structure

The information to be exchanged between train driver and signaller have been standardised into short standard sentences. The common list was organised in 5 clusters as detailed below:

- Basic (23)
- Activities within the station (36)
- Disturbance (45)
- Emergency (6)
- Accident (5)

and made available in 4 languages: French, German, Italian and Dutch. The messages included in the list in the English language are to be used for comparison of the relevant operational situation, in which the message should be used. The English language can be considered as a “bridge language” and is not intended for operational communication.

This work led to a finalised list containing 124 messages validated by RUs and IMs in mid of 2019 and covered mostly the standard operational situations.

The special attention was taken to PDMs for Emergency situations and Accidents. In these types of situations, the human factor is crucial and on the tool, for which PDMs are also adapted, should be put high importance.

During the adaptation of PDMs, the contentment of the communication protocols and principles set out in Appendix C defined in Commission Regulation 2019/773 were followed.

The special attention was paid to define a PDMS in the sense that the driver would be able to:

- send and understand all messages;
- effectively communicate in routine, degraded and emergency situations;
- complete the forms associated with the use of the Book of forms if they are transformed to PDMS.

For relevant words in PDMs where the names consisting of figures and letters the International Phonetic Alphabet were implemented into the toll based on national rules.

The communication rules – *The International Phonetic Alphabet*

A	Alpha	G	Golf	L	Lima	Q	Quebec	V	Victor
B	Bravo	H	Hotel	M	Mike	R	Romeo	W	Whisky
C	Charlie	I	India	N	November	S	Sierra	X	X-ray
D	Delta	J	Juliet	O	Oscar	T	Tango	Y	Yankee
E	Echo	K	Kilo	P	Papa	U	Uniform	Z	Zulu
F	Foxtrot								

Figure 5 The International Phonetic Alphabet – TSI OPE

Based on the Regulation 2019/773 requirements the set of PDMs covers also the situations defined in the regulation as:

- collisions;
- fires on the train;
- evacuation of trains;
- accidents in tunnels;
- incidents involving dangerous goods;
- derailments.

All related processes where the communication is applied follow the operational rules of IM and RU and were not the subject of the project except the necessary adaptations which will be defined based on Pilot testing results at end of the project.

6. Enhancement of predefined messages

Whilst the previous section explained the status of the work undertaken by the Consortium Partners before the start of Translate4Rail and how it contributed to the elaboration of the project deliverable, this section provides an insight into the way in which the former work was enhanced since the start of T4R.

The enhancements are the following and constitute the deliverables:

1. The initial list of predefined messages was enhanced with the addition of 3 new languages;
2. The list of predefined messages was enriched with dialogues or real exchanges between driver and signaller;
3. The list of PDM was extended with new messages to fully cover the situation from Regulation 2019/773;
4. By adding a new/additional language, as well as due to the increasing number of PDMs, the messages were reorganised in the situation clusters (Basic, Activities within the station, Disturbance, Emergency, Accident) and new/enhanced operational clusters were defined, such as:
 - Arrival / Departure
 - Assistance
 - Basic Communication
 - Failures
 - Identification / Location
 - Reporting Situation
 - Shunting
 - Signals
 - Track Status
 - Train Action / Status
 - Train Movement
 - Wagon Load
 - Written Orders
5. The “Motion Cluster” for PDMs was also defined to enable using PDMs in electronic devices. Here, PDMs are organised according to the situation in which the relevant PDM can be used and communication would be carried out using an additional device. The situation, in which the relevant PDM is going to be used then cover the communication in the standstill or running mode, and/or its combination (both).
6. Special enhancement of PDMs was done using the advantage of electronic device which is able to work with variable words in predefined sentences. This feature allowed to reduce the number of PDMs and cover more operational communication with a reduced set of sentences

The above-mentioned outputs of this deliverable are provided as part 2 and part 3 in the Excel format in the attachment. Indeed, transferring their content into a word document would not have been readable.

To support the process of enhancing the list of PDMs as well as to propose and select the specific cross border section for the Pilot testing, **the survey of using the written orders from the IMs side**, of which the language is used in the defined list of PDMs, was elaborated.

The IMs were asked:

- How did you implement TSI OPE Operational instructions into national written orders (WOs)?
- How many written orders/formulas do you have?
- Do you have them organised?
- How many of them apply to the border sections?
- In what kind of document do you have WO defined?
- What is your the most possible border section to run the Pilot?
- Is that section equipped with ETCS?
- How many orders would be applicable on that Pilot?
- What WO for that Pilot would you use – EU/national?

Answers were different IM-by-IM. Some IMs have implemented the TSI OPE operational instruction into the national Written Orders book, some are in progress (e.g. the updating of operational rules is being done). The organisational aspect and content of the planned Pilot testing was adapted based on the received answers from IMs.

6.1. From messages to dialogues

The PDMs were included into the project with its start in December 2019. The aim was to further develop the list of predefined messages, adapt them for use in an electronic device and prepare a list of dialogue scenarios for pilot testing and prove that PDMs can cover different operational situations - routine, degraded and emergency ones.

The dialogue scenarios were elaborated for the languages where is a high probability of pilot testing: French, Italian, German and Dutch with a so called explanatory language - English. The dialogue scenarios can be extended also with new languages in case of pilot testing using the explanatory English one.

The dialogue scenarios were defined by railway experts and are the result of close and intense work between infrastructure experts and train drivers.

The dialogues come from the daily operation and cover routine, degraded and emergency situations to prove the versatility of PDMs. Scenarios are composed of orders, questions and answers, based on the joint list of predefined messages, of the most common exchanges between drivers and signallers. In case that the real dialogue cannot be covered by PDMs, a free speech translation will be applied and further analysed in expert working groups in order to assess the translation quality and eventual new PDM definition.

The prepared enhanced list of PDMs defined for the T4R project, covers, together with WOs, situations described in the **TSI OPE 2019** – Appendix B, B2 Common operational rules, which are the following (in bold, the overlapping of TSI 2012/2019 is highlighted):

- **Sanding;**

- **Departure of the train;**
- **No authorisation for train movement at the expected time;**
- **Complete failure of front end lights;**
- **Complete failure of a rear end signal;**
- **Failure of the audible warning device of a train;**
- **Failure of level crossing;**
- **Failure of voice radio communication;**
- **Running on sight;**
- **Assistance to a failed train;**
- **Authorisation to pass a signal showing a stop aspect/indication;**
- **Anomalies in lineside signalling;**
- **Emergency call;**
- **Immediate actions to prevent danger to trains;**
- Failure of on-board equipment;
- End of authority passed without permission;
- Failure of trackside equipment including catenary.

In case of degraded operations, the contingency arrangements were also considered by definition of a common list of PDMs, related to:

- rolling stock failures;
- infrastructure failures;
- extreme weather conditions.

To cover Europe wide requirements listed in the TSI OPE and relevant national rules sixteen operational dialogue scenarios were defined. These sixteen dialogues are intended as the basic ones to start the tool pilot testing under the conditions of the T4R project. The pilot testing companies can also create their own ones, based on the national operational procedures. The T4R team will analyse them and decide about their further possible use for EU pilot testing.

The prepared scenarios cover all three operational situation – routine, degraded and emergency one and are composed of updated predefined messages which are listed in Annex T4R – D1.2 part 2 - update. These scenarios are the basic evidence that the PDMs can be used in the daily operation which needs to be proven in pilot testing to get the real results of their content and coverage of various situations. The detailed description of prepared scenarios can be found in figure 6 and will be the subject of minimal testing scenarios of the pilot testing. Results of such testing will be handled based on the proposed improvement loop to fine-tune the existing and define the new ones in case that the existing PDMs do not meet requirements for operational communication sufficiently.

The 16 situations are organised as “a dialogue”:

Situation	Scenario No.	Scenario	Operational description
Routine	1	Whole train composition shunting movement	Train is arriving in a shunting yard/border station. Train driver has to check with the shunting man if the ground-to-train radio is working well in order to start with the shunting procedure. <i>(in case of an open call the train number would have to be repeated during shunting movement)</i>
	2	Search for the train by the train driver in the locomotive	Locomotive is arriving at the station and requests to the signaller that he is searching for his train. Train driver is contacting the signaller via GSM-R.
	3	Occupied track in station	Train is stopped at the entering signal of a station since a track is occupied by a locomotive. There is a communication between train driver and signaller since the signal is out of order (eg or no signal to enter on an occupied track) and therefore the train driver has to receive a written order. The signaller presses the GSM-R button to contact the train driver.
Degraded	4	Traction problems of a train	The train driver is calling the signaller via GSM-R, since he is stopped and has to investigate the situation.
	5	Switch failure	Train driver is stopped in front of the red signal and contacts the signaller via GSM-R due to a failed switch (final position of the switch is not reached because of an obstacle).
	6	Disturbance of a level crossing	Signaller has to give an order to the driver. Signaller contacts driver via GSM-R button.
	7	No complete information on an approaching train at a border station, signaller leaves the signal red	Train is stopped at a border station in front of the signal. The signaller does not have all details on the train. Therefore, he contacts the train driver via GSM-R in order to receive the lacking information (if it stops or is just passing the station).
	8	Brake problem	The train driver has a problem with the brakes, stops the train and informs the signaller about the issue and therefore presses the GSM-R button.
	9	Removing a train after incident on the track (single track) between stations. The train driver presses the GSM-R button to contact the signaller	A train between stations needs to be pulled to the station. <i>Procedure can variate according to the national rules</i>
	10	Train driver reports persons near to tracks	The train driver is currently driving and is calling the signaller via GSM-R.
Emergency	11	Emergency stop	Signaller informs the train driver via GSM-R emergency group call to immediately stop the train. The signaller has to repeat the message several times
	12	Train driver reports a default on a train (load displaced) passing in the other direction	The train driver reports a default on a train (load displaced) passing in the other direction. The train driver contacts the signaller via GSM-R, since in a first step he assessed the loading gauge not fouled.
	13	Displaced Load	A third party (another train driver) informs signaller about a displaced load on a train. The structure gauge is potentially fouled. After receiving this information the signaller contacts the affected train driver via GSM-R.
	14	Accident at a level crossing	Train driver reports about the accident on level crossing of his train (single line). Train driver using GSM-R cab-radio.
	15	Accident between two stations	Two trains collision on the track between stations (double track). The train driver is pressing the GSM-R button to contact the signaller.
	16	Collision between stations	The train hits a fallen tree across the track - single line. The train driver presses GSM-R button to contact the signaller.

Figure 6 The list of scenario dialogues

This work was carried out in order to pave the way for the testing phasing. It is the corner stone for the laboratory tests initially and the real live pilot testing of which the preparatory phase will be initiated at the latest in month 6.

Figure 5 provides an extract of the list of dialogues. The full list constitutes deliverable D1.2 part 2.

Scenario No.	line Nr from the list of PDM	situation cluster (new)	operational situation	Who is speaking	Message English	Who is speaking	Message French	Who is speaking	Message Italian
1			Whole train composition shunting movement						
			Train is arriving in a shunting yard/border station. Train driver has to check with the shunting man if the ground-to-train radio is working well in order to start with the shunting procedure. (in case of an open call the train number would have to be repeated during shunting movement)						Treno in arrivo in un impianto di smistamento/di confine. l'AdC deve verificare con il manovratore l'efficienza della radio per comunicazioni terra-treno per effettuare la manovra (in caso di chiamata aperta il numero treno dovrebbe essere ripetuto durante la manovra)
	501	ACTIVITIES WITHIN STATION	functional check of the mobile radio before the shunting movement can start	ground staff	Shunting man is calling train <train_number> for functional check.	ground staff	Chef de manoeuvre appelle le train <train_number> pour vérification	ground staff	Treno <train_number>, qui manovratore per verifica tecnica
	36	BASIC	speech transmission procedure: transferring the opportunity to speak	all	Over	all	A vous (A toi)	all	Passo
	94	BASIC	message receiving procedure in case no read back is necessary (informative message)	driver/signaller	Received (Understood)	driver/signaller	Reçu (Compris)	driver/signaller	Ricevuto (inteso)
	36	BASIC	speech transmission procedure: transferring the opportunity to speak	all	Over	all	A vous (A toi)	all	Passo
			the functional check for the ground-to-train radio is finished						la verifica di funzionamento è completata
	66	BASIC	communication breaking procedure: keep the other party waiting	driver/signaller	Wait (Please wait)	driver/signaller	Attendez	driver/signaller	Attendi (restate in linea)
	36	BASIC	speech transmission procedure: transferring the opportunity to speak	all	Over	all	A vous (A toi)	all	Passo

Figure 7 Extract of the list of dialogues between driver and signaller

6.2. Additional languages

Within Translate4Rail, it is the partners' aim to ensure a wider European uptake of the developed concept. That can be supported by a wide range of supported languages.

The growth of rail freight relies essentially on the international dimension and this should be strengthened especially via lines of Rail Freight Corridors. Adding the languages contributing to international corridors coverage makes the benefit of synergy effects when the longer train path is covered and not only isolated bilateral sections. The advantage of middle Europe countries was considered to enable crossing them and also cover Euro-Asia corridors.

In view of the above and to proactively encourage a European uptake as wide as possible, UIC and RNE decided to focus the enhancements on the addition of 3 languages. The list was therefore enriched with all the predefined messages translated into Polish, Slovak and Slovenian.

The enhanced list of predefined messages, available in 7 languages as described above constitutes Deliverable D1.2 part 3, a snapshot of which can be found under figure 8 below.

operational cluster (new)	motion cluster (new)	line Nr active situations	adapted message	situation cluster (new)	operational situation	Who is speaking	Message English	Who is speaking	Message French	Who is speaking	Message Italian
Identification/Location	both	1.1		BASIC	identification and inform about exact location	driver	This is train <train_number> at <track_number, km, signal_number, station_name, other_specific_location> /between stations <station_name> and <station_name>, in front switch number <switch_number>	driver	Ici train <train_number> à <track_number, km, signal_number, station_name, other_specific_location> / entre les gares de <station_name> et <station_name> /avant l'aiguille <switch_number>	driver	Qui macchinista del treno <train_number> fermo a <track, km, signal, station_name>, tra le stazioni di <station_name> e <station_name>
Basic Communication	standing	6		BASIC	inform about how persons can be contacted	driver	I'm using the ground-to-train radio/track telephone	driver	J'utilise la RST/téléphone de voie	driver	Utilizzo cab radio/vado al telefono fisso/radio
Identification/Location	both	21		BASIC	signaller getting in contact with driver	signaller	Train <train_number>, this is the signaller from <station_name, signal_box_name>	signaller	Train <train_number>, ici agent circulation de <station_name, signal_box_name>	signaller	Treno <train_number>, qui regolatore di <station, signal_box_name, traffic_control_centre_name>
Identification/Location	both	26		BASIC	signallers identification	signaller	This is the signaller from <station, signal_box_name, traffic_control_centre_name>	signaller	Ici agent circulation / régulateur de < Gare, poste, COGC >...	signaller	Qui regolatore di <station, signal_box_name, traffic_control_centre_name>
Identification/Location	both	31		BASIC	identification of the driver	driver	This is train <train_number>	driver	Ici train <train_number>	driver	treno <train_number>
Basic Communication	both	36		BASIC	speech transmission procedure: transferring the opportunity to speak	all	Over	all	A vous (A toi)	all	Passo

Figure 8 Extract of the enhanced list of predefined messages

6.3. Next steps

In previous sections of this report, we highlighted the key function of the prepared predefined messages in relation to the implementation of a “drive-through philosophy” in Europe whereby any train driver could drive anywhere with any language proficiency.

To improve the prepared PDMs within the Pilot testing an improvement loop needs to be defined to utilise the testing result.

The improvement loop must also integrate border specific input and feedback in so far as each border point has specificities and needs to be addressed which others may not. Each future pilot by the full interoperability implementations needs to take into account.

Relevant stakeholders in this process are on the one hand the pilot managers who are the representatives of the involved RUs and IMs and on the other hand the experts of the LP UPDM SWG.

PDMs improvement loops for testing phases

- Pilot managers gather PDMs improvements via “Ticket PDM changes” during testing ;
- Pilot managers can adapt PDMs for the specific pilot immediately;
- The aggregated changes will be monthly shared with the LP UPDM SWG experts;
- Pilot managers will be invited for further explanations on proposed changes on PDMs;
- LP UPDM SWG experts will analyse the proposed changes, taking into the account European legislation requirements especially the TSI OPE, the result of the analyses is the possible inclusion of new messages into the full set of PDMs;

- Proposed new local T4R pilot PDMs will be either integrated into the Agreed EU PDMs or not. Each proposal will be assessed, and the decision justified by the experts of the LP UPDM sWG. Experts of the LP UPDM sWG take the final decision on changes regarding the Agreed EU PDMs.
- The not approved messages for EU wide use can be still applied for national purposes probably by the time of full operational interoperability in the EU.
- The special situation can occur when the driver uses a national message which has no alternative on tested infrastructure – free speech translation will be done by the language tool – this translation is registered in the tool and can be the subject of further analyses in working groups to define a new PDM in case of message frequent repetition.

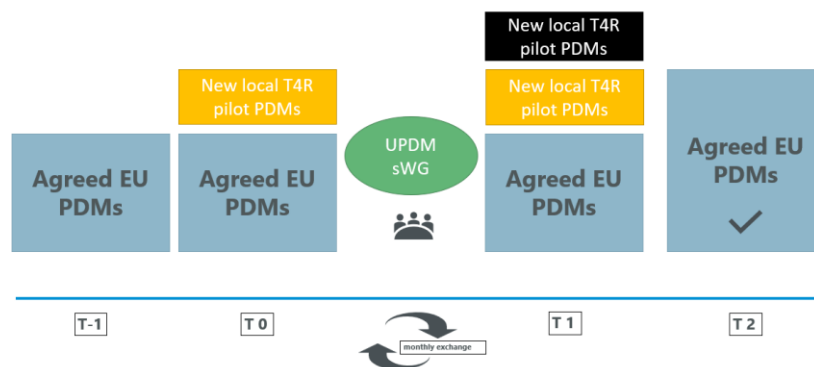


Figure 9 Improvement loop for PDMs

The procedure of PDM changes based on “Ticket principles” to have every change documented.

Template

Ticket PDM changes

Date:

Number of the request:

Number:

PILOT MANAGERS	PDM Number	English PDM	PDM	Operational cluster	Motion cluster	Operational situation	When is required
Existing PDM							
Proposed adapted PDM							
Proposed new PDM							
Problem description							
Justification for the change							

sWG PDM	PDM Number	English PDM	PDM	Operational cluster	Motion cluster	Operational situation	When is required
Accepted adapted PDM							
Accepted new PDM							
Description/justification of the decision by the sWG PDM							

Date of decision by LP UPDM sWG:

Figure 10 Template for Ticket PDM changes

Template

PDM feedback

Date:

Number:

Question	Feedback
How would you assess the usability of PDMs?	
What is your impression on the use of PDMs?	
Are the PDMs sufficient so have save operational communication?	
Which operational situations are not possible to cover with PDMs?	

Figure 11 Template for feedback on PDM changes

7. Conclusions

The work carried out to date seems to highlight:

- On a very long-time horizon, full automation of cross border operations could be a solution. Although steps towards this final goal are being taken, it needs some years for these technologies to reach a fully sufficient level of maturity enabling operation in real-life environments. **In the meantime, the need for the sector is to develop agile and pragmatic solutions** to overcome interoperability hurdles and to take major steps towards a level playing field with other modes **has been clearly recognised by the sector.**
- The project shows that with a systematic approach most relevant operational and emergency situations can be categorised into standard messages. This conclusion is a major step in current thinking. This knowledge should make it easier to extend the project to other non-covered languages and should overcome the remaining scepticism to step into this approach.
- **The importance of collaboration** has been proven. Only now where the project partners are working closely together a workable solution will be developed. Only with this balanced assessment of each other interest and sufficient consideration for the different business case, we will be able to come to a sustainable solution.
- The approach has also shown that real results are within reach. **It can go relatively quickly** whenever a structured process is followed. This structured process should allow future implementations and extensions to other countries and/or languages to go even faster.
- The project is giving a clear view of how this could work **in real-life operations.** We are able to go beyond the research lab and deliver a tool and methodology which is applicable under different operational circumstances.
- For the future, the list of PDMs is proposed to be frozen (once a year) to have a “final version of the year”, because updating and enhancing of the list of PDMs is a working process. Here, the maintenance process to keep the list of PDMs updated should be set up.

8. Annexes

The two Annexes which form part of this deliverable contain a detailed description of PDMs (e.g. description of operational situations, assignment to the specific clusters, etc.), as well as a description of the testing scenarios resulting from real operational situations in which PDMs are used.

These annexes form the basis of a master list of PDMs which today include not only the requirements from TSI OPE 2019/773 and the communication content of its Annex C, but also specific national requirements, the latter being still mandatory until full implementation of TSI OPE requirements.