



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 769267.



# PortForward

## 10.2 – Interim Progress Report

Christian Blobner (FhG/IFF)

<b>Document Number</b>	10.2
<b>Document Title</b>	Interim Progress Report
<b>Version</b>	5.0
<b>Status</b>	Final
<b>Deliverable Type</b>	Deliverable
<b>Contractual Date of Delivery</b>	31.12.2018
<b>Actual Date of Delivery</b>	25.01.2019
<b>Contributors</b>	All
<b>Keyword List</b>	Report, Progress, Activities
<b>Dissemination level</b>	PU

**Disclaimer:**

This document reflects only the author's view.  
Neither INEA nor the Commission is responsible  
for any use that may be made of the information it contains.

## Change History

Version	Date	Status	Author (Partner)	Description
1.0	10.12.2018	working	Christian Blobner (FhG/IFF)	created
2.0	14.01.2019	working	Christian Blobner (FhG/IFF)	
3.0	21.01.2019	draft	Christian Blobner (FhG/IFF)	
3.1	22.01. 2019	draft	Afshin Mansouri (BRUNEL)	Input to WP5
3.2	22.01.2019	draft	Alessandra Turi (MARTE)	Input to WP7
3.3	23.01.2019	draft	Christos Papatheologos (CORE)	Input to WP8 and WP9
4.0	24.01.2019	Final draft	Christian Blobner (FhG/IFF)	consolidation of partner input for quality check
5.0	25.01.2019	FINAL	Christian Blobner (FhG/IFF)	Finalization for submission

## Quality Check

Version Reviewed	Date	Reviewer (Partner)	Description
4.0	24.01.2019	Olena Reche (FhG/IFF)	Quality Check
4.0	24.01.2019	Christos Papatheologos (CORE)	Quality check

## Abbreviations

CSA	Coordination and Support Action
DTF	Dock the Future (project)
ICT	Information and Communication Technology
IMV	Internal Movement Vehicles
INEA	Innovation and Networks Executive Agency
IoT	Internet of Things
KPI	Key Performance Indicators
LCA	Lifecycle Assessment
M	project month
PO	Project Officer
RoRo	Roll-on/Roll-off
ToC	Table of Contents
TRL	Technology Readiness Level
WP	work package

## **Executive Summary**

This first progress report for the PortForward project gives an overview of the activities of the project consortium within the first six months of the project. The focus for the activities lays in the establishment of the partnership through the project Kick-Off in Magdeburg and the start of the work, specifically in the preparatory work in the first work package. Moreover, a number of activities were started to connect the relevant use case partners, i.e. through on-site visits at the participating ports. For dissemination of project activities, the project established the project website as well as took part in several dissemination related activities. Additionally, the project coordinated with the relevant CSA “Docks the Future” and the respective research projects.

## Table of Contents

1	Summary.....	9
1.1	Project Details .....	9
1.2	Project Summary .....	10
1.3	Overview of the work done during the reporting period.....	11
1.3.1	Objectives of the project for the reporting period.....	11
1.3.2	Summary of progress .....	11
1.4	Main Results.....	14
1.5	Deviations from the project schedule / Part A/B.....	14
2	WP1 – Stakeholder needs and technical requirements .....	15
2.1	Objectives of WP1 for the reporting period .....	15
2.2	Summary of progress.....	15
2.3	WP1 Meetings .....	16
2.4	Deliverables.....	17
2.5	Deviations from Annex I.....	20
3	WP2 PortForward framework design .....	20
3.1	Objectives of WP2 for the reporting period .....	20
3.2	Summary of progress.....	20
3.3	WP2 Meetings .....	21
3.4	Deliverables.....	22
3.5	Deviations from Annex I.....	22
4	WP3 IoT-enabled ports.....	23
4.1	Objectives of WP3 for the reporting period .....	23
4.2	Summary of progress.....	23
4.3	WP3 Meetings .....	23
4.4	Deliverables.....	24
4.5	Deviations from Annex I.....	24
5	WP4 PortForward services .....	25
5.1	Objectives of WP4 for the reporting period .....	25
5.2	Summary of progress.....	25
5.3	WP4 Meetings .....	25
5.4	Deliverables.....	25



- 5.5 Deviations from Annex I.....25
- 6 WP5 Green Scheduling & Sustainability of operations .....26
  - 6.1 Objectives of WP5 for the reporting period .....26
  - 6.2 Summary of progress.....26
  - 6.3 WP5 Meetings .....26
  - 6.4 Deliverables.....26
  - 6.5 Deviations from Annex I.....27
- 7 WP6 The PortForward Dashboard & technical validation (TRL 5).....28
  - 7.1 Objectives of WP6 for the reporting period .....28
  - 7.2 Summary of progress.....28
  - 7.3 WP6 Meetings .....28
  - 7.4 Deliverables.....29
  - 7.5 Deviations from Annex I.....29
- 8 WP7 Use cases & impact assessment (TRL 6).....30
  - 8.1 Objectives of WP7 for the reporting period .....30
  - 8.2 Summary of progress.....30
  - 8.3 WP7 Meetings .....30
  - 8.4 Deliverables.....30
  - 8.5 Deviations from Annex I.....30
- 9 WP8 Valorization and market assessment.....31
  - 9.1 Objectives of WP8 for the reporting period .....31
  - 9.2 Summary of progress.....31
  - 9.3 WP8 Meetings .....31
  - 9.4 Deliverables.....31
  - 9.5 Deviations from Annex I.....31
- 10 WP9 Dissemination/ Communication/ Exploitation.....32
  - 10.1 Objectives of WP9 for the reporting period .....32
  - 10.2 Summary of progress.....32
  - 10.3 WP9 Meetings .....34
  - 10.4 Deliverables.....34
  - 10.5 Deviations from Annex I.....35
- 11 WP10 Project Management .....36
  - 11.1 Objectives of WP10 for the reporting period .....36



11.2	Summary of progress.....	36
11.3	WP10 Meetings .....	36
11.4	Deliverables.....	36
11.5	Deviations from Annex I.....	37
12	WP11 Ethics Requirements .....	38
12.1	Objectives of WP11 for the reporting period .....	38
12.2	Summary of progress.....	38
12.3	WP11 Meetings .....	38
12.4	Deliverables.....	38
12.5	Deviations from Annex I.....	39
13	Conclusion .....	40

## Tables

Table 1	PortForward consortium members.....	9
Table 2	PortForward work packages .....	10
Table 3	General overview of the progress per WP .....	11
Table 4	Summary of Progress for WP1 .....	15
Table 5	Overview of WP1 meetings .....	16
Table 6	Submitted deliverables in WP1 within the current period .....	17
Table 7	Summary of Progress for WP2 .....	20
Table 8	Overview of WP2 meetings .....	21
Table 9	Summary of Progress for WP3 .....	23
Table 10	Overview of WP3 meetings .....	23
Table 11	Summary of Progress for WP4 .....	25
Table 12	Overview of WP4 meetings .....	25
Table 13	Summary of Progress for WP5 .....	26
Table 14	Summary of Progress for WP6 .....	28
Table 15	Overview of WP6 meetings .....	28
Table 16	Summary of Progress for WP7 .....	30
Table 17	Summary of Progress for WP8 .....	31
Table 18	Overview of WP8 meetings .....	31
Table 19	Summary of Progress for WP9 .....	32



Table 20 PortForward dissemination and networking events.....	33
Table 21 Submitted deliverables in WP9 within the current period.....	34
Table 22 Summary of Progress for WP10 .....	36
Table 23 Overview of WP2 meetings .....	36
Table 24 Submitted deliverables in WP10 within the current period.....	36
Table 25 Summary of Progress for WP11 .....	38
Table 26 Submitted deliverables in WP11 within the current period.....	38



# 1 Summary

The present document is the Periodic Report submitted by the PortForward project. The purpose of this document is to provide a technical progress report of the work packages and tasks carried out by the PortForward consortium during the first six months of the project, July 2018 – December 2018 (M1-M6). It will provide an overview about the deliverables produced and, where applicable, the deviations from the Grant Agreement.

As D10.2 is a technical report, this document includes no explanation of personnel costs and efforts or any major direct costs incurred by PortForward partners.

## 1.1 Project Details

Grant Agreement number: 769267

Project acronym: PortForward

Project title: Towards a green and sustainable ecosystem for the EU Port of the Future

Funding Scheme: Research and Innovation Action

Activity Period: from 01/07/2018 to 31/12/2021 (42 months)

Project Website: [www.portforward-project.eu](http://www.portforward-project.eu)

Consortium:

**Table 1 PortForward consortium members**

Participant No *	Participant organization name	Participant Name	Short	Country
1	Fraunhofer IFF	IFF		DE
2	ACCIONA Construcción S.A.	ACCIONA		ES
3	IMEC	IMEC		BE
4	Brunel University London	BRUNEL		UK
5	LEITAT	LEITAT		ES
6	Ubimax GmbH	UBIMAX		DE
7	Core Innovation & Technology OE	CORE		EL
8	Port Authority of Vigo	VIGO		ES
9	Autoridad Portuaria de Baleares	PDB		ES



10	Autorità di Sistema portuale del Mar Tirreno Settentrionale, Northern Tyrrhenian Sea Port System Authority	APS MTS	IT
11	MARTE	MARTE	IT
12	Kristiansand Havn KF	KRISTIANSAND	NO
13	Magdeburger Hafen	MAGDEBURG	DE

## 1.2 Project Summary

The Port of the Future will be able to enhance sustainable development and to manage the resources to be invested and their employment for a competitive advantage. Therefore, the port of the future must be oriented to port community and have an operative strategic capability to work, in line with European purposes, on the following:

- Smart, through ICT solutions, because it is important to improve exchange of information flows between port and port community;
- Interconnected with the use of a combination of different modes of transport and the integration of different technologies, because it is important to achieve better monitoring and controlling of the freight flows;
- Green through the adoption of green technologies because it is important to reduce the environmental impact of port operations saving the resources.

All in all, sustainable development is the present and future for ports that want to lead the industry supported by three cornerstones: Operational Excellence, Insightful Collaboration with partners through the supply chain, and top-notch Safety, Health and Environmental practices.

PortForward proposes a holistic approach that will lead to a smarter, greener and more sustainable port ecosystem. For its implementation, the PortForward project is broken down in eleven work packages as indicated in Table 2. The current reporting period covers activities in all work packages, whereby work packages one to five, which are mainly concerned with establishing the theoretical base represent the main focus of the period.

**Table 2 PortForward work packages**

WP No	Work Package Title	Lead Participant Short Name	Start Month	End month
WP1	Stakeholder needs and technical requirements	ACCIONA	1	8
WP2	PortForward framework design	LEITAT	2	18
WP3	IoT-enabled ports	IMEC	2	40
WP4	PortForward services	UBIMAX	4	38
WP5	Green Scheduling & Sustainability of operations	BRUNEL	1	42

<b>WP6</b>	The PortForward Dashboard & technical validation (TRL 5)	IFF	4	40
<b>WP7</b>	Use cases & impact assessment (TRL 6)	MARTE	4	42
<b>WP8</b>	Valorisation and market assessment	CORE	1	42
<b>WP9</b>	Dissemination/Communication/Exploitation	CORE	1	42
<b>WP10</b>	Project Management	IFF	1	42
<b>WP11</b>	Ethics	IFF	1	42

## 1.3 Overview of the work done during the reporting period

### 1.3.1 Objectives of the project for the reporting period

The Grant Agreement does not specify any milestones for the activity period. The relevant deliverables for the period have been submitted. The only deviations to report have been a slight delay in the production of the deliverables D10.2, D1.1 and D1.2.

### 1.3.2 Summary of progress

The following table provides a general overview of the progress per WP.

**Table 3 General overview of the progress per WP**

No.	Work Package Title	Status & comments
WP1	Stakeholder needs and technical requirements	<p>Progress according to the project plan. Work in the work package facilitated a harmonization of approaches to the stakeholder description and the understanding of the structuring of the use cases, as well as the explicit technical capabilities of each partner in the use cases. On-site meetings at relevant use case ports (in cooperation with other work packages) have been carried out to clarify specific aspects.</p> <p>Deliverables have been submitted with delays but did not influence the work progress of this or other work packages.</p> <p>Further details can be found under 2</p> <p>WP1 – Stakeholder needs and technical requirements</p>
WP2	PortForward framework design	<p>Progress according to the project plan. The work package is closely coordinating with WP1 to achieve the expected results and synchronize work, e.g. through synchronized surveys. Specific focus is put on the technical aspects of the port infrastructures and use case partners.</p> <p>No deliverables have been planned for the work package in the current period.</p>

		Further details can be found under 3 WP2 PortForward framework design
WP3	IoT-enabled ports	<p>Progress according to the project plan. Current focus is on the coordination of partners to ensure the successful technical integration. Coordination of the consequent activities is mainly through telephone conferences and within meetings in the scope of on-site port visits.</p> <p>No deliverables have been planned for the work package in the current period.</p> <p>Further details can be found under 4 WP3 IoT-enabled ports</p>
WP4	PortForward services	<p>Progress according to the project plan. Service development is coordinated with requirements development in work packages one and two. On-site meetings helped to define the scope for the services.</p> <p>No deliverables have been planned for the work package in the current period.</p> <p>Further details can be found under 5 WP4 PortForward services</p>
WP5	Green Scheduling & Sustainability of operations	<p>Progress according to the project plan. Service development is coordinated with requirements development in work packages one and two. On-site meeting at Vigo helped to define the scope for the service.</p> <p>No deliverables have been planned for the work package in the current period.</p> <p>Further details can be found under 6 WP5 Green Scheduling &amp; Sustainability of operations</p>
WP6	The PortForward Dashboard & technical validation (TRL 5)	<p>Progress according to the project plan. Work is closely coordinated with work package two with respect to architecture design to take into account the requirements for the digital twin concept, dashboard and decision support.</p> <p>No deliverables have been planned for the work package in the current period.</p> <p>Further details can be found under 7 WP6 The PortForward Dashboard &amp; technical validation (TRL 5)</p>
WP7	Use cases & impact assessment (TRL 6)	<p>Progress according to the project plan. Through a close cooperation with work package one, there is an intensive process ongoing for the comprehensive and structured description of the use cases. The on-site visits were closely coordinated between the use case partners to cover aspects from multiple work packages, incl. use cases.</p> <p>No deliverables have been planned for the work package in the current period.</p>

		Further details can be found under 8 WP7 Use cases & impact assessment (TRL 6)
WP8	Valorization and market assessment	<p>Progress according to the project plan. Activities were started to coordinate the establishment of the project advisory board, with consortium decisions expected in M8. Further coordination with work package nine to identify relevant exploitable results to ensure sustainability.</p> <p>No deliverables have been planned for the work package in the current period.</p> <p>Further details can be found under 9 WP8 Valorization and market assessment</p>
WP9	Dissemination/ Communication/ Exploitation	<p>Progress according to the project plan. Project website and dedicated social media accounts have been launched and coordination with CSA Docks the Future is ongoing. Use of partner networks to ensure presence at relevant events, e.g. Docks the Future or ALICE, to disseminate results.</p> <p>The deliverables for the work package (D9.1, D9.2 and D9.5) were submitted according to schedule.</p> <p>Further details can be found under 10 WP9 Dissemination/ Communication/ Exploitation</p>
WP10	Project Management	<p>Progress according to the project plan. Organization of half-yearly project management meetings (Kick-Off carried out, February 2019 meeting in planning) as well as additional meetings on needs basis. Established project structure as laid out in D10.1, including communication and cooperation rules, so that the consortium has a deep common understanding of the project objectives and how to cooperate to achieve them jointly. Implementation of a common document repository and online workspace.</p> <p>Further details can be found under 11 WP10 Project Management.</p>
WP11	Ethics	<p>Progress according to project plan. The work package is closely coordinated with project management to define procedures as well as with work package nine for identifying relevant data sets in the ethics context. The submitted deliverables D11.1 and D11.2 lay out the ethics procedures and requirements for the work in the project.</p> <p>The work in the work package is completed. Further details can be found under 12 WP11 Ethics Requirements.</p>

## 1.4 Main Results

The main technical results of this reporting period can be summarized as follows:

- Harmonization and summary of stakeholders' needs and expectations for PortForward use cases (WP1)
- Launching of a stakeholder survey (WP1)
- Definition of a comprehensive and consistent use case structure and description of the relevant framework parameters (WP1)
- Implementation of a project website including a public repository for the dissemination of public deliverables (WP9)
- First definition of exploitable results (WP9)
- First definition of relevant data sets (WP9)
- Publication of a technical paper (WP9)
- Participation in several dissemination relevant meetings (WP9)
- Implementation of an internal online document repository and workspace (WP10)
- Definition of relevant project processes and procedures to ensure smooth project implementation (WP10)
- Definition of ethics requirements and procedures, incl. informed consent procedures for the project (WP11)

## 1.5 Deviations from the project schedule / Part A/B

There are no major deviations from the project schedule. There have been slight delays in the submission of the deliverables D1.1, D1.2 and D10.2. However, due to the use of an online workspace for the work in the project as well as regular coordination telephone-conference between project partners, these submission delays do not influence the further progress of the project. Moreover, there is a slight delay in forming the project advisory board (MS16) as approaching candidates over the Christmas/New Year's holidays (M6) was not deemed appropriate. This will be rectified towards the 2<sup>nd</sup> Project Management Meeting in Madrid in February 2019 (M8).

## 2 WP1 – Stakeholder needs and technical requirements

### 2.1 Objectives of WP1 for the reporting period

The main objective of the work package in the reporting period was to foster the joint understanding between the relevant stakeholders involved in the project. This activity revolved around a comprehensive description and structuring of the project’s use cases, including the definition of the relevant (also non-beneficiary) stakeholders, the description of relevant contexts, objectives and framework parameters.

### 2.2 Summary of progress

Table 4 provides a summary of the main activities achieved within WP1 for the midterm of the project:

**Table 4 Summary of Progress for WP1**

No: 1	Implementation of on-site port visits to gather first-hand information on port processes, systems currently deployed, and port needs that could potentially be solved by PortForward
Description:	Through the course of the first six months in the work package 1, specifically Task 1.1 three port visits were been organized (Balears, Naples and Salerno, Livorno). Moreover, in cooperation with work package five another port visit was organized to Vigo, while during the Kick-Off a port visit was organized in Magdeburg. In this respect the partners got an early impression of the respective use case ports. The port visits also included coordination activities with relevant local stakeholders.
No: 2	Harmonization of user needs and requirements
Description:	The first technical deliverable lays out the comprehensive description of the ports and the activities to be expected in the implementation of the project. It describes the ports, its processes and the overall port systems as well as identifies relevant stakeholders for each port. Moreover, it lays out the ports’ economic, social and environmental goals.
No: 3	Analysis of use cases
Description:	The work package’s second deliverable directly focuses on the description of the use cases and elaborates for each use case a summary, the underlying rationale, a structured description and identifies typical assessment procedures and tools/services required.
No: 4	Stakeholder survey
Description:	While the main part of the information for work package one was collected through direct feedback with stakeholders in face to face meetings, e.g. during the port visits but also in individual meetings, the project also launched a survey to gather additional stakeholder feedback <a href="https://docs.google.com/forms/d/e/1FAIpQLScAvsE5IhssJjc39LfKtlw6_rDnrKNWm">https://docs.google.com/forms/d/e/1FAIpQLScAvsE5IhssJjc39LfKtlw6_rDnrKNWm</a>



	<p><a href="#">Xg6Wx8DqQvzYsguqA/viewform</a>, which has been additionally published on the project website.</p> <p>The survey was also shared with the “Port of the Future Network” through Docks the Future.</p> <p>The online survey is still active and available for ongoing collection of data from stakeholders. The feedback collected will be analyzed and used within assessment of the individual use cases in WP7.</p>
--	--

## 2.3 WP1 Meetings

Table 5 Overview of WP1 meetings

No.	Date	Name	Responsible partner & venue	Purpose
1	July 10-12, 2018	Project Kick-off meeting	FhG/IFF, Magdeburg	Kick-Off of WP1 and agreement of overall framework and proceeding of WP1 work and visit to the Port of Magdeburg
2	July 27, 2018	1st PortForward WP1 conference call	ACCIONA, Online	WP1 General planning review, T1.1 (General task planning/Deadlines, Methodology to collect end users’ expectations and needs) T1.2 (General task planning/Deadlines)
3	September 11, 2018	2nd PortForward WP1 conference call	ACCIONA, Online	Recap of WP1 General planning T1.1 (Update on task planning/Deadlines, Update on questionnaire status, Field visits/focus groups, Update on D1.1) T1.2 (Update on task planning/Deadlines, Potential questionnaire)
4	September 25-26, 2018	Visit to the Port of Vigo	BRUNEL, Vigo	Raising mutual understanding among partners of WP5 about current practice of port operations at Vigo, the concept of green scheduling of yard operations, sustainability assessment and identifying available data – with relevance to WP1 activities
5	October 4-5, 2018	Palma port visit	PDB, Palma de Mallorca	To carry out a technical visit of the Port of Palma, in order to obtain first-hand information on port processes, systems currently deployed and port needs that could potentially be solved by PortForward.





				Different meetings with stakeholders internal and external to the port were organized.
6	October 10-11, 2018	Visit and meeting in the Port of Livorno	MAR.TE, Livorno	Use Case identification and description at the port of Livorno
7	November 29-30, 2018	Visit and meetings in the ports of Naples and Salerno	MAR.TE, Naples and Salerno	To carry out a technical visit of the Ports of Naples and Salerno, in order to obtain first-hand information on port processes, systems currently deployed, and port needs that could potentially be solved by PortForward, different meetings with stakeholders internal and external to the port were organized.
8	December 4, 2018	3rd PortForward WP1 conference call	ACCIONA, Online	Recap of WP1 General planning T1.1. Update on task outcomes T1.3. Current status T1.4. Current status
9	December 13, 2018	WP1.T3 / D1.3 conference call	ACCIONA, Online	Specific discussion on general approach and ToC for D1.3
10	December 17, 2018	WP1.T4 / D1.4 and WP6.T4 / D6.4 conference call	ACCIONA, Online	Overview of Dashboard approaches Initial discussion about integration of the approaches Discussion about relation of Dashboard to KPIs and their definition in T1.4 Discussion about integration of Dashboard with other WP6 developments (Digital Twin / Decision Support System)

## 2.4 Deliverables

Table 6 Submitted deliverables in WP1 within the current period

<b>D1.1</b>	<b>Harmonized user needs and goals</b>
Author	ACCIONA
Contributors	All
Description	PortForward project proposes a holistic framework that will lead to smarter, greener and more sustainable ports through the implementation of innovative ICT



	<p>solutions to improve exchange of information flows between port and port community, a tighter integration with different modes of transport and the hinterland/city environment as well as the adoption of green technologies to reduce the environmental impact and resource consumption of port operations.</p> <p>The first step for the development of this framework has been the analysis of the end users expectations and goals, which are in first place the Port Authorities of the ports involved in PortForward project: Balears, Kristiansand, Livorno/Piombino, Magdeburg, Naples/Salerno, Vigo and by extension, the Port Communities of these ports as well as of any port that could potentially replicate the PortForward framework.</p> <p>The analysis of end users’ expectations and goals has been done through different activities, among which the organization of technical visits, focus groups/workshops with key stakeholders in each of the PortForward ports and the analysis of ports’ technical documentation can be highlighted. Furthermore, a questionnaire has been launched to retrieve additional feedback from external stakeholders.</p> <p>The analysis performed in each port includes a synthesis of the port main features (locations, activities, etc.), the identification and classification of key stakeholders, the description of main port processes (port general services, commercial services, etc.), the analysis of hinterland transportation and urban environment, a general description of port ICT-based systems as well as economic, environmental, and social expectations of each port.</p> <p>Main economic expectations and goals expressed by the stakeholders are the increase of efficiency and quality of port operations, risk and cost reduction, timeliness and reliability of port operations, and improved planning of port maintenance activities and of the port public domain.</p> <p>Main environmental expectations and goals identified are the prevention and reduction of pollution, improved monitoring of carbon footprint and reduction of CO2 emissions, rational use of natural resources, increased renewable energy generation and consumption at port area, compliance with environmental regulations and policies, and increased awareness of port stakeholders about environmental issues.</p> <p>Lastly, the main social expectations and goals identified include the improvement of working conditions in the port, the socio-economic revitalization of the port region, and the achievement of a positive perception of the port by the society.</p>
<b>D1.2</b>	<b>Use case restrictions &amp; requirements</b>
Author:	Vigo
Contributors	All
Description	PortForward project proposes a holistic framework that will lead to smarter, greener and more sustainable ports through the implementation of innovative ICT solutions to improve exchange of information flows between port and port



community, a tighter integration with different modes of transport and the hinterland/city environment, and the adoption of green technologies to reduce the environmental impact and resource consumption of port operations.

The project is currently developing the specifications of the PortForward framework. After a preliminary analysis of end users expectations and goals, which was documented in deliverable D.1.1, a set of use cases has been developed in order to describe at high level what kind of interactions there will be between the systems, processes and stakeholders of each of the ports involved as use cases of the project (Balears, Livorno/Piombino, Magdeburg, Naples/Salerno, and Vigo), and the PortForward framework.

In order to carry out this task, consortium partners have continued the activities that had been initiated for the analysis of end users' expectations and needs, analyzing the information collected through a set of technical visits to the use case ports, combined with specific meetings with key stakeholders of the corresponding port community. In parallel, the project continues the collection of additional feedback from external port-related stakeholders through an online questionnaire.

The use case analysis carried out at each port includes a port introduction, which recaps the main findings from D1.1 that will be more relevant for the use case. This is followed by a summary of the use case(s) proposed for the port. For each use case it is explained its relevance both from the point of view of the opportunities that it will provide to test and validate the PortForward framework, and from the point of view of the potential impact that can be achieved for the port. The use case includes as well an analysis of the main decision makers and stakeholders involved, the expected improvements and how they could be assessed qualitatively and/or quantitatively, and potential drawbacks and restrictions that shall be properly managed.

For the Balears ports, three use cases are proposed. The first one will address the optimization of yard management and operations scheduling for RoRo and/or bulk cargo transportation from the logistic and environmental point of view. The second case will focus on the improvement of centralized supervision and management operations of the port authority, as well as on the development of advanced maintenance strategies. The third use case will focus on the prediction of port-city interactions from the point of view of the demand for city attractions and services by the people arriving to the port through cruise ships, ferryboats, and recreational vessels.

The use case in the port of Vigo will focus on the application to the container terminal of PortForward's Green Scheduler and sustainability assessment through Life Cycle Assessment methodology (LCA). The use case encompasses three different aspects of the management and scheduling processes: yard space allocation, yard crane management, and Internal Movement Vehicles (IMVs) scheduling and deployment.

In the ports of Livorno and Piombino, two use cases are proposed. The first one will develop advanced assistance services for port pilots, addressing the difficult ship maneuvering within the port of Livorno due to the limited width of the port

	<p>access channel and the low depth of the quays and docks. The second use case will focus on assistance to goods control and inspection within port boundaries to ensure security and enforcement of the legal framework.</p> <p>For the ports of Naples and Salerno, a global use case has been defined that addresses three closely interlinked issues, namely: logistics and multimodal relations with the surrounding environment, optimization of freight management, and access to data related to environmental and social impact of port activities on the surrounding areas.</p> <p>Lastly, the port of Magdeburg will focus on the application of advanced monitoring of port operations applied on one hand to multi-purpose storage areas for automated analysis of occupation and handled goods, and on the other hand to external transportation traffic (on public roads) between the different port terminals, as data basis for a future slot management.</p>
--	---

## 2.5 Deviations from Annex I

There are no major deviations from the project schedule. There have been slight delays in the submission of the deliverables D1.1, D1.2. However, due to the use of an online workspace for the work in the project as well as regular coordination telephone-conference between project partners, these submission delays do not influence the further progress of the project.

## 3 WP2 PortForward framework design

### 3.1 Objectives of WP2 for the reporting period

The main objective for the second work package in the reporting period was to assess the already available technical systems within the port as according to T2.1.

### 3.2 Summary of progress

**Table 7 Summary of Progress for WP2**

No: 1	Development and deployment of a questionnaire to identify the different services and technologies available in the different port sites.
Description:	In close cooperation with the first work package, the task elaborated a questionnaire to assess the current state within the participating ports, i.e. prior to the use cases. The questionnaire includes questions about the existing communication infrastructure and its interconnections between different available services. Also, it asks for information on the current data collection and storage practices, i.e. how it data can be interfaced with, preferences toward cloud-based data storage and processing solutions, whether external data sources are already used, data storage and processing infrastructure. On the service side it asks for existing services and platforms for e.g. travelers or workers and what roles are defined and/or desired. With respect to stakeholders it asks for their expected openness for contact on service issues, the ports' data privacy manager, if stakeholders run third party



	<p>services in the port, and available on-site testing areas. Finally, with respect to environmental indicators the questionnaire asks for available KPI in this field, the admission system for vessels, sources of energy, manner of recording energy consumption and emissions, and supply of electrical energy to vessels.</p> <p>As seen from the latter point, also work package five questions were covered in this respect to assess indicators for the lifecycle assessment, which is led by LEITAT, also leader of T2.1.</p> <p>The questionnaires were completed in bilateral meetings between the individual ports and their respective use case partners.</p>
No: 2	Coordination of work between Task1.3 and Task 2.2
Description:	It was assessed that there will be an increased coordination need between the individual tasks from WP1 and WP2, as T1.3 also covers technical issues relevant for the implementation of WP2. Final discussions will be made on this topic during the 2 <sup>nd</sup> Project Management Meeting in Madrid, scheduled for February 2019.

### 3.3 WP2 Meetings

Table 8 Overview of WP2 meetings

No.	Date	Name	Responsible partner & venue	Purpose
1	July 10-12, 2018	Project Kick-off meeting	FhG/IFF, Magdeburg	Kick-Off of WP2 and agreement of overall framework and proceeding of WP2 work
2	August 6, 2018	1st WP2, Task 2.1 conference call	LEITAT, online	Kick-Off the work in the framework of this task and gather a set of actions to be done within the next few weeks
3	September 10, 2019	September status call of WP2, T2.1 of PortForward	LEITAT, online	Status update and gather a set of actions to be done within the next few weeks
4	October 15, 2019	WP2, T2.1 periodic status call of task	LEITAT, online	Continue the alignment and check the progress between partners of WP2 and Task 2.1. Make decisions about the progress achieved and solve the issues found in the execution.

### **3.4 Deliverables**

The project schedule foresees no deliverables in this work package for this period.

### **3.5 Deviations from Annex I**

No deviations to report.

## 4 WP3 IoT-enabled ports

### 4.1 Objectives of WP3 for the reporting period

The main objective of the work package in the reporting period was to harmonize the expectations of the consortium members with respect to IoT related platforms within the project and with respect to the use cases. Specifically, partners presented aspects of the IoT middleware and the Fraunhofer Virtual Fort Knox. Moreover, partners used the opportunities of the WP1 port visits to relate those platforms to the individual use case applications.

### 4.2 Summary of progress

Table 9 Summary of Progress for WP3

No: 1	Coordination with T2.1
Description:	WP3 coordinated with WP2 regarding technical specifications for the use of the IoT middleware.
No: 2	Coordination with WP11
Description:	As data collection and processing is relevant for WP3, specific requirements were discussed vis-à-vis the project structure as well as GDPR conformity for ports' data collection.
No: 3	Coordination with use cases and IoT middleware demo
Description:	The work package coordinated with the different use cases, i.e. during the port visits as well as during WP3 telephone conferences, to identify relevant scenarios for testing. In this scope a demo of the IoT middleware was set up for partners to familiarize with the system's functionalities.

### 4.3 WP3 Meetings

Table 10 Overview of WP3 meetings

No.	Date	Name	Responsible partner & venue	Purpose
1	October 15, 2018	WP3 Kickoff conference call	IMEC, online	The objective of this call was to introduce the IoT middleware infrastructure (provided by IMEC) that will be used in WP3 and more specifically to provide some "getting-started" information for technical partners connecting to it.

2	November 5, 2018	2nd WP3 conference call	IMEC, online	The objective of this recurrent conference call was to ease collaboration amongst WP3 involved actors.
3	December 3, 2018	3rd WP3 conference call	IMEC, online	The objective of this recurrent conference call was to ease collaboration amongst WP3 involved actors.

#### **4.4 Deliverables**

The project schedule foresees no deliverables in this work package for this period.

#### **4.5 Deviations from Annex I**

No deviations to report.



## 5 WP4 PortForward services

### 5.1 Objectives of WP4 for the reporting period

The work package 4 objectives for the period are the coordination of the remote assistance services and the people and asset tracking services with the relevant use case partners.

### 5.2 Summary of progress

Table 11 Summary of Progress for WP4

No: 1	Remote assistance service coordination
Description:	The coordination of the service implementation was initiated during the port visit in Livorno in October with further planning for the use case between the use case partners.
No: 2	Asset tracking service coordination
Description:	The discussion between the use case partners was initiated.

### 5.3 WP4 Meetings

Table 12 Overview of WP4 meetings

No.	Date	Name	Responsible partner & venue	Purpose
1	November 14, 2018	1st WP4 Kick-Off-Conference Call	UBIMAX, online	Kicking off the work in the work package and aligning the work of the partners
2	November 30, 2019	WP4, T4.1 Kick-off and alignment call	LEITAT, online	Kicking off the work in the task and aligning the work of the partners

### 5.4 Deliverables

The project schedule foresees no deliverables in this work package for this period.

### 5.5 Deviations from Annex I

No deviations to report. However, from the initial discussions between the use case and technical partners it became apparent, that changes to the initial use case setups will be necessary as some services have been implemented in the time between proposal writing and project start. These changes will be discussed in the 2<sup>nd</sup> Project Management Meeting in Madrid in February 2019 and eventual changes coordinated with the project officer.

## 6 WP5 Green Scheduling & Sustainability of operations

### 6.1 Objectives of WP5 for the reporting period

The objective for the work package within the period was to initiate the work for the green scheduler, and the sustainability analysis, based on lifecycle assessment (LCA) methodology.

### 6.2 Summary of progress

Table 13 Summary of Progress for WP5

No: 1	Organization of work package start between the partners in coordination with WP1
Description:	The first port visit in the project was organized between Vigo and the use case partners. Within this meeting the basic framework conditions were discussed for the subsequent work and coordination of Sustainability assessment (task T5.1) and Developing the multi-objective model of green yard scheduling (task T5.2). Subsequently, relevant historic data was identified at the Port of Vigo that are being used by LEITAT for the sustainability assessment of Vigo's Container Terminal (operated by Termavi) as a priority. These data are also being used for defining the scope of multi-objective model for green yard scheduling (task T5.2.1) by Brunel. Major progress was made with recruitment of the two Postdoctoral Fellows to join the project team at Brunel University. This includes obtaining recruitment approvals from Brunel University, job advertisement on public forums, shortlisting of candidates, interview, selection and employment offers to the selected candidates, obtaining employment approvals and signing contracts with the two selected candidates. The two Postdoctoral Fellows will start shortly by February 2019.
No: 2	Organization of a survey on sustainability parameters in coordination with WP2
Description:	Within the T2.1 survey among project partners, specifically ports, a specific part was elaborated to assess the current state of indicator and data collection within ports towards environmental and sustainability aspects.

### 6.3 WP5 Meetings

There have been no further specific meetings associated with the work package. Please refer to Table 5 for the relevant port visit coordinated with WP1 – plus bilateral coordination between Vigo and Brunel. The life cycle assessment survey was coordinated with the work for T2.1, incl. telephone conferences.

### 6.4 Deliverables

The project schedule foresees no deliverables in this work package for this period.

## **6.5 Deviations from Annex I**

No deviations to report.

## 7 WP6 The PortForward Dashboard & technical validation (TRL 5)

### 7.1 Objectives of WP6 for the reporting period

The focus of the work package within the period was to initiate the work on the digital twin concept and the decision support system.

### 7.2 Summary of progress

**Table 14 Summary of Progress for WP6**

No: 1	Establishment of underlying digital twin properties
Description:	First concepts for the digital twin from the manufacturing context were gathered and discussed among the partners for further adaptation to the port infrastructure concept. Furthermore, coordination with WP3 and WP2 has been initiated to analyze potential interfaces with the IoT aspects as well as implications from/for the overall technical architecture.
No: 2	Coordination of decision support basics
Description:	Some initial decision support concepts were discussed, specifically focusing on the analytical hierarchy process and the ValueSec approach. Further coordination specifically addressed coordination with efforts revolving around the KPI catalogue and the Dashboard to ensure consistency and the necessary synergy between the tasks.

### 7.3 WP6 Meetings

**Table 15 Overview of WP6 meetings**

No.	Date	Name	Responsible partner & venue	Purpose
1	October 17, 2018	WP 6 – Kick-Off Web-Conference	FhG/IFF, online	Goal: Kick-Off of WP 6 + common understanding of tasks with main contributors in WP + first discussion of ToC for D6.1
2	November 26, 2018	WP6 – 2nd Conference Call	FhG/IFF, online	Common understanding of tasks with main contributors in WP6; Discussion of ToC V0.2 for D6.1 and ToC V0.1 D6.2; Clarification of the interdependencies of the tasks in WP06 with other WPs

## **7.4 Deliverables**

The project schedule foresees no deliverables in this work package for this period.

## **7.5 Deviations from Annex I**

There are no deviations to report. However, discussions within the work package led to the agreement to start T6.4 earlier than scheduled (from M12 to probably M9) to better align efforts between the decision support system and the dashboard. A final decision on that will be taken during the 2<sup>nd</sup> Project Management Meeting in Madrid in February 2019.

## 8 WP7 Use cases & impact assessment (TRL 6)

### 8.1 Objectives of WP7 for the reporting period

The work package only started in the last month of the reporting period. The objective is the start of the work.

### 8.2 Summary of progress

Table 16 Summary of Progress for WP7

No: 1	Use case definition and structuring
Description:	<p>Although not technically part of the work package, there has been a necessary coordination with WP1 towards the consistent structuring and definition of the use cases to ensure the methodological and research framework.</p> <p>At the moment activity 7.1 has started. In this one MARTE is defining the methodology and the main elements (e.g. test site, necessary technical instalments, types of stakeholders, etc.) that will be considered in the research framework. This approach could be discussed during the Madrid meeting.</p>

### 8.3 WP7 Meetings

There have been no work package specific meetings in the period

### 8.4 Deliverables

The project schedule foresees no deliverables in this work package for this period.

### 8.5 Deviations from Annex I

No deviations to report.

## 9 WP8 Valorization and market assessment

### 9.1 Objectives of WP8 for the reporting period

The main objective of the work package for the reporting period was to structure the composition of the advisory board. The other remaining tasks run concurrent to the project tasks and interface where necessary, here specifically with respect to implications from the exploitation and data management efforts.

### 9.2 Summary of progress

Table 17 Summary of Progress for WP8

No: 1	Identification of an advisory board long-list and derivation of a short list
Description:	The efforts in T8.2 led to definition of the basic requirements and rationale for the project advisory board. Based on these partners were asked to contribute viable candidates for a long-list, from which the short list has been derived. After receiving formal acceptance from the members, the advisory board will be officially formed during the M6 project meeting in Madrid, completing the project milestone MS16.

### 9.3 WP8 Meetings

Table 18 Overview of WP8 meetings

No.	Date	Name	Responsible partner & venue	Purpose
1	September 17, 2018	WP8.T8.2 PortForward Advisory Board teleconference	CORE, online	To plan on the next steps for the formation of the PortForward Advisory Board
2	November 06, 2018	Meeting with Inha University	FhG/IFF, Incheon, Korea	Discussions about advisory board collaboration with Inha University

### 9.4 Deliverables

The project schedule foresees no deliverables in this work package for this period.

### 9.5 Deviations from Annex I

There is a slight delay in forming the advisory board for the project. This will be rectified in the 2<sup>nd</sup> Project Management Meeting in Madrid in February 2019.

## 10 WP9 Dissemination/ Communication/ Exploitation

### 10.1 Objectives of WP9 for the reporting period

For the initial project period, there have been a number of objectives for the work package, including setting up the project website in coordination with establishing a project design, defining the dissemination and exploitation plan as well as defining the data management plan. Moreover, carrying out relevant dissemination activities for the project were important aspects of the task.

### 10.2 Summary of progress

**Table 19 Summary of Progress for WP9**

No: 1	Agreeing on a project design and setting up the website
Description:	Discussions on the first design aspects such as the logo started during the project kick-off with an agreement on the logo and subsequent design elements through an online poll among the consortium members. The website was set up towards M3 and used extensively to chronicle the activities of the project towards the public and disseminate relevant information. The project design also includes the establishment of the standard presentation, a project leaflet, a banner and a poster, also to be found on the website. Social media accounts on LinkedIn and twitter were also launched around M3 and are also used for dissemination and communication purposes.
No: 2	Definition of the dissemination and exploitation plan
Description:	Defining the overall strategy and tools for dissemination of project information and results, resulted in the deliverable D9.2
No: 3	Definition of the data management plan
Description:	The identification, definition and structuring of project data sets resulted in D9.5 work was coordinated with WP11 with respect to ethical considerations.
No: 4	Coordination with the Docks the Future CSA and the “Port of the Future” Network
Description	During the project kick-off it was agreed with the Docks the Future CSA that the dissemination/exploitation coordinator will be the main contact person for collaboration, resulting in regular telephone conferences with the CSA and the other “Port of the Future” projects. Moreover, PortForward took part in several events, which can be found in the subsequent dissemination table.
No: 5	Publication of an introductory article
Description	The partners Brunel and CORE successfully submitted an article, which was chosen for publication in PTI Journal - Edition 79, Smart Ports & Supply Chains.



**Table 20 PortForward dissemination and networking events**

No.	Event	Organizer	Date	Place	Partner/s and persons involved	Topics
1	3rd Naples Shipping Week	The Propeller Club Port of Naples	Sep 24, 2018 - Sep 29, 2018	Naples, Italy	MARTE Alessandra Turi  APS MTS (as promoter)	Networking with port communities
2	GreenPort Congress Valencia	Mercator Media Ltd	Oct 16, 2018 - Oct 19 2018	Valencia, Spain	VIGO Carlos Botana	Networking with port communities specifically to Green Scheduler/LCA use case
3	DocksTheFuture experts' workshop	Docks the Future	Oct 29, 2018 - Oct 30 2018	Porto, Portugal	FhG/IFF Christian Blobner  MARTE Roberto Cinquegrani	Participation in expert working groups and networking with DTF
4	Collaborative Innovation Day "New Global Routes: One Belt One Road Initiative & TEN-T"	ALICE ETP, ICCS, Greek Ministry of Infrastructure and Transport	Nov 6, 2018	Athens, Greece	CORE Stefanos Kokkorikos	Presentation and poster presentation, coordination with PIXEL project
5	Stakeholder meeting	Inha University	Nov. 6, 2018	Incheon, Korea	FhG/IFF Christian Blobner	Presentation of project and discussion of potential collaboration
6	Meeting of the "Kammerunion Elbe/Oder"	Chamber of Commerce Magdeburg	Nov. 15, 2018	Magdeburg, Germany	FhG/IFF Christian Blobner	Project Presentation at "Kammerunion Elbe/Oder"

### 10.3 WP9 Meetings

There have been no work package specific meetings in the period

### 10.4 Deliverables

**Table 21 Submitted deliverables in WP9 within the current period**

<b>D9.1</b>	<b>Project Website</b>
Author	IFF
Contributors	ALL
Description	This deliverable provides the access details to the project website for the PortForward project.
<b>D9.2</b>	<b>1<sup>st</sup> Interim Plan for Exploitation and Dissemination of Results (PEDR)</b>
Author	CORE
Contributors	MARTE, FhG/IFF
Description	<p>This document is a deliverable of the PortForward project, which is funded by the European Union’s Horizon 2020 Program under Grant Agreement #769267. The Plan for Exploitation and Dissemination of results (PEDR) defines how the PortForward results will be exploited and disseminated to achieve a successful commercialization and how each partner will exploit the individual results that will be developed.</p> <p>This is the first version of the PEDR and includes a description of the expected results that each partner will develop and a first approach for their exploitation. Furthermore, it depicts all the activities that need to be carried out to develop the Exploitation and Dissemination Plan for PortForward and to define the characteristics of its potential audience and customers.</p> <p>The deliverable is structured in three sections as follows:</p> <ul style="list-style-type: none"> <li>• Section 1: Overview of PortForward Project and Exploitable Results</li> <li>• Section 2: The development of Exploitation Plan and the future activities of the project</li> <li>• Section 3: The development of Dissemination Plan and the future activities of the project</li> </ul>
<b>D9.5</b>	<b>Data Management Plan (DMP) V1</b>
Author:	CORE
Contributors	All



Description	<p>This document is a deliverable of the PortForward project, which is funded by the European Union’s Horizon 2020 Program under Grant Agreement #769267.</p> <p>It describes what data the project will generate, how these data will be produced and analyzed. It also aims to detail how the data related to the PortForward project will be disseminated and afterwards shared and preserved.</p>
-------------	---

### 10.5 Deviations from Annex I

No deviations to report.

## 11 WP10 Project Management

### 11.1 Objectives of WP10 for the reporting period

The main objective of the work package in this period was to kick-off the PortForward project and establish the necessary structures and procedures for a smooth running of the project.

### 11.2 Summary of progress

**Table 22 Summary of Progress for WP10**

No: 1	Project Kick-Off
Description:	The project was kicked-off in Magdeburg on July 10-12, 2018. The work packages were launched between the partners, a first port visit and use case discussion with Magdeburg port was carried out. It also allowed for the presentation of the INEA PO and the Docks the Future project
No: 2	Establishment of project procedures
Description:	The project manual as represented in D10.1 lays out the basic structure and procedures for the project including communication and documentation. It also includes procedures for the set-up of the document management system and the different communication channels, e.g. the project email pool and contact list.

### 11.3 WP10 Meetings

**Table 23 Overview of WP2 meetings**

No.	Date	Name	Responsible partner & venue	Purpose
1	July 10-12, 2018	Project Kick-off meeting	FhG/IFF, Magdeburg	Kick-Off of project and agreement of overall framework for work in project, presentation by INEA PO and Docks the Future

### 11.4 Deliverables

**Table 24 Submitted deliverables in WP10 within the current period**

<b>D10.1</b>	<b>Project Manual</b>
Author	IFF
Contributors	-



Description	The project manual is a document containing information and procedures for the execution of the PortForward project. It will function as a manual and reference document for the project partners to efficiently execute the project.
<b>D10.2</b>	<b>Interim Progress Report</b> ( <i>this report</i> )
Author	IFF
Contributors	All
Description	-

### 11.5 Deviations from Annex I

No deviations to report.

## 12 WP11 Ethics Requirements

### 12.1 Objectives of WP11 for the reporting period

The main objective of the work package was to lay out the ethics procedures for the project as a whole. Specific focus was put on the informed consent procedures and the procedures for handling personal data.

The work in the work package is concluded.

### 12.2 Summary of progress

**Table 25 Summary of Progress for WP11**

No: 1	Informed consent procedures
Description:	The procedures have been defined and are laid out in D11.1
No: 2	Handling and processing of personal data
Description:	The procedures and processes for collecting and processing personal data have been defined and are laid out in D11.2

### 12.3 WP11 Meetings

There have been no work package specific meetings in the period

### 12.4 Deliverables

**Table 26 Submitted deliverables in WP11 within the current period**

<b>D11.1</b>	<b>H – Requirement No. 1</b>
Author	IFF
Contributors	-
Description	The deliverable constitutes the first of two ethics deliverables for the PortForward project. This deliverable is concerned, per Grant Agreement, with procedures and criteria to identify/recruit research participants, the informed consent procedures to be implemented and highlight principles and template for informed consent forms.
<b>D11.2</b>	<b>POPD – Requirement No. 2</b>
Author	IFF

Contributors	-
Description	The PortForward project aims for stakeholder inclusion and the testing of technical solutions in realistic use cases. This will increase the viability and sustainability of the project’s results and foster exploitation beyond the project. To this end, it will be necessary to process data from different sources. Ensuring the responsible collection, use and processing of personal data is an important aspect in fulfilling the ethical requirements of the project. This deliverable will, per Grant Agreement, provide insights about how the project consortium is compliant towards the collection of personal data, about how data is handled over the lifecycle of the project (collection, storage, protection, retention and destruction). Furthermore, informed consent procedures will be re-iterated.

## 12.5 Deviations from Annex I

No deviations to report.

## **13 Conclusion**

The report at hand provides an overview of the work of the PortForward project during the first six months of the project. As expected, important effort was spent on starting the individual work packages and bringing all partners on the same page.

Substantial effort was put and significant progress was made in the staging work packages 1 and 2. Here especially a number of meetings were organized with the involved use case partners to harmonize the approaches to the implementation of the cases in the later stages of the project.

There have been no serious delays or set-backs in the implementation of the project so far.