1. Identification

Call	Date of submission
C1	25/04/2022

1.1. Full name of the project

Emerging marine Digital Twin Services for key sectors of the Blue Economy: from climate analysis to operational forecasting

123 / 250 characters

1.2. Short name of the project

BlueDataServices

16 / 20 characters

1.3. Programme priority

2. Water-smart societies

1.4. Programme objective

2.2 Blue economy

1.6. Project duration

Contracting start	22/09/2022	**Contracting end**	31/12/2022
Implementation start	01/01/2023	**Implementation end**	31/12/2025
		Duration of implementation phase (months)	36
Closure start	01/01/2026	**Closure end**	31/03/2026

1.7. Project summary

Plethora of marine data is provided on EU, Baltic Sea regional and national levels but the systematic use of the data in TAILORED environmental planning, monitoring and forecasting services by Target Groups (ports, shipping companies, planning agencies, aqua-farms etc) is limited due to: lack of relevant new tailored information products, web services and apps; inability of pan-EU services to address new needs of users and shortcomings in converting data into user specific services. Demand for new data services by the Target Groups as new business opportunities and value chains (renewables, LNG) and needs (ultra-high resolution data) have emerged. The overarching need is the increased safety at sea while increasing the financial benefits of the Blue Economy sector. We propose three Digital Twin (DT) solutions valorizing existing marine data to improve the tailored services for Blue Economy resulting in co-efficient use of marine resources: Static DT Service (new map layers for planning agencies and renewable energy sector); Off-Shore Dynamic DT Service (relevant operational data for generating new information and services for safe navigation and wind-farming); Coastal Dynamic DT Service (timely data for ports and coastal operators). The DT-based thematic services answer the emerging needs of Target Groups. Durability of the solutions is assured as new users and public will have access to the services after the end of project via continuous output of project core partners.

1,496 / 1,500 characters

1.8. Summary of the partnership

The project core partners accompanied by a variety of prime users and associated organization supports the development of innovative and sustainable marine monitoring/forecasting services for the benefit of emerging Blue Economy sectors. The transnational co-operation (project partners are involved in various EU initiatives) assures technological compatibility of the developed services with the ongoing and future EU initiatives - Copernicus, Destination Earth, Digital Twin of the Ocean - which are the bases for the durability of the project outputs.

The CORE PARTNERS are national weather services (FMI, DMI, LEGMC) and universities (TalTech, UL, TLU) that have a long-term experience in developing marine monitoring and forecasting services as well as in providing desired information for environmental management authorities. The inclusion of a number of core partners assures the durability of the project solutions as providing the tailored services is their daily activity. Likewise, the core partners have existing communication channels for direct access to institutional users and wider public, which improves the durability of the project solutions as new users can be brought to the services after the project lifetime. Overall, the consortium has the necessary competences in environmental monitoring and management as well as in operational service development. The consortia needs strong ICT competences for successful project implementation and solution transfer. The core partners have permanent sub-contractors and in-house competences to carry out the ICT developments for user-friendly solutions. The publicity and demonstration of services for user engagement can also be done using the existing networks of core partners. As an additional measure a communication partner (G48) has been included and resources have been allocated to engage new non-traditional users among the target groups.

Second group of relevant entities are the PRIME USERS of project solutions (5 as PROJECT PARTNERS and 5 as ASSOCIATED ORGANIZATIONS). They will be a kind of ginipigs for piloting and validating the 3 thematic Digital Twin solutions. User partners of each solution will be actively involved to co-design, pilot and validate the Blue Economy sector services according to their specific needs and to assure sustainable uptake of the services. The user partner group includes 3 port operators (20+ ports), renewable energy developer, 2 shipping companies, 3 ice services, spatial planning authority and sea pilot service. 5 entities among the ASSOCIATED PARTNERS are Target Group representatives who will receive the project solutions to upscale the services. POLICY MAKERS are included among the Associated Partners.

An ADVISORY BOARD, consisting of representatives of user and associated partners, will be formed to guide the development activities of the project team. Coordinators of the Policy Areas SAFE, INNOVATION, SPATIAL PLANNING have been engaged in the Advisory Board.

2,997 / 3,000 characters

1.11. Project Budget Summary

Financial resources [in EUR]		Preparation costs	Planned project budget
ERDF	ERDF co-financing	0.00	1,849,116.00
	Own contribution ERDF	0.00	462,279.00
	ERDF budget	0.00	2,311,395.00
NO	NO co-financing	0.00	0.00
	Own contribution NO	0.00	0.00
	NO budget	0.00	0.00
NDICI	NDICI co-financing	0.00	0.00
	Own contribution NDICI	0.00	0.00
	NDICI budget	0.00	0.00
RU	RU co-financing	0.00	0.00
	Own contribution RU	0.00	0.00
	RU budget	0.00	0.00
TOTAL	**Total Programme co-financing**	0.00	1,849,116.00
	Total own contribution	0.00	462,279.00
	Total budget	0.00	2,311,395.00

2. Partnership

2.1. Overview: Project Partnership

2.1.1 Project Partners

No.	LP/PP	Organisation (English)	Organisation (Original)	Country	Type of partner	Legal status	Partner budget in the project	Active/inactive	
								Status	from
1	LP	Tallinn University of Technology	Tallinna Tehnikaülikool	EE	Higher education and research institution	a)	523,400.00 €	Active	22/09/2022
2	PP	Finnish Meteorological Institute	Ilmatieteen laitos	FI	National public authority	a)	413,000.00 €	Active	22/09/2022
3	PP	University of Latvia	Latvijas Universitāte	LV	Higher education and research institution	a)	360,100.00 €	Active	22/09/2022
4	PP	Danish Meteorologiacal Institute	Danmarks Meteorologiske Institut	DK	National public authority	a)	410,900.00 €	Active	22/09/2022
5	PP	Tallinn University	Tallinna Ülikool	EE	Higher education and research institution	a)	255,550.00 €	Active	22/09/2022
6	PP	Garage48	Garage48 OÜ	EE	Small and medium enterprise	b)	113,650.00 €	Active	22/09/2022
7	PP	Latvian Environment, Geology and Meteorology Centre	Latvijas vides, ģeoloģijas un meteoroloģijas centrs	LV	Small and medium enterprise	a)	65,000.00 €	Active	22/09/2022
8	PP	Saarte Liinid Plc	Saarte Liinid AS	EE	Small and medium enterprise	b)	35,995.00 €	Active	22/09/2022
9	PP	Eckerö Line Ab Oy	Eckerö Line Ab Oy	FI	Large enterprise	b)	36,400.00 €	Active	22/09/2022
10	PP	Finnish Transport Infrastructure Agency	Väylävirasto	FI	National public authority	a)	36,400.00 €	Active	22/09/2022
11	PP	Institute of Hydro-Engineering of the Polish Academy of Sciences	Instytut Budownictwa Wodnego Polskiej Akademii Nauk	PL	Higher education and research institution	a)	61,000.00 €	Active	22/09/2022

2.1.2 Associated Organisations

No.	Organisation (English)	Organisation (Original)	Country	Type of Partner
AO 1	Environment Agency	Keskkonnaagentuur	EE	Sectoral agency
AO 2	Transport Administration	Transpordiamet	EE	Sectoral agency
AO 3	Liepaja Special Economic Zone	Liepājas speciālā ekonomiskā zona	LV	Infrastructure and public service provider
AO 4	Skulte port authority	Skultes ostas pārvalde	LV	Infrastructure and public service provider
AO 5	Baltic Operational Oceanographic System	Baltic Operational Oceanographic System	DK	Interest group
AO 6	Ministry of Economic Affairs and Communications	Majandus- ja Kommunikatsiooniministeerium	EE	National public authority
AO 7	Finnlines Oyj	Finnlines Oyj	FI	Large enterprise

2.2 Project Partner Details - Partner 1

LP/PP Lead Partner

Partner Status Active

Active from 22/09/2022 **Inactive from**

Partner name:

Organisation in original language Tallinna Tehnikaülikool

23 / 250 characters

Organisation in English	Tallinn University of Technology (32 / 250 characters)
Department in original language	Meresüsteemide instituut (24 / 250 characters)
Department in English	Department of Marine Systems (28 / 250 characters)

Partner location and website:

Address	Akadeemia tee 15a (17 / 250 characters)	**Country**	Estonia
Postal Code	12618 (5 / 250 characters)	**NUTS1 code**	Eesti
Town	Tallinn (7 / 250 characters)	**NUTS2 code**	Eesti
Website	Taltech.ee (10 / 100 characters)	**NUTS3 code**	Põhja-Eesti

Partner ID:

Organisation ID type	Registration code (Registrikood)
Organisation ID	74000323
VAT Number Format	EE + 9 digits
VAT Number	N/A ☐ EE100224841 (11 / 50 characters)
PIC	999842536 (9 / 9 characters)

Partner type:

Legal status	a) Public	
Type of partner	Higher education and research instituti	University faculty, college, research institution, RTD facility, research cluster, etc.
Sector (NACE)	72.19 - Other research and experimental development on natural sciences and engineering	

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities? No

Role of the partner organisation in this project:

TalTech (Estonia, Lead partner) will be responsibe for project overall management, communication and financial affairs. Principal work is carried out by the Department of Marine Systems which has expertise in developing operational marine monitoring and forecasting services as well as in data analysis for environmental management. TalTech has participated and led numerous INTERREG and other EU funded projects. TalTech will lead the solution preparation and piloting activities (A.1.1 Data Consolidation; A2.2. Piloting Coastal Dynamic Digital Twin Service) and solution transfer Work Package (incl. A.3.3. Communication with Advisory Board). TalTech will contribute also to the development of Digital Twin and solution piloting.

732 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

○ Yes ○ No

State aid relevance

For the partner type selected, the Programme sees a medium to high risk for implementing State aid relevant activities. If the partner is of the opinion that its activities are not State aid relevant, it can ask the MA/JS for a plausibility check on the State aid relevance. Does the partner want to do this?

○ Yes ○ No

2.2 Project Partner Details - Partner 2

LP/PP	Project Partner
Partner Status	Active
Active from	22/09/2022
Inactive from	

Partner name:

Organisation in original language	Ilmatieteen laitos (18 / 250 characters)
Organisation in English	Finnish Meteorological Institute (32 / 250 characters)
Department in original language	Asiakaspalvelut (15 / 250 characters)
Department in English	Customer Services (17 / 250 characters)

Partner location and website:

Address	P.O. BOX 503 (or physical address Erik Palménin aukio 1, FI-00560 HELSINKI) (75 / 250 characters)	**Country**	Finland
Postal Code	FI-00101 (8 / 250 characters)	**NUTS1 code**	Manner-Suomi
Town	Helsinki (8 / 250 characters)	**NUTS2 code**	Helsinki-Uusimaa
Website	www.fmi.fi (10 / 100 characters)	**NUTS3 code**	Helsinki-Uusimaa

Partner ID:

Organisation ID type	Business Identity Code (Y-tunnus)
Organisation ID	0244664-7
VAT Number Format	FI + 8 digits
VAT Number	N/A ☐ FI02446647 (10 / 50 characters)
PIC	999591306 (9 / 9 characters)

Partner type:

Legal status	a) Public	
Type of partner	National public authority	Ministry, etc.

Sector (NACE) 84.11 - General public administration activities

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities? No

Role of the partner organisation in this project:

Finnish Meteorological Institute (FMI) has long-term experience in developing and providing operational monitoring and forecasting services in national and pan-EU scale (e.g. ice and snow cover monitoring). FMI will develop new services for brash ice conditions and navigation. These will include background studies for capacity building and data flow development in back-end services (A.1.1, A.1.4.). FMI will also contribute to wind energy related work with ice data examination and deliveries (A.1.3, O.2.3). FMI takes part in all work packages WP1-WP3 and has lead position Piloting Offshore Dynamic Digital Twin Service: winter navigation, route planning and renewable energy (O.2.1.). End-users of the FMI output in particular are involved project partners like Finnish Transport Infrastructure Agency and shipping companies. FMI will communicate withe these target groups to assure sustainable transfer the projects solutions (A.3.4).

942 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

○ Yes ○ No

2.2 Project Partner Details - Partner 3

LP/PP Project Partner

Partner Status Active

Active from 22/09/2022 **Inactive from**

Partner name:

Organisation in original language Latvijas Universitāte

21 / 250 characters

Organisation in English University of Latvia

20 / 250 characters

Department in original language Skaitliskās modelēšanas institūts

33 / 250 characters

Department in English Institute of numerical modelling

32 / 250 characters

Partner location and website:

Address Raiņa bulvāris 19

17 / 250 characters

Postal Code LV1586

6 / 250 characters

Town Rīga

4 / 250 characters

Website www.modinst.lv

14 / 100 characters

Country Latvia

NUTS1 code Latvija

NUTS2 code Latvija

NUTS3 code Rīga

Partner ID:

Organisation ID type	Unified registration number (Vienotais reģistrācijas numurs)
Organisation ID	90000076669
VAT Number Format	LV + 11 digits
VAT Number	N/A ☐ LV90000076669 (13 / 50 characters)
PIC	999871830 (9 / 9 characters)

Partner type:

Legal status	a) Public
Type of partner	Higher education and research instituti — University faculty, college, research institution, RTD facility, research cluster, etc.
Sector (NACE)	72.19 - Other research and experimental development on natural sciences and engineering

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities? Yes

Role of the partner organisation in this project:

Institute of numerical modelling of University of Latvia (UL) as a core partner will participate in the whole chain of project activities:
In WP1
- participation in A.1.2 assessment of user requirements with emphasis on interaction with LV users and potential users of Coastal Dynamic DT ("Port service").
- employment of UL setups of numerical models of hydrodynamics and waves for development of both Static (A.1.3) and Dynamic (A.1.4) Digital Twins.
In WP2
- lead of Work package 2 - Piloting and evaluating solutions
- contribution in shaping of other services in activities O.2.1, O.2.2, O.2.3.
in WP3
- participation in transferring solutions (all activities A.3.1. - A.3.5) with emphasis on transnational transfer of Coastal Dynamic DT and engaging Latvian end-users for all other services.

797 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

○ Yes ○ No

State aid relevance

For the partner type selected, the Programme sees a medium to high risk for implementing State aid relevant activities. If the partner is of the opinion that its activities are not State aid relevant, it can ask the MA/JS for a plausibility check on the State aid relevance. Does the partner want to do this?

○ Yes ○ No

2.2 Project Partner Details - Partner 4

LP/PP	Project Partner		
Partner Status	Active		
Active from	22/09/2022	**Inactive from**	

Partner name:

Organisation in original language	Danmarks Meteorologiske Institut (32 / 250 characters)

Organisation in English	Danish Meteorologiacal Institute (32 / 250 characters)
Department in original language	Vejrforskning Afdeling (22 / 250 characters)
Department in English	Weather Research Department (27 / 250 characters)

Partner location and website:

Address	Lyngbyvej 100 (13 / 250 characters)	**Country**	Denmark
Postal Code	DK-2100 (7 / 250 characters)	**NUTS1 code**	Danmark
Town	Copenhagen (10 / 250 characters)	**NUTS2 code**	Sjælland
Website	www.dmi.dk (10 / 100 characters)	**NUTS3 code**	Østsjælland

Partner ID:

Organisation ID type	Civil registration number (CPR)
Organisation ID	18159104
VAT Number Format	DK + 8 digits
VAT Number	**N/A** ☐ DK18 15 91 04 (13 / 50 characters)
PIC	999509438 (9 / 9 characters)

Partner type:

Legal status	a) Public	
Type of partner	National public authority	Ministry, etc.
Sector (NACE)	84.11 - General public administration activities	

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities?	Yes

Role of the partner organisation in this project:

Danish Meteorological Institute (DMI) is a national weather service and has extensive experience in developing marine forecasting and monitoring services. DMI will contribute to service development and piloting as well as to national user engagement.
The specific contributions of DMI are:
- leading WP1 and activity A.1.3;
- leading the development of the Static DT by providing high resolution weather and ocean reanalysis data products (A.1.3.);
- contributing to piloting Static DT service for offshore wind farm siting (O.2.3);
- supporting the implementation of Static DT service for marine spatial planning (O.2.3);
- organizing a national user events in Denmark (A.3.1) and preparing publications (A.3.5)

718 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

○ Yes ○ No

2.2 Project Partner Details - Partner 5

LP/PP	Project Partner		
Partner Status	Active		
Active from	22/09/2022	**Inactive from**	

Partner name:

Organisation in original language	Tallinna Ülikool (16 / 250 characters)
Organisation in English	Tallinn University (18 / 250 characters)
Department in original language	Ökoloogia keskus (16 / 250 characters)
Department in English	Institute of Ecology (20 / 250 characters)

Partner location and website:

Address	Narva mnt 25 (12 / 250 characters)	**Country**	Estonia
Postal Code	10120 (5 / 250 characters)	**NUTS1 code**	Eesti
Town	Tallinn (7 / 250 characters)	**NUTS2 code**	Eesti
Website	www.tlu.ee (10 / 100 characters)	**NUTS3 code**	Põhja-Eesti

Partner ID:

Organisation ID type	Registration code (Registrikood)
Organisation ID	74000122
VAT Number Format	EE + 9 digits
VAT Number	N/A ☐ EE100251335 (11 / 50 characters)
PIC	999421653 (9 / 9 characters)

Partner type:

Legal status	a) Public	
Type of partner	Higher education and research instituti	University faculty, college, research institution, RTD facility, research cluster, etc.
Sector (NACE)	72.19 - Other research and experimental development on natural sciences and engineering	

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities? No

Role of the partner organisation in this project:

Tallinn University (TLU), Institute of Ecology is the expert in the field of coastal planning (coastal erosion, siltation of ports, sediment transport, coastal sediments (including sea bottom sediments)).
-TLU will lead Piloting Static Digital Twin Service: coastal planning and renewable energy (O.2.3)
-TLU will contribute to the Data Consolidation (A.1.1), Development of Static Digital Twin (A.1.3), Organizing events for user engagement (A.3.1) and Publications for promoting the solutions and engaging users (A.3.5)

522 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

○ Yes ○ No

State aid relevance

For the partner type selected, the Programme sees a medium to high risk for implementing State aid relevant activities. If the partner is of the opinion that its activities are not State aid relevant, it can ask the MA/JS for a plausibility check on the State aid relevance. Does the partner want to do this?

○ Yes ○ No

2.2 Project Partner Details - Partner 6

LP/PP Project Partner

Partner Status Active

Active from 22/09/2022 **Inactive from**

Partner name:

Organisation in original language Garage48 OÜ

11 / 250 characters

Organisation in English Garage48

8 / 250 characters

Department in original language Garage48 OÜ

11 / 250 characters

Department in English Garage48

8 / 250 characters

Partner location and website:

Address Telliskivi 57

13 / 250 characters

Postal Code 10412

5 / 250 characters

Town Tallinn

7 / 250 characters

Website www.garage48.org

16 / 100 characters

Country Estonia

NUTS1 code Eesti

NUTS2 code Eesti

NUTS3 code Põhja-Eesti

Partner ID:

Organisation ID type	Registration code (Registrikood)
Organisation ID	14270370
VAT Number Format	EE + 9 digits
VAT Number	N/A ☐ EE101976622 (11 / 50 characters)
PIC	900551105 (9 / 9 characters)

Partner type:

Legal status	b) Private	
Type of partner	Small and medium enterprise	Micro, small, medium enterprises < 250 employees, ≤ EUR 50 million turnover or ≤ EUR 43 million balance sheet total
Sector (NACE)	93.29 - Other amusement and recreation activities	

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities? Yes

Financial data	**Reference period**	01/01/2020 –	31/12/2022
	Staff headcount [in annual work units (AWU)]		3.0
	Employees [in AWU]		3.0
	Persons working for the organisation being subordinated to it and considered to be employees under national law [in AWU]		0.0
	Owner-managers [in AWU]		0.0
	Partners engaged in a regular activity in the organisation and benefiting from financial advantages from the organisation [in AWU]		0.0
	Annual turnover [in EUR]		447,195.00
	Annual balance sheet total [in EUR]		299,895.00
	Operating profit [in EUR]		4,869.00

Role of the partner organisation in this project:

G48 has extensive experience in facilitating technology transfer and in organizing international user engagement events (hackathons, workshops).
- G48 is responsible for organizing Hackathon for facilitating solution transfer to the target groups (A.3.2.)

G48 will contribute also to other user outreach activities (events and publication):
- Organizing events for user engagement (A.3.1)
- Publications for promoting the solutions and engaging users (A.3.5.)

461 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

○ Yes ○ No

2.2 Project Partner Details - Partner 7

LP/PP	Project Partner		
Partner Status	Active		
	Active from 22/09/2022	**Inactive from**	

Partner name:

Organisation in original language	Latvijas vides, ģeoloģijas un meteoroloģijas centrs (51 / 250 characters)
Organisation in English	Latvian Environment, Geology and Meteorology Centre (51 / 250 characters)
Department in original language	Prognožu un klimata daļa (24 / 250 characters)
Department in English	Forecasting and Climate Department (34 / 250 characters)

Partner location and website:

Address	Maskavas iela 165 (17 / 250 characters)	**Country**	Latvia
Postal Code	LV-1019 (8 / 250 characters)	**NUTS1 code**	Latvija
Town	Rīga (4 / 250 characters)	**NUTS2 code**	Latvija
Website	videscentrs.lvgmc.lv/ (21 / 100 characters)	**NUTS3 code**	Rīga

Partner ID:

Organisation ID type	Unified registration number (Vienotais reģistrācijas numurs)
Organisation ID	50103237791
VAT Number Format	LV + 11 digits
VAT Number	**N/A** ☐ LV50103237791 (13 / 50 characters)
PIC	986071446 (9 / 9 characters)

Partner type:

Legal status	a) Public	
Type of partner	Small and medium enterprise	Micro, small, medium enterprises < 250 employees, ≤ EUR 50 million turnover or ≤ EUR 43 million balance sheet total
Sector (NACE)	74.90 - Other professional, scientific and technical activities n.e.c.	

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities?	Yes

Role of the partner organisation in this project:

Latvian Environment, Geology and Meteorology Centre (LEGMC) is a user partner in the project. As a national environmental agency and weather service the LEGMC wil be a institutional large scale user and promoter of multiple outputs of the project as well as a contributor to development of Static and Dynamic Digital Twins (A.1.3., A.1.4.). The data provided by DT will be displayed on operational web sites of LEGMC (O.2.2, O.2.3).
LEGMC will lead the following user engagement activities:
- consolidation of user requirements and contributing to preparation of Communication Strategy (A.1.2.).
- organizing events for user engagement (A.3.1.) and promoting the project outputs.
- preparing publications for promoting the solutions and engaging users (A.3.5).

761 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

○ Yes ○ No

2.2 Project Partner Details - Partner 8

LP/PP Project Partner

Partner Status Active

Active from 22/09/2022 **Inactive from**

Partner name:

Organisation in original language Saarte Liinid AS

16 / 250 characters

Organisation in English Saarte Liinid Plc

17 / 250 characters

Department in original language Saarte Liinid AS

16 / 250 characters

Department in English Saarte Liinid Plc

17 / 250 characters

Partner location and website:

Address Rohu 5

6 / 250 characters

Postal Code 93819

5 / 250 characters

Town Kuressaare

10 / 250 characters

Website saarteliinid.ee

15 / 100 characters

Country Estonia

NUTS1 code Eesti

NUTS2 code Eesti

NUTS3 code Lääne-Eesti

Partner ID:

Organisation ID type Registration code (Registrikood)

Organisation ID 10216057

VAT Number Format EE + 9 digits

VAT Number **N/A** ☐ EE100202261

11 / 50 characters

PIC n/a

3 / 9 characters

Partner type:

Legal status	b) Private	
Type of partner	Small and medium enterprise	Micro, small, medium enterprises < 250 employees, ≤ EUR 50 million turnover or ≤ EUR 43 million balance sheet total
Sector (NACE)	50.10 - Sea and coastal passenger water transport	

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities? Yes

Financial data	**Reference period**	01/01/2021 –	31/12/2021
	Staff headcount [in annual work units (AWU)]		99.0
	Employees [in AWU]		99.0
	Persons working for the organisation being subordinated to it and considered to be employees under national law [in AWU]		0.0
	Owner-managers [in AWU]		0.0
	Partners engaged in a regular activity in the organisation and benefiting from financial advantages from the organisation [in AWU]		0.0
	Annual turnover [in EUR]		7,961,192.00
	Annual balance sheet total [in EUR]		64,142,640.87
	Operating profit [in EUR]		1,390,685.56

Role of the partner organisation in this project:

Saarte Liinid (SL) is a private company who operates 20 ports in the eastern Baltic Sea region. SL is a user partner for Piloting the Coastal Dynamic Digital Twin service (O.2.2) in selected port (Heltermaa). In the late phase of the project the piloted service will be transferred to 6 ports operated by SL (A.3.4).
In order to achieve effective transfer of the solutions to SL ports the partner will contribute to the following activities:
- data consolidation (A.1.1) as data collected by user will be integrated into the tailored Coastal DT service.
- providing user requirements (A.1.2) for effective co-design of tailored port monitoring service (O.2.2.)
- representative of SL will participate in Advisory Board (A.3.3.)

728 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

○ Yes ○ No

2.2 Project Partner Details - Partner 9

LP/PP	Project Partner		
Partner Status	Active		
	Active from	22/09/2022	**Inactive from**

Partner name:

Organisation in original language	Eckerö Line Ab Oy
	17 / 250 characters
Organisation in English	Eckerö Line Ab Oy
	17 / 250 characters
Department in original language	-
	1 / 250 characters
Department in English	-
	1 / 250 characters

Partner location and website:

Address	Torggatan 2 (11 / 250 characters)	**Country**	Finland
Postal Code	22101 (5 / 250 characters)	**NUTS1 code**	Åland
Town	Mariehamn (9 / 250 characters)	**NUTS2 code**	Åland
Website	www.eckeroline.fi/ (18 / 100 characters)	**NUTS3 code**	Åland

Partner ID:

Organisation ID type	Business Identity Code (Y-tunnus)
Organisation ID	0967682-4
VAT Number Format	FI + 8 digits
VAT Number	**N/A** ☐ FI04984000 (10 / 50 characters)
PIC	n/a (3 / 9 characters)

Partner type:

Legal status	b) Private	
Type of partner	Large enterprise	≥ 250 employees
Sector (NACE)	50.10 - Sea and coastal passenger water transport	

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities? Yes

Financial data

Reference period	01/01/2021 –	31/12/2021
Staff headcount [in annual work units (AWU)]		11,599.0
Employees [in AWU]		872.0
Persons working for the organisation being subordinated to it and considered to be employees under national law [in AWU]		727.0
Owner-managers [in AWU]		10,000.0
Partners engaged in a regular activity in the organisation and benefiting from financial advantages from the organisation [in AWU]		0.0
Annual turnover [in EUR]		122,856,000.00
Annual balance sheet total [in EUR]		218,915,000.00
Operating profit [in EUR]		-30,626,000.00

Role of the partner organisation in this project:

The Eckerö Line is the user partner of Offshore Dynamic Digital Twin Services (O.2.1) and participates in the activities that lead to successful implementation of the service. The company refines user needs for developing new weather and sea state services for fairway section of sea transport (A.1.2). Together with application developers it defines and/or iterates specifications for the service content and related issues with user needs and user-experience. It will act as pilot user providing feedback and tuning of the final application primarily for smartphones while also building capabilities to bring new features to desktop services (O.2.1). It will take part in project meetings including meetings with developers and the project partners, and perform the administrative and reporting tasks related to the project.

826 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

○ Yes ○ No

2.2 Project Partner Details - Partner 10

LP/PP	Project Partner		
Partner Status	Active		
Active from	22/09/2022	**Inactive from**	

Partner name:

Organisation in original language	Väylävirasto (12 / 250 characters)
Organisation in English	Finnish Transport Infrastructure Agency (40 / 250 characters)
Department in original language	Talvimerenkulku (24 / 250 characters)
Department in English	Finland's winter navigation (35 / 250 characters)

Partner location and website:

Address	Opastinsilta 12A, 00520 Helsinki (32 / 250 characters)	**Country**	Finland
Postal Code	PO.BOX 33 (18 / 250 characters)	**NUTS1 code**	Manner-Suomi
Town	Helsinki (8 / 250 characters)	**NUTS2 code**	Helsinki-Uusimaa
Website	vayla.fi/en (20 / 100 characters)	**NUTS3 code**	Helsinki-Uusimaa

Partner ID:

Organisation ID type	Business Identity Code (Y-tunnus)
Organisation ID	1010547-1
VAT Number Format	FI + 8 digits
VAT Number	N/A ☐ FI10105471 (10 / 50 characters)
PIC	986244494 (9 / 9 characters)

Partner type:

Legal status	a) Public	
Type of partner	National public authority	Ministry, etc.
Sector (NACE)	84.13 - Regulation of and contribution to more efficient operation of businesses	

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities? No

Role of the partner organisation in this project:

Finnish Transport Infrastructure Agency will be the prime user of the Brash Ice Service which is a part of Dynamic Offshore Digital Twin service (O.2.1) and participates in the activities that lead to successful implementation of the service. Partner will participate in testing the service and provide feedback on it. The Agency refines user needs for developing new Brash Ice Services for winter navigation (A.1.2). Together with application developers the Agency defines and/or iterates specifications for the service content and related issues with user needs and user-experience. It will act as pilot user providing feedback and co-designing the final application. It will take part in project meetings including meetings with developers and the project partners, and perform the administrative and reporting tasks related to the project.

843 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

○ Yes ○ No

2.2 Project Partner Details - Partner 11

LP/PP Project Partner

Partner Status Active

Active from 22/09/2022 **Inactive from**

Partner name:

Organisation in original language Instytut Budownictwa Wodnego Polskiej Akademii Nauk

51 / 250 characters

Organisation in English Institute of Hydro-Engineering of the Polish Academy of Sciences

64 / 250 characters

Department in original language Zakład Mechaniki i Inżynierii Brzegów

37 / 250 characters

Department in English Department of Coastal Dynamics and Engineering

46 / 250 characters

Partner location and website:

Address 7 Kościerska

12 / 250 characters

Postal Code 80-328

6 / 250 characters

Town Gdańsk

6 / 250 characters

Website www.ibwpan.gda.pl

17 / 100 characters

Country Poland

NUTS1 code Makroregion północny

NUTS2 code Pomorskie

NUTS3 code Gdański

Partner ID:

Organisation ID type	Tax identification number (NIP)
Organisation ID	5840902434
VAT Number Format	PL + 10 digits
VAT Number	N/A ☐ PL5840902434 (12 / 50 characters)
PIC	994505887 (9 / 9 characters)

Partner type:

Legal status	a) Public	
Type of partner	Higher education and research instituti	University faculty, college, research institution, RTD facility, research cluster, etc.
Sector (NACE)	72.19 - Other research and experimental development on natural sciences and engineering	

Partner financial data:

Is your organisation entitled to recover VAT related to the EU funded project activities? No

Role of the partner organisation in this project:

Institute of Hydro-Engineering of the Polish Academy of Sciences (IBW PAN) is a prime user partner of Static Digital Twin Service (O.2.3). IBW PAN will acquire, exchange, analyze and structure information from coastal evolution in the Southern Baltic Sea (A.1.1.). IBW PAN will communicate with the maritime authorities in the Southern Baltic Sea region to contribute to the consolidation of user requirements (A.1.2.). IBW PAN will co-design the Static Digital Twin Service (O.2.3) with the development partners of the project and provide feedback on user experience. Also the institute will participate in transferring the Static Digital Twin solution to new users (maritime authorities, planning agencies) (A.3.4.).

721 / 1,000 characters

Has this organisation ever been a partner in the project(s) implemented in the Interreg Baltic Sea Region Programme?

◉ Yes ○ No

State aid relevance

For the partner type selected, the Programme sees a medium to high risk for implementing State aid relevant activities. If the partner is of the opinion that its activities are not State aid relevant, it can ask the MA/JS for a plausibility check on the State aid relevance. Does the partner want to do this?

○ Yes ◉ No

2.3 Associated Organisation Details - AO 1

Associated organisation name and type:

Organisation in original language
Keskkonnaagentuur
17 / 250 characters

Organisation in English
Environment Agency
18 / 250 characters

Department in original language
Ilmaprognooside osakond
23 / 250 characters

Department in English
Weather Forecasting Department
30 / 250 characters

Legal status
a) Public

Type of associated organisation
Sectoral agency

Local or regional development agency, environmental agency, energy agency, employment agency, etc.

Associated organisation location and website:

Address
Mustamäe tee 33
15 / 250 characters

Country
Estonia

Postal Code
10616
5 / 250 characters

Town
Tallinn
7 / 250 characters

Website
keskkonnaagentuur.ee/
www.ilmateenistus.ee/
46 / 100 characters

Role of the associated organisation in this project:

Estonian Environment Agency (ESTEA) is a target group reperesentative who will benefit from the project outputs. ESTEA will provide input for consolidation of user requirements (A.1.2) for the Offshore Dynamic Digital Twin solution (O.2.1.) with the focus on navigation and brash ice services. Likewise the new information products and services developed (wave measurements/forecasts, brash ice information, etc) within the project will be displayed by ESTEA (official weather information provider in Estonia, ILM+ mobile app) once they meet the requirements (incl. product quality, data formats) given by ESTEA. The representatives of ESTEA will participate in project meetings/events (including Advisory Board A.3.3.) organized and financed by the project.

758 / 1,000 characters

2.3 Associated Organisation Details - AO 2

Associated organisation name and type:

Organisation in original language
Transpordiamet
14 / 250 characters

Organisation in English
Transport Administration
24 / 250 characters

Department in original language
Liikuvuse planeerimise teenistus
32 / 250 characters

Department in English
Mobility Planning Division
26 / 250 characters

Legal status
a) Public

Type of associated organisation
Sectoral agency

Local or regional development agency, environmental agency, energy agency, employment agency, etc.

Associated organisation location and website:

Address
Valge 4
7 / 250 characters

Country
Estonia

Postal Code
11413
5 / 250 characters

Town
Tallinn
7 / 250 characters

Website
www.transpordiamet.ee/
22 / 100 characters

Role of the associated organisation in this project:

Estonian Transport Administration (TRAM) is a target group representative who will benefit from the project outputs. TRAM will provide user requirements (A.1.2) for the co-design of the Offsore and Coastal Dynamic DT services (O.2.1., O.2.2). Also the Agency will participate in solution transfer (A.3.4) as receiving party. The new data products and services (wave, sea ice information, wind forecast) developed within the project will be used by TRAM (official national marine traffic authority in Estonia) once they meet the requirements (incl. product quality, data formats) given by TRAM. The representatives of TRAM will participate in project meetings/events organized and financed by the Project.

705 / 1,000 characters

2.3 Associated Organisation Details - AO 3

Associated organisation name and type:

Organisation in original language
Liepājas speciālā ekonomiskā zona
33 / 250 characters

Organisation in English
Liepaja Special Economic Zone
29 / 250 characters

Department in original language
Ostas kapteiņa dienests
23 / 250 characters

Department in English
Harbour master service
22 / 250 characters

Legal status
a) Public

Type of associated organisation
Infrastructure and public service provi
Public transport, utility company (water supply, electricity supply, sewage, gas, waste collection, airport, port, railway, etc.)

Associated organisation location and website:

Address
Fēniksa iela 4
14 / 250 characters

Country
Latvia

Postal Code
LV3401
6 / 250 characters

Town
Liepāja
8 / 250 characters

Website
liepaja-sez.lv
14 / 100 characters

Role of the associated organisation in this project:

Liepaja Special Economic Zone (Harbour master) is a user organisation which will provide input for consolidating user requirements (A.1.2), co-designing Coastal Digital Twin Service (O.2.2) and upscaling the developed service. Harbour master service of Liepāja port will provide bathymetry survey, port configuration files, measurements at its buoy (wave, salinity, current, wind, temperature, including historic data) and end-user's feedback (A.1.1, A.1.2).
459 / 1,000 characters

2.3 Associated Organisation Details - AO 4

Associated organisation name and type:

Organisation in original language
Skultes ostas pārvalde
22 / 250 characters

Organisation in English
Skulte port authority
21 / 250 characters

Department in original language
-
1 / 250 characters

Department in English
-
1 / 250 characters

Legal status
a) Public

Type of associated organisation
Infrastructure and public service provi
Public transport, utility company (water supply, electricity supply, sewage, gas, waste collection, airport, port, railway, etc.)

Associated organisation location and website:

Address
Upes iela 41
12 / 250 characters

Country
Latvia

Postal Code
LV2161
6 / 250 characters

Town
Saulkrasti
10 / 250 characters

Website
www.skulteport.lv
17 / 100 characters

Role of the associated organisation in this project:

Associated organisation will provide input in defining user requirements (A.1.2), co-designing of Coastal Dynamic Digital Twin services (O.2.2) and uptake of the service (A.3.4). Skulte port authority will provide bathymetry survey, port configuration files, historic wave measurements, measurements at its buoy (A.1.1).
321 / 1,000 characters

2.3 Associated Organisation Details - AO 5

Associated organisation name and type:

Organisation in original language
Baltic Operational Oceanographic System
39 / 250 characters

Organisation in English
Baltic Operational Oceanographic System
39 / 250 characters

Department in original language
-
1 / 250 characters

Department in English
-
1 / 250 characters

Legal status
a) Public

Type of associated organisation
Interest group
Trade union, foundation, charity, voluntary association, club, etc. other than NGOs

Associated organisation location and website:

Address
Lyngbyvej 100
13 / 250 characters

Country
Denmark

Postal Code
DK-2100
7 / 250 characters

Town
Copenhagen
10 / 250 characters

Website
www.boos.org/
13 / 100 characters

Role of the associated organisation in this project:

The Digital Twin services (O.2.1, O.2.2, O.2.3) will be promoted by the regional network Baltic Operational Oceanographic System (BOOS). Thus BOOS will contribute to transfer of solutions (A.3.4).
196 / 1,000 characters

2.3 Associated Organisation Details - AO 6

Associated organisation name and type:

Organisation in original language: Majandus- ja Kommunikatsiooniministeerium (41 / 250 characters)

Organisation in English: Ministry of Economic Affairs and Communications (47 / 250 characters)

Department in original language: Majandusarengu osakond (22 / 250 characters)

Department in English: Department of economic develpment (33 / 250 characters)

Legal status: a) Public

Type of associated organisation: National public authority — Ministry, etc.

Associated organisation location and website:

Address: Suur-Ameerika 1 (15 / 250 characters)

Country: Estonia

Postal Code: 10122 (5 / 250 characters)

Town: Tallinn (7 / 250 characters)

Website: www.mkm.ee/en (13 / 100 characters)

Role of the associated organisation in this project:

Ministry of Economic Affairs and Communications (MKM) is a Policy Area Innovation coordinator to which current project contributes. Also the Ministry the national body for coordinating the policy in transport sector, including marine transport. The Ministry will participate in Advisory Board activities (A.3.3) and have a guiding role to assure that the project outputs would contribute to the PA INNOVATION and SAFE activities.

429 / 1,000 characters

2.3 Associated Organisation Details - AO 7

Associated organisation name and type:

Organisation in original language: Finnlines Oyj (13 / 250 characters)

Organisation in English: Finnlines Oyj (13 / 250 characters)

Department in original language: Finnlines Plc., Ship Management (31 / 250 characters)

Department in English: Finnlines Plc., Ship Management (31 / 250 characters)

Legal status: b) Private

Type of associated organisation: Large enterprise — ≥ 250 employees

Associated organisation location and website:

Address: Komentosilta 1 (14 / 250 characters)

Country: Finland

Postal Code: 00980 (6 / 250 characters)

Town: Helsinki (8 / 250 characters)

Website: www.finnlines.com (17 / 100 characters)

Role of the associated organisation in this project:

Finnlines is a user of the project outputs. The company refines user needs for co-developing new weather and sea state services for fairway section of sea transport (A.1.2.). Together with application developers it defines and/or iterates specifications for the service content and related issues with user needs and user-experience (O.2.1, O.2.2). It will act as prime user providing feedback and tuning of the final application. It will take part in project meetings including meetings with developers and the project partners.

529 / 1,000 characters

3. Relevance

3.1 Context and challenge

Plethora of marine data is provided on different levels: EU (Copernicus, EMODnet), Baltic Sea regional (VASAB, HELCOM) and national. However, the systematic exploitation of the data in tailored environmental monitoring and forecasting services by end users (ports, shipping companies, renewable energy providers, aquafarmers, planning and management authorities etc) is limited and the full potential of the available data is not exploited.

The challenge can be described as overcoming the "data-rich-information-poor" situation. Our approach is to synthesize the traditional map layers (e.g. wind energy potential, habitat maps, mean met-ocean parameters) and operational forecasts (wind speed, sea level, wave height, surface temperature) to satisfy the new information needs of Blue Economy. New needs are emerging for renewable energy sector (wind turbine blade icing, seawater heat and wave energy potential, subsurface currents), planning agencies (e.g. sediment transport patterns), coastal operations (ports, LNG terminals) and offshore activities (navigation, wind farming). A pressing need is for brash ice monitoring and user friendly fairway navigation information to improve route planning and safety of winter navigation while increasing financial benefits and reducing environmental impact.

Currently entities have to solve their problem independently by turning to national service provider (e.g. Core Partners of current project). A critical mass of such challenges have emerged and they all have similar root cause, inefficient retrieval of user-friendly and relevant information from existing data sources, and thus a unified solution. Via transnational cooperation between users of new met-ocean services and providers of the services a set of data layers (Static Digital Twin) and operational services (Coastal and Offshore Digital Twin) will be implemented in the project to have a transnational cost effective, transferrable and holistic solutions for multiple Target Groups.

2,000 / 2,000 characters

3.2 Transnational value of the project

The project partnership and selection of pilot users supports development of innovative and sustainable marine monitoring/forecasting/management services. Moreover, the transnational co-operation (project partners are involved in various EU initiatives) assures technological compatibility of the developed services with the ongoing and future EU initiatives on sustainable use of marine resources - Copernicus, Destination Earth, Digital Twin of the Ocean.

The transnational cooperation is required to consolidate the national sectoral competences and high resolution data sources (input for 3 Digital Twins solution) for the benefit of the entire Baltic Sea region. The demand for Digital Twin services exists in multiple countries. The prepared Digital Twin includes sub-solutions for navigation support, brash ice monitoring, renewable energy (wind, seawater heat), port services, spatial planning (coastal erosion, wind farm siting). The leading competences in the Baltic Sea region are shared between participating countries. The national leading institutions of the (sub-)solutions in Denmark, Finland, Estonia Latvia and Poland are included as project partners to assure effective transfer of the state-of-the-art solution across boarders and sectors. Each participating country is a service co-developer and -provider for at least one (sub-)solution and recipient (to whom the service is transferred) of two or more (sub-)solutions. To assure that the different user requirements (public vs. private, ports in different countries, shipping company vs. transport administrator, planning agency vs. renewable energy developer) are considered the user partners (prime users, associated partners) from different sectors and countries are included. The diverse representation of engaged Target Groups increases the durability of the transferred solutions after project life time as the different aspects of the solutions are tested and validated in different countries during the project.

1,994 / 2,000 characters

3.3 Target groups

Target group	Sector and geographical coverage	Its role and needs
Small and medium enterprise	The main representatives of this target group are (1) ports and their sub-contractors as well as (2) companies dealing with development in coastal areas (real estate, renewable energy, transport). Relevant SMEs in all programme area countries are targeted. Companies from Estonia, Latvia and Finland have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Organizations. 431 / 500 characters	SMEs are the users of project outputs - Dynamic and Static Digital Twin Solutions. SMEs have a large potential in uptake of tailored marine monitoring/forecasting services as the usage of existing marine data services is complicated. For example, cost-effective and safe operations at ports requires more effective use of met-ocean data. Dynamic SMEs have identified the need for novel data services (e.g. improved local marine forecast) and data layers (e.g. energy potential of seawater temperature, relevant marine data layers for LNG terminal development). Having the value-added map layers would improve their daily activities. Likewise, the improved operational marine forecast would increase winter navigation safety near ports while increasing economic benefits. SMEs will have to provide user requirements for the project so that the innovative project outputs would answer to the sectoral needs and could be transferred to multiple SMEs (different ports) across Baltic Sea region. 990 / 1,000 characters

Target group	Sector and geographical coverage	Its role and needs
Large enterprise	The target group includes offshore wind farms (operators/developers), large ports, shipping companies. Companies in all programme area countries are targeted. Enterprises from Denmark, Finland and Latvia have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Partners 329 / 500 characters	Large enterprises (wind farm sector, shipping companies) are the users of the project outputs (Static Digital Twin Solution, Offshore Digital Twin Solution). The target group has identified the need (1) to improve winter navigation services, (2) to improved meteo-marine forecast service for wind farm maintenance activities and (3) to have new risk maps (rotor blade icing risk) for wind farm siting. The basic data for such services is available, however the desired value-added tailored services and map layers are not existing. The target group will communicate the specific requirements to the Project which will be the basis for co-designing the tailored Offshore Digital Twin components and Static Digital Twin map layers for the target group. 752 / 1,000 characters
Sectoral agency	The target group includes environmental, meteorological and transport agencies/institutes. Agencies in all programme area countries are targeted. Agencies from Poland, Estonia, Finland, Denmark and Latvia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the National public authorities because the legal status of such institutions is different in various countries. 480 / 500 characters	The agencies have multiple roles in the project. They are involved (1) in capacity building and development of the solutions as project partners; (2) in piloting the solutions as users of some of the services; (3) acting as a tailored service provider for contractual users. The agencies (together with other project core partners) will also assure the durability of the implemented solutions as it is their daily responsibility to provide value-added information products and services to wider public and new users. 517 / 1,000 characters
Infrastructure and public service provid	The target group includes transport sector authorities (port operators, vessel traffic authorities, waterway management authorities). All programme area countries are targeted. Users from Poland, Denmark, Estonia, Latvia and Finland have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. 357 / 500 characters	The target group are the users of the project outputs (Offshore Dynamic Digital Twin, Coastal Dynamic Digital Twin). The target group has identified needs (1) to improve winter navigation services and (2) to use more efficiently the existing met-ocean data (e.g. improved local marine forecast), which would lead to cost-effective and safe operations at ports. The basic data for such services is available, however the desired value-added tailored services are not existing. Infrastructure and public service providers will have to specify the user requirements for the project so that the innovative project outputs would answer to the sectoral needs and could be transferred to multiple actors across Baltic Sea region. 723 / 1,000 characters

Target group	Sector and geographical coverage	Its role and needs
National public authority	The target group includes marine monitoring and forecasting service providers (meteorological services) in Finland and Estonia. Entities in all programme area countries are targeted. Authorities from Finland and Estonia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the Sectoral Agencies because the legal status of such institutions is different in	The National public authorities have multiple roles in the project. They are involved (1) in capacity building and development of the solutions as project partners; (2) in piloting the solutions as users of some of the services; (3) acting as a tailored service provider for contractual users. The agencies (together with other project core partners) will also assure the durability of the implemented solutions as it is their daily responsibility to provide value-added users.

3.4 Project objective

Your project objective should contribute to:

Blue economy

The general objective of the project is to advance a digital framework to increase the efficient use of available meteorological and oceanographic data in tailored innovative digital solutions to improve safety at sea (winter navigation solution, preparedness and response to accidents) and to improve planning activities in coastal regions for multiple target groups.

The efficient use of available met-ocean data in daily activities enables to reduce operating costs of the target groups while increasing safety. As the needs of different target groups are overlapping the 3 common Digital Twins for different users can be implemented using innovative digital solutions for delivering the relevant data to the Blue Economy sectors.
Current project proposes three solutions (Digital Twins) for valorizing the existing high resolution 4D marine data (mainly physical parameters but also meteorological and biogeochemical data to some extent) to improve the tailored forecasting and monitoring services for Blue Economy sector which will result in safe navigation and eco-efficient use of marine resources.

Specifically, current project aims at:
(1) implementing 3 Digital Twin services (Coastal, Offshore and Static) according to the requirements of Blue Economy sectors;
(2) providing new missing information for economic operators of Blue Economy sectors (renewable energy, LNG etc.) by providing relevant, accurate and value-added map layers;.
(3) improving the services of national agencies responsible for planning activities by providing new value-added map layers;
(4) providing timely and accurate operational information to improve safety of navigation, offshore and coastal operations;
(5) increasing the uptake of the marine data services across the Baltic Sea.

The capacity building and solution transfer of project outputs results in improved core activities (public entities) as well as in increased financial benefits (private entities) of the actors in the Blue Economy sector.

1,999 / 2,000 characters

3.5 Project's contribution to the EU Strategy for the Baltic Sea Region

Please indicate whether your project contributes to the implementation of the Action Plan of the EU Strategy for the Baltic Sea Region (EUSBSR).

(•) Yes ( ) No

Please select which Policy Area of the EUSBSR your project contributes to most.

PA Safe

Please list the action of this Policy Area that your project contributes to and explain how.

Action 2: Developing winter navigation to meet future challenges: Offshore Dynamic Digital Twin solution will be developed in cooperation between transport authorities, weather services and research institutions to provide brash ice monitoring service to shipping companies which is relevant for the safe winter navigation. Currently there are no such solutions available according to EUSBSR.

Action 3: To be a forerunner in digitalisation and automation (maritime traffic management): The improved met-ocean information (new content, higher resolution) will be made available for the innovative tailored e-navigation services of the target groups (ports, shipping companies, national maritime authorities, sea pilots etc.) to improve the safety at sea via timely and relevant information. The new and improved services will enhance operations both on-board ships and for shore based facilities (ports).

Action 4: Ensure accurate preparedness and response for maritime accidents and security issues. The tailored Digital Twin services developed in the project will be used by target groups to improved co-operation and sharing of real-time information in order to increase Maritime Situational Awareness among authorities and other stakeholders in order to make SAR-operations more efficient. The improved situational awareness among target groups (incl. maritime authorities) will also improve the coordination of crisis management capacities and resources.

1,463 / 1,500 characters

If applicable, please describe which other Policy Areas of the EUSBSR your project contributes to and how.

Project solutions contribute to digitalization and data exploitation, covered by 5 policy areas.
PA Inno: Act.1 - Challenge-driven innovation: Answering to the emerging user needs (new map layers, improved forecast accuracy) via intensified Big-Data uptake in innovative Digital Twin services for transport safety and economic growth.
PA Inno: Act.2 - Digital innovation and transformation: Advancing digital framework for extracting tailored information from Big Marine Data.
PA Inno: Act.3 - Co-creative innovation: Cross-border R&D cooperation for co designing innovative marine monitoring and forecasting solutions.
PA Transport: Act.3 - Facilitate innovative technologies & solutions in the Baltic Sea region: Implementation of novel data processing solutions in daily practices.
PA Energy: Act.4 - Increasing the share of renewable energy including marine renewable energy: Providing marine renewable energy potential and risk maps (seawater heat, icing risk of rotor blades).
PA Secure : Act.1 - Build capacities for prevention, preparedness, response and recovery in emergency and crisis management: Capacity building of meteoservices and Blue Economy sectors (ports) by improving the operational forecast accuracy.
PA Spatial Planning: Act.2 - Ensuring coherent maritime spatial plans throughout the Baltic Sea: New information for spatial planning by providing new high resolution map layers (rotor icing risk, energy potential of waves and seawater heat) which are currently missing.

1,499 / 1,500 characters

3.6 Other political and strategic background of the project

Strategic documents

The project follows EU Communication "Transforming the EU's Blue Economy for a Sustainable Future" (2021) which states that reliable, high-quality and harmonised ocean data are the prerequisite for a sustainable transformation of the blue economy, enabling industry, public authorities and civil society to make informed decisions. The jobs supported by better information are in the marine environment (e.g. shipping, energy generation) and on land (e.g. ports, shipyards, land-based aquaculture).

498 / 500 characters

EU Communication "The European Green Deal" (2019) sets up multiple actions for achieving climate-neutral development. Among the actions, it is important to manage maritime space more sustainably, notably to help tap into the growing potential of offshore renewable energy. In a wider context, a sustainable blue economy is essential to achieving the objectives of the European Green Deal. Our project is in agreement with these goals and actions.

446 / 500 characters

Our project - Emerging marine Digital Twin Services for key sectors of the Blue Economy - is a direct implementation of the EU Communication "Shaping Europe's digital future" (2020). Its key action "Destination Earth" is an initiative to develop a high precision digital model of Earth (a “Digital Twin of the Earth”) that would improve Europe’s environmental prediction and crisis management capabilities. The project is applied for the Baltic Sea and is a coherent sub-section of the above action.

500 / 500 characters

3.7 Seed money support

Please indicate whether your project is based on a seed money project implemented in the Interreg Baltic Sea Region Programme 2014-2020.

○ Yes ◉ No

3.8 Other projects: use of results and planned cooperation

Full name of the project	Funding Source	Use of the project outcomes and/or planned cooperation
Copernicus Marine Environment Monitoring Service: BAL MFC & Sea Ice TAC 71 / 200 characters	European Commission, Mercator Ocean 35 / 200 characters	Use of Copernicus project outcomes: - thematic 4D input data from BALMFC: wave hindcast, ocean-ice reanalysis - sea ice data from Sea ICE TAC: reprocessed ice concentration and thickness data Planned co-operation: - To inform CMEMS about the BlueDataServices user needs and feedbacks on using CMEMS products (cooperation with BAL MFC and Sea Ice TAC), so that these user needs may be considered in the future CMEMS service evolvement. 436 / 1,000 characters

Full name of the project	Funding Source	Use of the project outcomes and/or planned cooperation
EMODnet 7 / 200 characters	DG-MARE 7 / 200 characters	Use of EMODnet project outcomes: - thematic input data from EMODnet Physics, EMODnet Habitat, EMODnet Geology: Baltic Sea in-situ physical, habitat, geological observations; - thematic input data from EMODnet Bathymetry: Baltic Sea bathymetry; - thematic input data from EMODnet Human activity: Baltic Sea human activities Planned cooperation: 1. To inform EMODnet about the BlueDataServices needs on observations, and our feedback on using EMODnet observations. 2. New observation data, especially geological data, if allowed, will contribute to EMODnet. 558 / 1,000 characters
Klimaatlas & National Climate Research Centre (NCKF) 53 / 200 characters	Ministry of Energy and Climate, Denmark 39 / 200 characters	Use of project outcomes: - High resolution ocean (0.9 km) hindcast and climate projections in Baltic-North Sea transition waters - Climate service products for Danish waters. - Energy-weather forecast (now still under NCKF development). - Existing Klimaatlas web service portal design. Planned cooperation: 1. Join NCKF/Klimaatlas national climate user meetings. 2. Share BlueDataServices tailored products with Klimaatlas and NCKF so that Danish national climate service (marine component) will be benefited from BlueDataServices project. 543 / 1,000 characters
Land-sea interactions advancing BlueGrowth in Baltic Sea coastal areas 70 / 200 characters	Interreg Baltic Sea Region 26 / 200 characters	Use of project outcomes: -thematic input data on Human activities in coastal areas 82 / 1,000 characters
OceanChallenge4Africa hackathon, powered by the Copernicus Marine Service. 75 / 200 characters	EU's Copernicus Marine Service, Segal Family Foundation. 56 / 200 characters	The user engagement methods for technology/solution transfer applied in the OceanChallenge4Africa hackathon will also be implemented in the BlueDataServices project. 166 / 1,000 characters

3.10 Horizontal principles

Horizontal principles	Projects's direct impact
Sustainable development	positive
Non-discrimination including accessibility	positive
Equality between men and women	positive

4. Management

Allocated budget 10%

4.1 Project management

☑ **Please confirm that the lead partner and all project partners will comply with the rules for the project management as described in the Programme Manual.**

If relevant, please indicate any other important aspects of the project management, e.g. external entity supporting the lead partner in the management of the project, advisory board, steering committee, any other relevant working groups, etc.

Management Board (representative from each project partner) will be the main working body to help the lead partner in effective project implementation. Lead partner has the necessary in-house administrative units (Finance Office, Marketing and Communications Office, Technology Transfer Office) to support project management.
Advisory Board (members from Target Groups and Associated Partners) will guide the project team from the user point of view and help to communicate the project outcomes.

498 / 500 characters

4.2 Project financial management

☑ **Please confirm that the lead partner and all project partners will comply with the rules for the financial management and control as described in the Programme Manual.**

If relevant, please indicate any other important aspects of the financial management, e.g. external entity supporting the lead partner, positions planned for financial management, involvement of special financial experts (e.g. for public procurement), etc.

Overall financial management will be the responsibility of lead partner who has the necessary in-house administrative units under Finance Office: Project Accounting and Reporting Division, Budget and Analysis division, Procurement Division. In addition to the support of relevant in-house units funds have been allocated in the project budget for project managers personnel costs. Project manager will coordinate administrative, financial and communication activities.

468 / 500 characters

4.3 Input to Programme communication

☑ **Please confirm that you are aware of the obligatory inputs to Programme communication that must be submitted along the pre-defined progress reports, as described in the Programme Manual.**

If relevant, please describe other important aspects of project communication that you plan to introduce, e.g. a communication plan, opening and closing events, social media channel(s) etc.

The general framework for communication activities has been described under WP1 (A.1.2 Communication Strategy) and WP3. Each partner will host at least 1 international communication event. A detailed Communication Strategy for promoting project solution will be worked out during the 1st reporting period. The nature (physical, on-line, forum, workshop, hackathon) as well as the location and time of each event will be indicated in the Communication Strategy.

462 / 500 characters

4.4 Cooperation criteria

Please select the cooperation criteria that apply to your project. In your project you need to apply at least three cooperation criteria. Joint development and joint implementation are the obligatory ones you need to fulfill in your project.

Cooperation criteria	
Joint Development	☑
Joint Implementation	☑
Joint Staffing	☑
Joint Financing	☑

5. Work Plan

Number	Work Package Name
1	WP1 Preparing solutions

Number	Group of Activity Name
1.1	Data consolidation for the solutions
1.2	User requirements and Communication Strategy
1.3	Development of high resolution Static Digital Twin for spatial planning and energy services
1.4	Development of Dynamic Digital Twin for Navigation and Port Services

Number	Work Package Name
2	WP2 Piloting and evaluating solutions

Number	Group of Activity Name
2.1	Piloting Offshore Dynamic Digital Twin Service: navigation, route planning
2.2	Piloting Coastal Dynamic Digital Twin Service: port operations and coastal activities
2.3	Piloting Static Digital Twin Service: coastal planning and renewable energy

Number	Work Package Name
3	Transferring solutions

Number	Group of Activity Name
3.1	Organizing events for user engagement
3.2	Hackathon for facilitating solution transfer to the target groups
3.3	Advisory Board recommendations
3.4	ICT support for transferring the solutions
3.5	Publications for promoting the solutions and engaging users

Work plan overview

Period:	1	2	3	4	5	6	Leader
WP.1: WP1 Preparing solutions							**PP4**
A.1.1: Data consolidation for the solutions							PP1
D.1.1: Data consolidation report		D					
A.1.2: User requirements and Communication Strategy							PP7
D.1.2: User requirements report, Communication Strategy document	D						
A.1.3: Development of high resolution Static Digital Twin for spatial planning and energy services							PP4
D.1.3: Static Digital Twin: datasets and map layers of climate variables for DT services		D	D				
A.1.4: Development of Dynamic Digital Twin for Navigation and Port Services							PP3
D.1.4: Dynamic Digital Twin: dataflows for DT services			D				
WP.2: WP2 Piloting and evaluating solutions							**PP3**
A.2.1: Piloting Offshore Dynamic Digital Twin Service: navigation, route planning							PP2
O.2.1: Dynamic Offshore Digital Twin Services					O		
A.2.2: Piloting Coastal Dynamic Digital Twin Service: port operations and coastal activities							PP1
O.2.2: Dynamic Coastal Digital Twin Services					O		
A.2.3: Piloting Static Digital Twin Service: coastal planning and renewable energy							PP5
O.2.3: Static Digital Twin Services					O		
WP.3: Transferring solutions							**PP1**
A.3.1: Organizing events for user engagement							PP7
D.3.1: Events which will result in reports of user engagement progress	D	D	D	D	D	D	
A.3.2: Hackathon for facilitating solution transfer to the target groups							PP6
D.3.2: Hackathon on the following topic: "Blue Data Services Hackathon"						D	
A.3.3: Advisory Board recommendations							PP1
D.3.3: Common recommendation of the Advisory Board meetings	D	D	D	D	D	D	
A.3.4: ICT support for transferring the solutions							PP1
D.3.4: Guide for sustainable DT solution transfer						D	
A.3.5: Publications for promoting the solutions and engaging users							PP2
D.3.5: Publications for promoting the solutions	D	D	D	D	D	D	

Outputs and deliverables overview

Code	Title	Description	Contribution to the output	Output/ deliverable contains an investment
D 1.1	Data consolidation report	The deliverable of this activity is a report for the project partners, which will contain the description of the data from transnational providers, link to data repository and a link to code repository. The holistic data inventory of scattered data is the bases for co-design of the Digital Twin services in WP2.	O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin	
D 1.2	User requirements report, Communication Strategy document	Report on user requirements and Communication Strategy. The document has 2 main sections: 1) Overview of user requirements and expectations regarding the prepared solutions. User requirements will be a set of recommendations for the development of Digital Twin solutions (O.2.1, O.2.2, O.2.3). 2) Communication Strategy document will provide answers to the following key areas: key message, audience, purpose, method, overview of owned tools, materials and channels, overview of the media relations, time schedule of the dissemination activities. The Communication Strategy will help to engage new users for the implemented solutions and will be input for WP3 Activities (A.3.1 Organizing event for user engagement and A.3.5 Publications for promoting the solutions and engaging users) as well as for piloting and evaluating of the solutions in WP2.	O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin	
D 1.3	Static Digital Twin: datasets and map layers of climate variables for DT services	This deliverable includes datasets of statistics and basic products for static services, especially on renewable energy and marine spatial planning, and a user manual report explaining the datasets and methods used to generate the products. The datasets will be generated according to the consolidated user requirements (A.1.2). The basic datasets will be used for the tailored services developed mainly in O.2.3, but also in O.2.1 and O.2.2. The Static DT provides high resolution static information on met-ocean conditions, wind resource, bathymetry and human activities in an integrated, user friendly way. The data portfolio includes met-ocean statistics (wind resource, spatial planning, seawater heat potential, extremes of ice and waves etc.) from newly available, high resolution reanalysis products and regional climate models (RCMs), representing present day atmospheric and oceanic conditions as well as future climate change indicators. The data sets and tailored products will provide information on average conditions as well as extreme conditions, required siting and design assessments. The data portfolio is complemented with static information on present day bathymetry, coastline, geology and human activities obtained through A.1.1. Product Manual: Report describing the data sets, derived tailored products and statistical methods used in the development of the Static Digital Twin (extreme value analysis method). Findings from the statistical analysis of present day climate re-analysis data sets and future climate projections are presented. The first version of the deliverable will be made available as datasets derived from existing products. The Static DT will be an updated deliverable in which new data generated by partners, can be included. This assures the durability of the Static DT (O.2.3.).	O.2.3 Static Digital Twin Services	
D 1.4	Dynamic Digital Twin: dataflows for DT services	Deliverable will be a report/description (protocol) of tailored dataflows that will be an input for Offshore and Coastal DT services (O.2.1, O.2.2) targeted at safe winter navigation as well as at safe and efficient port activities. The project Outputs will rely on the dataflows of met-ocean data described in the current deliverable.	O.2.1 Dynamic Offshore Digital Twin Services; O.2.2 Dynamic Coastal Digital Twin Services	
O 2.1	Dynamic Offshore Digital Twin Services	1) A new brash ice service concept and ice information content will be developed to offer improved ice services. The novel information on brash ice will be integrated into the tailored services. 2) The data from Fairway ToolBox service will be used for providing forecasting information along shipping routes to the tailored services. The combination of various parameters for specific locations, areas, and shipping routes will be visualized in a user-friendly environment. This information will be useful for decision support and for increasing navigation safety. 3) New mobile software with different end-user applications for smartphones will be developed. This includes development of the software (front- and back-end) together with establishing the dataflows and background IT systems. New capabilities enable similar contents to be published in customer portals, which will be tested in the systems of end-user project partners (input for activity A.3.4). For the public, a short link/QR code, which leads to the parameter-graph of a specific trip, on the passenger ticket makes the information easily available to the passengers. Same graphs could be used on port or vessel on-board displays. The extracted data as API service will be used for the hackathon (A.3.2) to transfer the solutions to new users. Additional need for such a solution is seen in planning tools, education and leisure activities.		

O 2.2	Dynamic Coastal Digital Twin Services	The output consists of dataflow from Dynamic DT to provide necessary information to the pilots to perform activities towards improving navigation safety and port operations. It will provide the user-specific data environment based on their initial requests of users (A.1.2). The user specific data will be a combination of forecast products from different providers (high-resolution models of core partners, public data centers, national monitoring centers, etc.). Both graphical (maps, time-series) and numerical outputs from the WP1 are made available for the pilot users in the requested data formats. The dataflow will be managed by the collection of software, which will be operationally used by pilot users to acquire the necessary tailored data products, it will be open source and stored in a public code repository (under the CC BY-SA copyright). The small example of Dynamic DT, necessary to run the solution for other regions and for different activities, will be stored in a public data repository. The data inventory to improve navigation safety includes the maps of waves and currents from the high-resolution models, brash ice risk prediction from forecast data and dataflow from route planning tool. For the safety and cost effectiveness of port operations detailed forecasts of the high-resolution wave and current conditions from Dynamic DT (A.1.4) are provided for specific port areas. The alert system for different activities is implemented to draw users attention if the conditions for daily activities are unfavorable. Upon availability forecasts are complemented with data from real-time observations from ships, moored port instruments and buoys. Transnational cooperation is necessary to make the services available for different regions where observations are available from the national authorities. The high-resolution coastline and bathymetry maps which are necessary for adjustments of high-resolution models in specific port areas are provided. The BlueDataServiceHUB can be adjusted to deliver dataflow for different regions of interest, thus serving a wide transnational value.		
O 2.3	Static Digital Twin Services	1) Static data mapping and download service for wind farm siting and marine spatial planning. The service includes a possibility to generate custom tailored maps and data products, like occurrence of marine heat and cold waves at different depth levels, combinations of high waves and high sea level etc. 2) Map layers describing the climate of met-ocean conditions will be produced containing seasonal aspects (wave parameters, dominating currents and their parameters, water exchange rates, statistical data on ice conditions, etc.). 3) New geological map layers describing threats and opportunities will be generated (data on geological investigations, shore types, class (and rate) of geological activity (erosion, accumulation, longshore transport) by using existing reports, raster orthophotos and Google Earth images, etc.). 4) Map layer containing metadata (links and descriptions leading to real data that is protected by copyright and cannot be shared directly), this data also includes the description of data type and quality. 5) Possible solution for citizen science to help promote the project and to ensure the durability of project results. For example, coastal erosion and accumulation events, new data on geological investigations, new features of shoreline defence can be reported.		
D 3.1	Events which will result in reports of user engagement progress	Each event will result in a report where the feedback and suggestions from Target Groups are listed, which will be input for the co-design of Digital Twin Services (outputs of WP2).	O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin	
D 3.2	Hackathon on the following topic: "Blue Data Services Hackathon"	The purpose of the hackathon is to support the implementation of the pilot services developed in the project WP2 in the use of end users. In order to transfer the pilot services into daily use, the needs of the end user are carefully considered and the prototyping during the hackathon is focused maximally towards meetings those needs by the participants and mentors (Target Groups of the project). The pilot DT sub-services that will be addressed are: - navigation, brash ice, route planning and renewable energy service based on Dynamic DT; - port operations and coastal activities service based on Dynamic DT; - coastal planning and renewable energy service based on Static DT. The prototyping of tailored services is centered around very hands-on mentoring, checkpoints and participants' teamwork where the pilot service developers and end users are dedicated mentors/experts for the team prototyping the adapted service and making sure it is moving in the needed direction. With three pilot service categories, the hackathon will aim to develop minimally three prototypes of customized pilot services ready for implementation for the end users. The hackathon format enables and encourages organisations cooperating across borders through the teamwork of participants, the work of mentors, the contribution of pilot services developers and end users during the hackathon, in the preparatory phase and pre-events, and follow-up activities in case of a transnational team ready to develop their prototype into a business. A final report outlining the hackathon results will be presented, including the following indicators: Number of participants engaged at the hackathon and pre-events and geographical reach Number of partner organisations engaged Prototypes developed with description of results Number of mentors engaged Jury Media outreach - publications, nr of audience reached.	O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin	
D 3.3	Common recommendation of the Advisory Board meetings	Each Advisory Board meeting (once per reporting period) will result in a report which includes unanimous recommendations and guidelines to project team for further developments.	O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin	

D 3.4	Guide for sustainable DT solution transfer	Each transferred TAILORED solution (at least 17 cases) will be described in the Guide. Guide includes description of software implementation, data formats, software and hardware requirements. User feedback and recommendations for new users are included in the description. All case descriptions are provided in a way that they are replicable in new locations with modified/tailored dataflows. THE DELIVERABLE SERVES AS A USER GUIDE FOR DURABLE SOLUTION IMPLEMENTATION IN NEW REGIONS.	O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin	
D 3.5	Publications for promoting the solutions	The deliverables of the activity are 10 publications which will be disseminated via different channels (social media, web sites, press releases).	O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin	

Work package 1

5.1 WP1 Preparing solutions

5.2 Aim of the work package

The aim of this work package is to prepare solutions to help address the identified challenge. You can either develop entirely new solutions or adapt existing solutions to the needs of your target groups. Prepare your solutions in a way that you can pilot them in Work Package 2. Consider how you involve your target groups in preparation of the solutions.
Organise your activities in up to five groups of activities to present the actions you plan to implement. Describe the deliverables and outputs as well as present the timeline.

5.3 Work package leader

Work package leader 1 PP 4 - Danish Meteorologiacal Institute

Work package leader 2 PP 1 - Tallinn University of Technology

5.4 Work package budget

Work package budget 35%

5.5 Target groups

	Target group	How do you plan to reach out to and engage the target group?
1	Small and medium enterprise The main representatives of this target group are (1) ports and their sub-contractors as well as (2) companies dealing with development in coastal areas (real estate, renewable energy, transport). Relevant SMEs in all programme area countries are targeted. Companies from Estonia, Latvia and Finland have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Organizations. 431 / 500 characters	The SME group includes both internal (user partners) and external users. Contacts to the user groups in partner countries will be established. Phone interview and/or online/face2face meetings, and a survey on user needs on data and service will be carried out to consolidate user requirements in A.1.1. and A.1.2. The user requirements will be incorporated in A.1.3. and A.1.4 for defining the Static and Dynamic DTs. Consolidation of user requirements is the bases for successful co-design of the project outputs (O.2.1, O.2.2, O.2.3.) 538 / 1,000 characters
2	Large enterprise The target group includes offshore wind farms (operators/developers), large ports, shipping companies. Companies in all programme area countries are targeted. Enterprises from Denmark, Finland and Latvia have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Partners 329 / 500 characters	This target group includes both internal (user partners) and external users. Contacts to the user groups in partner countries will be established. Phone interview, and/or online/face2face meetings, and a survey on user needs on data and service will be carried out to identify user requirements and data availability in A.1.1. and A.1.2. The user requirements will be incorporated in A.1.3. and A.1.4 for defining the Static and Dynamic DTs. Consolidation of user requirements is the bases for successful co-design of the project outputs (O.2.1, O.2.2, O.2.3.) 563 / 1,000 characters

	Target group	How do you plan to reach out to and engage the target group?
3	Sectoral agency The target group includes environmental, meteorological and transport agencies/institutes. Agencies in all programme area countries are targeted. Agencies from Poland, Estonia, Finland, Denmark and Latvia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the National public authorities because the legal status of such institutions is different in various countries. 480 / 500 characters	This target group includes both internal (user partners, associated organizations) and external users. For winter navigation authorities from partner countries, especially Finland as end users will be involved in service specification. Also the Estonian ice service will be contacted. For wind energy, Danish authority such as Energinet.dk will be contacted. For port management, port authorities in partner countries, especially Estonia and Latvia, will be contacted. For marine spatial planning, maritime agencies in partner countries, especially Poland and Germany, will be contacted. Phone interview, online and/or face2face meetings and a survey on user needs, on data availability and service quality will be carried out to specify user requirements in A.1.1. and A.1.2. The user requirements will be incorporated in A.1.3. and A.1.4 for defining the Static and Dynamic DTs. Consolidation of user requirements is the bases for successful co-design of the project outputs (O.2.1, O.2.2, O.2.3.) 1,000 / 1,000 characters
4	Infrastructure and public service provider The target group includes transport sector authorities (port operators, vessel traffic authorities, waterway management authorities). All programme area countries are targeted. Users from Poland, Denmark, Estonia, Latvia and Finland have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. 357 / 500 characters	Phone interview, online and/or face2face meetings and a survey on user expectations on data and service will be carried out to specify user requirements in A.1.1. and A.1.2. The user requirements will be incorporated in A.1.3. and A.1.4 for defining the Static and Dynamic DTs. Consolidation of user requirements is the bases for successful co-design of the project outputs (O.2.1, O.2.2, O.2.3.) 398 / 1,000 characters
5	National public authority The target group includes marine monitoring and forecasting service providers (meteorological services) in Finland and Estonia. Entities in all programme area countries are targeted. Authorities from Finland and Estonia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the Sectoral Agencies because the legal status of such institutions is different in various countries 485 / 500 characters	This targeted group, can be largely represented by BOOS (Baltic Sea Operational Oceanographic System), which consists of 23 operational marine agencies from Baltic countries. Non-Russian partners will be engaged on their user needs on the Static DT and Dynamic DT, through online survey and presentations in BOOS annual meeting, as well as interaction with BOOS coastal modelling working group and Multi-model Ensemble forecasting working group. 445 / 1,000 characters

5.6 Activities, deliverables, outputs and timeline

No.	Name
1.1	**Data consolidation for the solutions**
1.2	**User requirements and Communication Strategy**
1.3	**Development of high resolution Static Digital Twin for spatial planning and energy services**
1.4	**Development of Dynamic Digital Twin for Navigation and Port Services**

WP 1 Group of activities 1.1

5.6.1 Group of activities leader

Group of activities leader PP 1 - Tallinn University of Technology

A 1.1

5.6.2 Title of the group of activities

Data consolidation for the solutions

36 / 100 characters

5.6.3 Description of the group of activities

The main aim of this activity is to consolidate human activity, marine, atmospheric, geological and geophysical data from European, regional and national databases/services, which will form a bases to create the two alternative but complementary Digital Twin (DT) solutions (static, dynamic) for the Baltic Sea with high spatial resolution. Aim is also to enable new data sources for the services to be developed in this project. Currently the data is highly scattered and cannot be used in an efficient way to support Blue Economy and the development of DT's.

In order to help address the identified challenge, two solutions will be prepared. For the static DT we will download and aggregate into one secure cloud server all the measurements data available from coastal measurement stations and from offshore measurement stations. High resolution reanalysis and hindcast data for weather, ocean, wave and ice, from Copernicus Services and partners (FMI, DMI and TalTech) will be collected and consolidated. For the dynamic DT, we will create a (e.g., GitHub) repository, which contains the codes/scripts/API's to download automatically data from different data providers, including forecasts and observations. This ensures the dataflow to all project partners who can use the repository and the data in the Static DT.

Specifically, we will consolidate data of marine met-ocean (e.g., winds, humidity, temperature, salinity, currents, water level, waves, sea ice), coastal sea geology and different shore types (sandy-, cliff- , crystalline shore etc.) and human activity data (e.g., fairways, anchoring areas). This data is needed by the service providers and user partners. A large body of literature in the form of research papers and report exists for the different shore types and we will translate it to a more user friendly format, geolocate it and form a database. Observation data from existing services - EMODnet and partners, Copernicus, Geo-Seas - will also be integrated.

A large proportion of this data comes from the target groups themselves. The data will be collected from target groups websites and back-end servers. The activity is in a tight transnational setting, since data from 8 countries surrounding the Baltic Sea will be used. Two-way communication with data providers is necessary, because we will only consolidate data which has been gone through a quality check by the service provider.

2,422 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable ✔

D 1.1

Title of the deliverable

Data consolidation report

25 / 100 characters

Description of the deliverable

The deliverable of this activity is a report for the project partners, which will contain the description of the data from transnational providers, link to data repository and a link to code repository. The holistic data inventory of scattered data is the bases for co-design of the Digital Twin services in WP2.

313 / 2,000 characters

Which output does this deliverable contribute to?

O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin

98 / 100 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.1: WP1 Preparing solutions						
A.1.1: Data consolidation for the solutions						
D.1.1: Data consolidation report						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

WP 1 Group of activities 1.2

5.6.1 Group of activities leader

Group of activities leader PP 7 - Latvian Environment, Geology and Meteorology Centre

A 1.2

5.6.2 Title of the group of activities

User requirements and Communication Strategy

44 / 100 characters

5.6.3 Description of the group of activities

The group of activities has a twofold purposes: (1) consolidating the users requirements and expectations for increasing the exploitation of met-ocean data in their daily activities for increasing safety and economic benefits and (2) creating a Communication Strategy for engaging target groups for effective upscaling of the project outputs.

1) User requirements will be outlined in order to consolidate the specific knowledge gaps and emerging needs of regional target groups and to engage them in active service development. The work will be done in cooperation with project partners to address existing and possible new users of the Digital Twin solutions. The user requirements will serve as the basis for developing the 3 outputs of the project (thematic DT services in WP2).

2) The Communication Strategy is one of the key documents developed early (by M6) in the project. Communication Strategy document will provide answers to the following key areas: key messages, audience, purpose, methods, materials and channels, overview of the media relations, time schedule of the dissemination activities. The compilation of the Communication Strategy will be the responsibility of the Project Manager and it will be prepared in cooperation with projects partners. This activity ensures that methods, strategies, and in particular piloting and demonstration activities will be efficiently communicated and disseminated in a way that target groups become aware of these, to ensure the continuation of project activities.

End-user outreach will be achieved through (1) organic social media outreach, (2) social media ads campaigns, (3) engagement of relevant organisations, universities and companies as info sharing partners, (4) regular media outreach and (5) online media outreach through project partners and info sharing in partners online channels (websites, event calendar, newsletters, e-mail lists etc).

Social media channels will be set up to share news and stories about the project and boost its visibility. Besides news, the key insights, conclusions, and relevant takeaways will be extracted from the project's formal reports, then visually improved, and communicated.

Publishing press releases is an effective ways to communicate with the public. Project Communication specialist will prepare press releases in good cooperation with the Public Relations Departments of core partners, who are also responsible for launching them.

Project website is planned to be hosted by lead partner. The regularly updated website will contain the project's objectives, activities, news, events, actions, progress and results.

2,634 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable ✔

D 1.2

Title of the deliverable

User requirements report, Communication Strategy document

57 / 100 characters

Description of the deliverable

Report on user requirements and Communication Strategy. The document has 2 main sections:
1) Overview of user requirements and expectations regarding the prepared solutions. User requirements will be a set of recommendations for the development of Digital Twin solutions (O.2.1, O.2.2, O.2.3).
2) Communication Strategy document will provide answers to the following key areas: key message, audience, purpose, method, overview of owned tools, materials and channels, overview of the media relations, time schedule of the dissemination activities. The Communication Strategy will help to engage new users for the implemented solutions and will be input for WP3 Activities (A.3.1 Organizing event for user engagement and A.3.5 Publications for promoting the solutions and engaging users) as well as for piloting and evaluating of the solutions in WP2.

849 / 2,000 characters

Which output does this deliverable contribute to?

O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin

98 / 100 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.1: WP1 Preparing solutions						
A.1.2: User requirements and Communication Strategy						
D.1.2: User requirements report, Communication Strategy document						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

WP 1 Group of activities 1.3

5.6.1 Group of activities leader

Group of activities leader PP 4 - Danish Meteorologiacal Institute

A 1.3

5.6.2 Title of the group of activities

Development of high resolution Static Digital Twin for spatial planning and energy services

92 / 100 characters

5.6.3 Description of the group of activities

High resolution Static Digital Twin, including re-analysis and climate projections of the Baltic Sea met-ocean conditions, will be developed for users in Blue Economy sector (e.g. planning agencies, renewable energy developers, aqua-farm developers) that need statistical and climate projection data analysis for their activities (planning the use of marine resources, assessing the renewable energy potential, assessing coastal processes etc.). This includes production of data statistics (monthly mean, trend and extremes) and tailored products (e.g., wind resource maps). The approach is to integrate state-of-the-art Copernicus (CMEMS, C3S) met-ocean hindcast/reanalysis/projections, complemented with national high resolution products and generate new data as necessary.

Marine weather products: current Copernicus C3S regional reanalysis (CERRA) is in 5 km resolution. A 2.5 km resolution reanalysis based on HARMONIE will be provided by DMI with improved quality especially on winds. The reanalysis will cover period of past 30 years. Wind resource maps with 2.5 km resolution will be made based on an integration of DMI reanalysis and existing FMI products in the Northern Baltic Sea.

Ocean-ice reanalysis: current CMEMS ocean-ice reanalysis has a resolution of 3.7 km. A new reanalysis will be made available by DMI with 1.8 km resolution. Hindcast products with 0.9 km resolution will be made available for the Baltic-North Sea transition zone by DMI and for the Northeastern Baltic by TalTech. In addition, Baltic Sea ice maps (covering past 15 years) from FMI/CMEMS will be used. Basic map layers will be made to be used for marine heat energy and aquaculture farm application etc. (O.2.3).

Wave hindcast: current CMEMS wave hindcast has a 1.9 km resolution. A 500 m resolution wave hindcast for the period 1993-2022 will be developed for selected coastal areas of the Baltic Sea. Output will include wave-spectra (at least 1D and spreading/directions at each frequency), which will become an important parameter for some emerging applications (e.g. floating wind parks, floating PIV parks, floating LNG terminals, wave energy converters). Basic map layers for coastal erosion and renewable energy will be developed.

Climate projections: Baltic Sea regional ocean-ice projections are currently not available from Copernicus climate service. However, they have been made by some national climate services. High resolution (0.9 km) climate projections on met-ocean conditions for Baltic-North Sea transition waters, will be used as demonstration products for coastal planning and renewable energy etc. (DMI). FMI wave projection in the Gulf of Bothnia (1.9 km resolution) will also be included. Winds, waves and sea level will be analyzed to produce future changes in corresponding areas.

Human activity and bathymetry data from EMODnet and geological database from A.1.1, which are required for wind farm siting and marine spatial planning, will be included in the Static DT.

2,997 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable ☑

D 1.3

Title of the deliverable

Static Digital Twin: datasets and map layers of climate variables for DT services

81 / 100 characters

Description of the deliverable

This deliverable includes datasets of statistics and basic products for static services, especially on renewable energy and marine spatial planning, and a user manual report explaining the datasets and methods used to generate the products. The datasets will be generated according to the consolidated user requirements (A.1.2). The basic datasets will be used for the tailored services developed mainly in O.2.3, but also in O.2.1 and O.2.2.

The Static DT provides high resolution static information on met-ocean conditions, wind resource, bathymetry and human activities in an integrated, user friendly way. The data portfolio includes met-ocean statistics (wind resource, spatial planning, seawater heat potential, extremes of ice and waves etc.) from newly available, high resolution reanalysis products and regional climate models (RCMs), representing present day atmospheric and oceanic conditions as well as future climate change indicators. The data sets and tailored products will provide information on average conditions as well as extreme conditions, required siting and design assessments. The data portfolio is complemented with static information on present day bathymetry, coastline, geology and human activities obtained through A.1.1.

Product Manual: Report describing the data sets, derived tailored products and statistical methods used in the development of the Static Digital Twin (extreme value analysis method). Findings from the statistical analysis of present day climate re-analysis data sets and future climate projections are presented.

The first version of the deliverable will be made available as datasets derived from existing products. The Static DT will be an updated deliverable in which new data generated by partners, can be included. This assures the durability of the Static DT (O.2.3.).

1,832 / 2,000 characters

Which output does this deliverable contribute to?

O.2.3 Static Digital Twin Services

34 / 100 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.1: WP1 Preparing solutions						
A.1.3: Development of high resolution Static Digital Twin for spatial planning and energy services						
D.1.3: Static Digital Twin: datasets and map layers of climate variables for DT services						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

WP 1 Group of activities 1.4

5.6.1 Group of activities leader

Group of activities leader PP 3 - University of Latvia

A 1.4

5.6.2 Title of the group of activities

Development of Dynamic Digital Twin for Navigation and Port Services

68 / 100 characters

5.6.3 Description of the group of activities

Dynamic DT considers port basins, areas surrounding the ports and navigation fairways. In addition to basic data from Copernicus CMEMS forecast and national forecast systems, these key regions will be covered with high resolution numerical models and in situ measurements of waves and hydrodynamics (sea level, currents, ice, temperature etc.). The value-added products will improve planning of shipping activities in the considered port and navigation area. Coastal areas around the ports will have higher data density compared to current operational forecasts for the Baltic Sea. The Dynamic DT will provide seamless transition from port scales to open sea scales which is a pioneering approach in operational service. The DT includes the state-of-the-art high resolution atmospheric models for weather forcing. Boundary conditions will be derived from existing open sea operational forecasts for the Baltic Sea and the North Sea (Copernicus).

Provided results will contain hourly waves, currents, sea level, temperature, salinity and ice. The Dynamic DT will involve observational dataflows from meteorological agencies and ports. For the ports that are influenced by rivers, the river discharge information will be based on either on most recent observations, European hydrological model E-hype or climatological data. The bathymetry of ports that are influenced by morphological changes are derived from most recent depth surveys consolidated in the Static DT (A.1.3). Open sea bathymetries will be acquired from national maritime agencies and EMODnet portal (A.1.1.; A.1.3). High resolution forecasts will be added to exterior of ports that are important for safe shipping outside port gates and better estimation of sediment transport that are critical for planning of dredging works (O.2.2; O.2.3).

Navigation support is an important application area of Dynamic DT which increases safety at sea. The developed Fairway ToolBox extracts spatio-temporal data from different data sources according to user requested/predefined routes (e.g. Tallinn-Helsinki, Helsinki-Travemünde), which will be input for the Offshore Dynamic DT service (O.2.1). Emerging wintertime safe navigation issue is the occurrence of brash ice (dangerous navigation conditions on fairways at ice edge) which is not currently reflected in operational ice charting. After comprehensive investigations of brash ice occurrence, dynamics and impact to marine transport a dataflow for operational brash ice occurrence mapping will be developed. Preparations involve building back-end dataflows for mobile navigation application (O.2.1).

2,612 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable ✔

D 1.4

Title of the deliverable

Dynamic Digital Twin: dataflows for DT services

47 / 100 characters

Description of the deliverable

Deliverable will be a report/description (protocol) of tailored dataflows that will be an input for Offshore and Coastal DT services (O.2.1, O.2.2) targeted at safe winter navigation as well as at safe and efficient port activities. The project Outputs will rely on the dataflows of met-ocean data described in the current deliverable.

337 / 2,000 characters

Which output does this deliverable contribute to?

O.2.1 Dynamic Offshore Digital Twin Services; O.2.2 Dynamic Coastal Digital Twin Services

89 / 100 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.1: WP1 Preparing solutions						
A.1.4: Development of Dynamic Digital Twin for Navigation and Port Services						
D.1.4: Dynamic Digital Twin: dataflows for DT services						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

Work package 2

5.1 WP2 Piloting and evaluating solutions

5.2 Aim of the work package

The aim of this work package is to pilot, evaluate and adjust solutions. Plan one or several pilots to validate the usefulness of the solutions prepared in Work Package 1. Start Work Package 2 early enough to have time to pilot, evaluate and adjust solutions, together with your target groups. By the end of this work package implementation the solutions should be ready to be transferred to your target groups in Work Package 3.
The piloted and adjusted solution should be presented in one project output.
Organise your activities in up to five groups of activities. Describe the deliverables and outputs as well as present the timeline.

5.3 Work package leader

Work package leader 1 PP 3 - University of Latvia

Work package leader 2 PP 2 - Finnish Meteorological Institute

5.4 Work package budget

Work package budget 35%

5.4.1 Number of pilots

Number of pilots 3

5.5 Target groups

	Target group	How do you plan to reach out to and engage the target group?
1	Small and medium enterprise The main representatives of this target group are (1) ports and their sub-contractors as well as (2) companies dealing with development in coastal areas (real estate, renewable energy, transport). Relevant SMEs in all programme area countries are targeted. Companies from Estonia, Latvia and Finland have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Organizations. 431 / 500 characters	The target group will be reached out in multiple ways: 1. Representatives of target group are among the Associated Organisations of the project; as such they already will be participating in sharing their needs and definition of the user requirements in WP1. 2. These partners will further participate in WP2 in - co-design of the outputs (services) - testing of the services - providing users' feedback of the services 3. The target group in wider scope - outside the consortia will be reached - via professional networks - via hackathon - via project events - via personal communication and sharing the success of pilot implementation of the services - through the sectoral and national agencies - through the national and international professional or functional associations of SMEs 789 / 1,000 characters
2	Large enterprise The target group includes offshore wind farms (operators/developers), large ports, shipping companies. Companies in all programme area countries are targeted. Enterprises from Denmark, Finland and Latvia have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Partners 329 / 500 characters	The reaching out for the large enterprises in general is similar to the small and medium sized enterprises. In addition the following aspects are important: 1. Some large enterprises may be project partners and directly participating in the organizing of the events. 2. Contrary to small enterprises the developed services will be tailor made (as opposed to "suitable-for-all") for large operators; this aspect will be reflected in the co-design of services. 3. Large enterprises operate their observation installations; the dataflow into the services from the large enterprises will be embedded. 4. The individual reaching out for large enterprises will be performed 667 / 1,000 characters

	Target group	How do you plan to reach out to and engage the target group?
3	Sectoral agency The target group includes environmental, meteorological and transport agencies/institutes. Agencies in all programme area countries are targeted. Agencies from Poland, Estonia, Finland, Denmark and Latvia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the National public authorities because the legal status of such institutions is different in various countries. 480 / 500 characters	The representatives form this target group are included in the consortia as either the partners (LEGMC, for example) or associated partners.They will participate in the design of the services. In addition to the engagement of SME and Large Enterprises, the Sectoral agencies have an overview of the needs of different end users and can interact with them directly. They may provide - benchmarking of the services - their network of end users of the services for collecting requirements, feedback and sharing information - aligning of the project results with sectoral policy All relevant Sectoral Agencies will be invited to the project events. 648 / 1,000 characters
4	Infrastructure and public service provider The target group includes transport sector authorities (port operators, vessel traffic authorities, waterway management authorities). All programme area countries are targeted. Users from Poland, Denmark, Estonia, Latvia and Finland have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. 357 / 500 characters	Infrastructure and public service providers will be reached out in the same manner as Large enterprises. 105 / 1,000 characters
5	National public authority The target group includes marine monitoring and forecasting service providers (meteorological services) in Finland and Estonia. Entities in all programme area countries are targeted. Authorities from Finland and Estonia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the Sectoral Agencies because the legal status of such institutions is different in various countries 485 / 500 characters	Outreach to this target group is similar that of the Sectoral agencies because the legal status of such institutions is different in various countries. 151 / 1,000 characters

5.6 Activities, deliverables, outputs and timeline

No.	Name
2.1	**Piloting Offshore Dynamic Digital Twin Service: navigation, route planning**
2.2	**Piloting Coastal Dynamic Digital Twin Service: port operations and coastal activities**
2.3	**Piloting Static Digital Twin Service: coastal planning and renewable energy**

WP 2 Group of activities 2.1

5.6.1 Group of activities leader

Group of activities leader PP 2 - Finnish Meteorological Institute

A 2.1

5.6.2 Title of the group of activities

Piloting Offshore Dynamic Digital Twin Service: navigation, route planning

74 / 100 characters

5.6.3 Description of the group of activities

Offshore Dynamic Digital Twin Service will develop "Navigation and safety service" for vessel operators to provide decision support in route planning and assure safe navigation in challenging conditions, especially during winter. Two major issues are addressed under this activity: improved user-friendly fairway monitoring and forecasting, and detailed brash ice mapping.

1) Seafarers need the best obtainable information on sea and weather conditions for safety and real-time decision making. Information has to be obtained in a dynamic manner, both in offshore and coastal areas for vessels approaching or departing the ports or queuing at the port approaches.
Dataflows in this service will benefit from the development of Dynamic DT (A.1.4). The dataflow will be determined together by research partners and IT professionals. The forecast at the given areas of operation and along the predefined (repeating, scheduled, one time etc.) routes will be displayed in an end-user application for mobile devices. Co-design of the application and further detailed specification of the software features and their adjustments will be made together with the offshore end-user partners. The service will be suitable for decision making support for both the seafaring end-users and the static offshore end-users such as operators of wind farms, aquaculture farms and ports (A.1.3).

2) Sea ice has a critical impact on winter navigation. Vessels and ice breakers need to have near real-time information about the atmospheric, oceanographic and sea ice conditions at the sea. Currently basic data are served by the national institutes, but more information is required by the users about brash ice barriers at the ice edge. Brash ice barrier is a strip or narrow belt of new, young or brash ice usually 100-5000 m across formed at the edge of sea ice and open water that may extend 2 to 20 m below the surface. Thick barriers may stop the low powered vessels completely and are limiting the movement of the stronger vessels such as ice breakers.
The service will identify brash ice barriers and predict favorable conditions where the brash ice barrier is formed. Data products on brash ice will be developed on the basis of existing observations and models (A.1.4). Thus, the intended service will improve the sea ice navigability by providing accurate and near real-time information and forecasts of the brash ice barriers. It will provide information and service on this identified gap of the current services.

The time series of the met-ocean (wave, wind, ice) parameters along shipping routes (including designated fairways) will be delivered to tailored user applications via Fairway Toolbox. Overall, the service significantly improves marine transport efficiency and safety.

2,778 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable

O 2.1

Title of the output

Dynamic Offshore Digital Twin Services

38 / 100 characters

Description of the output

1) A new brash ice service concept and ice information content will be developed to offer improved ice services. The novel information on brash ice will be integrated into the tailored services.

2) The data from Fairway ToolBox service will be used for providing forecasting information along shipping routes to the tailored services. The combination of various parameters for specific locations, areas, and shipping routes will be visualized in a user-friendly environment. This information will be useful for decision support and for increasing navigation safety.

3) New mobile software with different end-user applications for smartphones will be developed. This includes development of the software (front- and back-end) together with establishing the dataflows and background IT systems. New capabilities enable similar contents to be published in customer portals, which will be tested in the systems of end-user project partners (input for activity A.3.4).

For the public, a short link/QR code, which leads to the parameter-graph of a specific trip, on the passenger ticket makes the information easily available to the passengers. Same graphs could be used on port or vessel on-board displays.

The extracted data as API service will be used for the hackathon (A.3.2) to transfer the solutions to new users. Additional need for such a solution is seen in planning tools, education and leisure activities.

1,416 / 3,000 characters

Target groups and uptake of the solution presented in this output

Target groups	How will this target group apply the output in its daily work?
Target group 1 Small and medium enterprise The main representatives of this target group are (1) ports and their sub-contractors as well as (2) companies dealing with development in coastal areas (real estate, renewable energy, transport). Relevant SMEs in all programme area countries are targeted. Companies from Estonia, Latvia and Finland have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Organizations.	Small and medium enterprises benefit from similar activities as large enterprises. New navigation support application enables a user to select points of interest along the fairway. For example, users can select variables and predetermine thresholds for which application gives notification in case of crossing of the critical sea state limit (high waves, strong winds etc.). Depending on each vessel (staff experience, regulation frameworks, cargo type etc.), thresholds will prescribe if the marine conditions are allowable for the planned activities (sailing, cargo latching, remote piloting). Users of new services will be professional users on vessels and in ports, for example commercial shipping companies and pilotage companies. Based on new ice brash barrier information, ships can avoid entering the barrier and icebreakers can optimize their assistance to the vessels. Users of this information are pilotage companies, ice breaking authorities and private shipping companies. 988 / 1,000 characters
Target group 2 Large enterprise The target group includes offshore wind farms (operators/developers), large ports, shipping companies. Companies in all programme area countries are targeted. Enterprises from Denmark, Finland and Latvia have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Partners	Large enterprises benefit from similar activities as small and medium enterprises. New navigation support application enables a user to select points of interest along the fairway. For example, users can select variables and predetermine thresholds for which application gives notification in case of crossing of the critical sea state limit (high waves, strong winds etc.). Depending on each vessel (staff experience, regulation frameworks, cargo type etc.), thresholds will prescribe if the marine conditions are allowable for the planned activities (sailing, cargo latching, remote piloting). Users of new services will be professional users on vessels and in ports, for example commercial shipping companies and pilotage companies. Based on new ice brash barrier information, ships can avoid entering the barrier and icebreakers can optimize their assistance to the vessels. Users of this information are pilotage companies, ice breaking authorities and private shipping companies. 988 / 1,000 characters
Target group 3 National public authority The target group includes marine monitoring and forecasting service providers (meteorological services) in Finland and Estonia. Entities in all programme area countries are targeted. Authorities from Finland and Estonia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the Sectoral Agencies because the legal status of such institutions is different in various countries	National public authorities as well as Infrastructure and public service providers benefit from the output in similar ways as the entities in these target groups (transport agencies, ice services, weather services) form a holistic value chain for multiple actors. Based on new ice brash barrier information, national maritime traffic authorities governing the ice breaking companies adjust their actions and daily decision-making. Users of this information are FMI and other ice services (in Sweden and Estonia) as safety authority, ice breaking services steered by national traffic authority, and government owned pilotage companies. New navigation support application enables an institutional user to select points of interest along the fairway. For example, users can select variables and predetermine thresholds for which application gives notification in case of crossing of the critical sea state limit (high waves, strong winds etc.). 944 / 1,000 characters
Target group 4 Infrastructure and public service provider The target group includes transport sector authorities (port operators, vessel traffic authorities, waterway management authorities). All programme area countries are targeted. Users from Poland, Denmark, Estonia, Latvia and Finland have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations.	National public authorities as well as Infrastructure and public service providers benefit from the output in similar ways as the entities in these target groups (transport agencies, ice services, weather services) form a holistic value chain for multiple actors. Based on new ice brash barrier information, national maritime traffic authorities governing the ice breaking companies adjust their actions and daily decision-making. Users of this information are FMI and other ice services (in Sweden and Estonia) as safety authority, ice breaking services steered by national traffic authority, and government owned pilotage companies. New navigation support application enables an institutional user to select points of interest along the fairway. For example, users can select variables and predetermine thresholds for which application gives notification in case of crossing of the critical sea state limit (high waves, strong winds etc.). 943 / 1,000 characters

Durability of the output

The output depends on the availability of brash ice information, Fairway ToolBox service and upstream services.

Durability of the solution is assured as new users and public will have access to the services after the end of project via continuous output of core partners.
The Finnish Meteorological Institute will maintain the navigation and brash ice services along their life cycle. FMI will share the service with other ice services (in Sweden and in Estonia) in the Baltic Sea region.
TalTech will maintain Fairway ToolBox service on regular bases (financed by Target Groups). As TalTech is already providing operational monitoring and forecasting services to various Target Groups (paying customers) the sustainable provision of tailored navigation service would increase their service/product portfolio.

810 / 1,000 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.2: WP2 Piloting and evaluating solutions						
A.2.1: Piloting Offshore Dynamic Digital Twin Service: navigation, route planning						
O.2.1: Dynamic Offshore Digital Twin Services						

5.6.7 This deliverable/output contains productive or infrastructure investment

WP 2 Group of activities 2.2

5.6.1 Group of activities leader

Group of activities leader PP 1 - Tallinn University of Technology

A 2.2

5.6.2 Title of the group of activities

Piloting Coastal Dynamic Digital Twin Service: port operations and coastal activities

85 / 100 characters

5.6.3 Description of the group of activities

The activities are performed to improve safe navigation and port operation based on Dynamical Digital Twin services (A.1.4).

For piloting the Coastal Digital Twin solutions three ports are selected with different activities, traffic intensity and environmental conditions. First pilot, the port of Helsinki (Finland), is a large seaport used by large enterprises where winter navigation is occasionally influenced by the ice conditions. Second pilot is the port of Liepaja (Latvia), which is mainly a cargo port and is influenced by the river. Third pilot is the port of Heltermaa (Estonia), which is operated by small and medium enterprises and where the main focus is on ro-ro ferry traffic.

The services are delivered to pilot users using an online digital tool (BlueDataServiceHUB) which will provide necessary dataflow from the Dynamic DT (A.1.4). For different types of activities default information layouts will be designed based on user requirements (A.1.2) and following users feedback will be taken into account to tailor the services further.

For the safe port operations the following steps are taken to pilot the solutions:
1) The adjustments of the solutions for service for specific pilot ports are performed.
2) Operational implementation of the models and observations in selected ports.
3) Dataflow from Dynamic DT is prepared and made operational for specific ports.
4) Delivering data (waves, ice, wind, currents) for ships entering or leaving the port area at specific times.

For port operators the dataflow for different types of activities will be developed to take into account the location of quays and different time windows of different activities. High-resolution met-ocean information with the potential warning levels about risks from the severe weather conditions is provided through the BlueDataServiceHUB. The flexibility of spatial service allocation will ensure transferability to other ports where the geometry of port and layout of quays are different.

The development of the BlueDataServiceHUB which provides the services will be done according to Target Groups needs. The service will be improved during the piloting phase based on user feedback collected from regular interviews with the user partners (PP8, PP9, PP10, PP11; AO4, AO7) who are involved in activities in different pilot ports. Services are evaluated by means of use frequency, quality of forecasts, accuracy and general relevance.

User manual will be prepared to provide guidelines for effective use and installation of the services.

2,550 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable

O 2.2

Title of the output

Dynamic Coastal Digital Twin Services

37 / 100 characters

Description of the output

The output consists of dataflow from Dynamic DT to provide necessary information to the pilots to perform activities towards improving navigation safety and port operations. It will provide the user-specific data environment based on their initial requests of users (A.1.2). The user specific data will be a combination of forecast products from different providers (high-resolution models of core partners, public data centers, national monitoring centers, etc.). Both graphical (maps, time-series) and numerical outputs from the WP1 are made available for the pilot users in the requested data formats.

The dataflow will be managed by the collection of software, which will be operationally used by pilot users to acquire the necessary tailored data products, it will be open source and stored in a public code repository (under the CC BY-SA copyright). The small example of Dynamic DT, necessary to run the solution for other regions and for different activities, will be stored in a public data repository.

The data inventory to improve navigation safety includes the maps of waves and currents from the high-resolution models, brash ice risk prediction from forecast data and dataflow from route planning tool.

For the safety and cost effectiveness of port operations detailed forecasts of the high-resolution wave and current conditions from Dynamic DT (A.1.4) are provided for specific port areas.
The alert system for different activities is implemented to draw users attention if the conditions for daily activities are unfavorable. Upon availability forecasts are complemented with data from real-time observations from ships, moored port instruments and buoys.

Transnational cooperation is necessary to make the services available for different regions where observations are available from the national authorities. The high-resolution coastline and bathymetry maps which are necessary for adjustments of high-resolution models in specific port areas are provided. The BlueDataServiceHUB can be adjusted to deliver dataflow for different regions of interest, thus serving a wide transnational value.

2,120 / 3,000 characters

Target groups and uptake of the solution presented in this output

Target groups	How will this target group apply the output in its daily work?
Target group 1 Small and medium enterprise The main representatives of this target group are (1) ports and their sub-contractors as well as (2) companies dealing with development in coastal areas (real estate, renewable energy, transport). Relevant SMEs in all programme area countries are targeted. Companies from Estonia, Latvia and Finland have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Organizations.	Small and medium enterprises benefit from similar activities as large enterprises. Ports and shipping companies will use the service to plan the activities which may require different safety measures due to environmental conditions. The high-resolution information for wave and current conditions within port basin support decisions which are related with safer ship landing, cargo loading and possible contaminant removal during accidents. The accurate marine weather prediction can reduce time and fuel usage of various port operations. The operational meteorological information can support decisions related to air pollution activities (loading of crude oil or coal). Providing tailored forecasts to port authorities can improve safety of activities which are time-flexible and might be conducted during periods when risks from environmental conditions are lower. The forecast for weather conditions is important for leisure boats to plan recreational activities. 967 / 1,000 characters
Target group 2 Large enterprise The target group includes offshore wind farms (operators/developers), large ports, shipping companies. Companies in all programme area countries are targeted. Enterprises from Denmark, Finland and Latvia have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Partners	Large enterprises benefit from similar activities as small and medium enterprises. Ports and shipping companies will use the service to plan the activities which may require different safety measures due to environmental conditions. The real-time dataflow of high-resolution information for wave and current conditions within port basin support decisions which are related with safer ship landing, cargo loading and possible contaminant removal during accidents. The accurate marine weather prediction can reduce time and fuel usage of various port operations (cargo loading, dredging, towing, ice breaking, etc.). The operational meteorological information can support decisions related to air pollution activities (loading of crude oil or coal). Providing tailored forecasts to port authorities can improve safety of activities which are time-flexible and might be conducted during periods when risks from environmental conditions are lower. 944 / 1,000 characters

Target groups	How will this target group apply the output in its daily work?
Target group 3 Infrastructure and public service provider The target group includes transport sector authorities (port operators, vessel traffic authorities, waterway management authorities). All programme area countries are targeted. Users from Poland, Denmark, Estonia, Latvia and Finland have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations.	The target groups require the tailored data services to provide possible warnings of severe weather or drift ice conditions at pilot ports. The dataflow of high-resolution models could be used to announce suggestions for different port activities and warn of possible dangers related to severe weather conditions. The marine and meteo forecast for specific port areas will also help planning the activities related to maintenance of port facilities and dredging. 463 / 1,000 characters
Target group 4 National public authority The target group includes marine monitoring and forecasting service providers (meteorological services) in Finland and Estonia. Entities in all programme area countries are targeted. Authorities from Finland and Estonia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the Sectoral Agencies because the legal status of such institutions is different in various countries	The BlueDataServiceHUB provides relevant/reliable information to the specialists (e.g. in weather services) who provide information to third parties (e.g., transport companies, media, judicial authorities). Providing the hydrological conditions and forecast from the ports to the national monitoring performers will help them to plan equipment testing activities. 363 / 1,000 characters

Durability of the output

The output depends on the availability of high-resolution models, availability of measurements from specific ports and upstream services. Durability of the solution is assured as new users and the public will have access to the services after the end of project via continuous output of core partners project.
Durability of the infrastructure of specific ports (dataflow from measurement equipment) is assured by the port operators. University of Latvia will maintain a high-resolution hydrodynamical model for the pilot ports and will share the model outputs after the project ends.
Tallinn University of Technology provides forecast dataflow service from national forecast products. The Danish Meteorological Institute will provide continuous dataflow to the Dynamical DT to maintain coastal digital services.

811 / 1,000 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.2: WP2 Piloting and evaluating solutions						
A.2.2: Piloting Coastal Dynamic Digital Twin Service: port operations and coastal activities						
O.2.2: Dynamic Coastal Digital Twin Services						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

WP 2 Group of activities 2.3

5.6.1 Group of activities leader

Group of activities leader PP 5 - Tallinn University

A 2.3

5.6.2 Title of the group of activities

Piloting Static Digital Twin Service: coastal planning and renewable energy

75 / 100 characters

5.6.3 Description of the group of activities

The task provides tools for a multitude of detailed custom-tailored digital ocean products, which are necessary for maritime spatial planning and offshore renewable energy siting. The service is based on the data consolidation (A.1.1) and Static DT (A.1.3).

Based on static DT products from A.1.3, i.e., key variable statistics and tailored products and human activity data, a pilot mapping and download service will be developed so that users can search, display and download the data products. This service will cover the entire Baltic Sea whereas the focus is on high resolution areas, e.g., the northeastern Baltic and the Baltic-North Sea transition waters.

Based on A.1.1 and A.1.2, a specific service for Baltic Sea waters will be developed to provide statistical material about the regime and past variability of key variables. The consolidated data cover a climatic period with a resolution of 1 km or better. The following activities will be carried out:

1) Baseline data products, using the consolidated high-resolution data on hydrodynamics (incl. waves and ice), meteorology (mainly coastal and offshore winds, threats from freezing and icing) and geology (are the coasts vulnerable to storms and ice, offshore bedrock and sediment features). This service will provide initial knowledge for the siting and design of sustainable coastal and offshore activities.
2) Refinement of digital geology and morphodynamcics in the regions of potential significant coastal and/or offshore activities like wind farms, aquaculture sites, bridge or pipeline construction. Different shore types (sandy-, cliff- , crystalline shore etc.) and dominating processes (erosion, accumulation, long-shore transport) will be identified. Majority of Swedish and Finnish coast is made of crystalline rock and coastal processes are nearly invisible. The rest of the Baltic Sea coast is very variable and dynamic and a large part of it is characterized by active coastal processes. The most dangerous coastal process for coastal inhabitants is erosion, especially in the areas of new housing. Currently the data on the areas at risk cannot be found easily. We will identify major erosion areas by comparing geolocated aerial maps from different years.
3) Demonstrative refinement of hydrodynamical data to the grid step 100-200 m in the areas of planned significant maritime activity. Such refinements will be performed as detailed case studies covering shorter periods (because of computing constraints) based on the consultation with users. Such sample case studies can address detailed problems like sediment transport due to waves and currents, dangerous ice formations created in combination of wind, waves and currents, technical design and environmental constraints for construction, water intake and discharge (incl conditions for wind farms and seawater heat pumps, basements of wind generators, LNG terminals, water exchange in aquaculture sites, sewage discharge).

2,965 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable ☐

O 2.3

Title of the output

Static Digital Twin Services

28 / 100 characters

Description of the output

1) Static data mapping and download service for wind farm siting and marine spatial planning. The service includes a possibility to generate custom tailored maps and data products, like occurrence of marine heat and cold waves at different depth levels, combinations of high waves and high sea level etc.
2) Map layers describing the climate of met-ocean conditions will be produced containing seasonal aspects (wave parameters, dominating currents and their parameters, water exchange rates, statistical data on ice conditions, etc.).
3) New geological map layers describing threats and opportunities will be generated (data on geological investigations, shore types, class (and rate) of geological activity (erosion, accumulation, longshore transport) by using existing reports, raster orthophotos and Google Earth images, etc.).
4) Map layer containing metadata (links and descriptions leading to real data that is protected by copyright and cannot be shared directly), this data also includes the description of data type and quality.
5) Possible solution for citizen science to help promote the project and to ensure the durability of project results. For example, coastal erosion and accumulation events, new data on geological investigations, new features of shoreline defence can be reported.

1,303 / 3,000 characters

Target groups and uptake of the solution presented in this output

Target groups	How will this target group apply the output in its daily work?
Target group 1 Small and medium enterprise The main representatives of this target group are (1) ports and their sub-contractors as well as (2) companies dealing with development in coastal areas (real estate, renewable energy, transport). Relevant SMEs in all programme area countries are targeted. Companies from Estonia, Latvia and Finland have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Organizations.	The static data mapping and download service provides the developers with accurate information about the renewable energy resource and met-ocean and geological conditions required for wind farm siting and design studies. Developers, usually as SMEs but also large enterprises, can assess the benefits and the main risks of the investments using integrated, high resolution data sets and tailored products. Future climate change indicators provide information for the planning of future investments. Output of this activity will also help the developers belonging to the category of small or medium enterprise to find out the general background and main risks or opportunities originating from the sea (erosion, accumulation, etc.), when they are planning developments near the coast. Additionally, existing reports or metadata describing the research carried out in the region of interest helps to plan further investigations. 930 / 1,000 characters
Target group 2 Sectoral agency The target group includes environmental, meteorological and transport agencies/institutes. Agencies in all programme area countries are targeted. Agencies from Poland, Estonia, Finland, Denmark and Latvia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the National public authorities because the legal status of such institutions is different in various countries.	Collected data serves as a tool for spatial planning (most suitable areas for ports, real-estate developments, infrastructure objects, coastal protection establishments etc.). It also helps to carry out investigations to improve risk management of the coastal areas. Energy agencies will be able to use the data mapping and download service to access the potential of a given site for further development. Climate change related risks of the development will be assessable. The integrated data service for renewable energy siting and marine spatial planning will allow users to access relevant information from one portal. 625 / 1,000 characters
Target group 3 National public authority The target group includes marine monitoring and forecasting service providers (meteorological services) in Finland and Estonia. Entities in all programme area countries are targeted. Authorities from Finland and Estonia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the Sectoral Agencies because the legal status of such institutions is different in various countries	A number of geological and geophysical investigations have been carried out in the Baltic Sea region but it is rather difficult to find and use these data (sometimes they are handwritten in Russian language etc.). Collection of such data is important for port planning, establishment of wind farms etc. It is important to know what kind of data is already available and what data need additional aggregation and pre-processing. The results of this task make sure that available data can be found in an easy manner and further work can be planned based on the integrated knowledge. This can save a significant amount of time and financial resources. 648 / 1,000 characters

Durability of the output

Collected data are relatively static. Climatic data are based on the long time series of observations and model products and they are kept with minimum maintenance costs. Once available, they retain their value over a decade. Geology is even more static. Shore types can slightly change over decades, but this information is available as a separate layer (shore dynamics). Rate of erosion and accumulation change over time, but in the very long term, the velocity of the process (important for coastal development) does not change much. Normally, the major change is human activity (applying coastal protection measures, establishing new ports etc.). Therefore, the collected data will be durable over time. The core partners will continue to provide the generated data layers to new users as it is their daily activity.

821 / 1,000 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.2: WP2 Piloting and evaluating solutions						
A.2.3: Piloting Static Digital Twin Service: coastal planning and renewable energy						
O.2.3: Static Digital Twin Services						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

Work package 3

5.1 Transferring solutions

5.2 Aim of the work package

In Work Package 3, communicate and transfer the ready solutions to your target groups. Plan at least one year for this work package to transfer your solutions to the target groups, considering their respective needs. Select suitable activities to encourage your target groups to use the solutions in their daily work.
Organise your activities in up to five groups of activities. Describe the deliverables and outputs as well as present the timeline.

5.3 Work package leader

Work package leader 1	PP 1 - Tallinn University of Technology
Work package leader 2	PP 2 - Finnish Meteorological Institute

5.4 Work package budget

Work package budget	20%

5.5 Target groups

	Target group	How do you plan to reach out to and engage the target group?

	Target group	How do you plan to reach out to and engage the target group?
1	Small and medium enterprise The main representatives of this target group are (1) ports and their sub-contractors as well as (2) companies dealing with development in coastal areas (real estate, renewable energy, transport). Relevant SMEs in all programme area countries are targeted. Companies from Estonia, Latvia and Finland have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Organizations. 431 / 500 characters	Targeted user events will be organised (A.3.1) to present the solutions and pilots to the user community and to collect feedback. New target groups will be reached through the implementation of Communication Strategy (A.1.2), including project publications to promote the solutions (A.3.5) and user engagement events (A.3.1). A dedicated innovative event, Hackathon (A.3.2), will be organised to facilitate solution transfer to the specific target groups representatives. The challenges of the Hackathon are defined according to the needs of Target Groups. The ICT support will be offered to interested entities in order to reduce the technology/solution transfer costs for them (A.3.4). Incorporating Advisory Board suggestions (A.3.3) serves as a general measure to sustainable solution implementation for improving the safety at sea. 837 / 1,000 characters
2	Large enterprise The target group includes offshore wind farms (operators/developers), large ports, shipping companies. Companies in all programme area countries are targeted. Enterprises from Denmark, Finland and Latvia have been engaged already and the representatives of the Target Group are among the Project Partners and Associated Partners 329 / 500 characters	Targeted user events will be organised (A.3.1) to present the solutions and pilots to the user community and to collect feedback. New target groups will be reached through the implementation of Communication Strategy (A.1.2), including project publications to promote the solutions (A.3.5) and user engagement events (A.3.1). A dedicated innovative event, Hackathon (A.3.2), will be organised to facilitate solution transfer to the specific target groups representatives. The challenges of the Hackathon are defined according to the needs of Target Groups. The ICT support will be offered to interested entities in order to reduce the technology/solution transfer costs for them (A.3.4). Incorporating Advisory Board suggestions (A.3.3) serves as a general measure to sustainable solution implementation for improving the safety at sea. 837 / 1,000 characters
3	Sectoral agency The target group includes environmental, meteorological and transport agencies/institutes. Agencies in all programme area countries are targeted. Agencies from Poland, Estonia, Finland, Denmark and Latvia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the National public authorities because the legal status of such institutions is different in various countries. 480 / 500 characters	Targeted user events will be organised (A.3.1) to present the solutions and pilots to the user community and to collect feedback. New target groups will be reached through the implementation of Communication Strategy (A.1.2), including project publications to promote the solutions (A.3.5) and user engagement events (A.3.1). A dedicated innovative event, Hackathon (A.3.2), will be organised to facilitate solution transfer to the specific target groups representatives. The challenges of the Hackathon are defined according to the needs of Target Groups. The ICT support will be offered to interested entities in order to reduce the technology/solution transfer costs for them (A.3.4). Incorporating Advisory Board suggestions (A.3.3) serves as a general measure to sustainable solution implementation for improving the safety at sea. 837 / 1,000 characters
4	Infrastructure and public service provider The target group includes transport sector authorities (port operators, vessel traffic authorities, waterway management authorities). All programme area countries are targeted. Users from Poland, Denmark, Estonia, Latvia and Finland have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. 357 / 500 characters	Targeted user events will be organised (A.3.1) to present the solutions and pilots to the user community and to collect feedback. New target groups will be reached through the implementation of Communication Strategy (A.1.2), including project publications to promote the solutions (A.3.5) and user engagement events (A.3.1). A dedicated innovative event, Hackathon (A.3.2), will be organised to facilitate solution transfer to the specific target groups representatives. The challenges of the Hackathon are defined according to the needs of Target Groups. The ICT support will be offered to interested entities in order to reduce the technology/solution transfer costs for them (A.3.4). Incorporating Advisory Board suggestions (A.3.3) serves as a general measure to sustainable solution implementation for improving the safety at sea. 837 / 1,000 characters

	Target group	How do you plan to reach out to and engage the target group?
5	National public authority The target group includes marine monitoring and forecasting service providers (meteorological services) in Finland and Estonia. Entities in all programme area countries are targeted. Authorities from Finland and Estonia have been engaged and the representatives of the Target Group are among the Project Partners and Associated Organizations. The target group has similar role as the Sectoral Agencies because the legal status of such institutions is different in various countries 485 / 500 characters	Targeted user events will be organised (A.3.1) to present the solutions and pilots to the user community and to collect feedback. New target groups will be reached through the implementation of Communication Strategy (A.1.2), including project publications to promote the solutions (A.3.5) and user engagement events (A.3.1). A dedicated innovative event, Hackathon (A.3.2), will be organised to facilitate solution transfer to the specific target groups representatives. The challenges of the Hackathon are defined according to the needs of Target Groups. The ICT support will be offered to interested entities in order to reduce the technology/solution transfer costs for them (A.3.4). Incorporating Advisory Board suggestions (A.3.3) serves as a general measure to sustainable solution implementation for improving the safety at sea. 837 / 1,000 characters

5.6 Activities, deliverables, outputs and timeline

No.	Name
3.1	**Organizing events for user engagement**
3.2	**Hackathon for facilitating solution transfer to the target groups**
3.3	**Advisory Board recommendations**
3.4	**ICT support for transferring the solutions**
3.5	**Publications for promoting the solutions and engaging users**

WP 3 Group of activities 3.1

5.6.1 Group of activities leader

Group of activities leader PP 7 - Latvian Environment, Geology and Meteorology Centre

A 3.1

5.6.2 Title of the group of activities

Organizing events for user engagement

37 / 100 characters

5.6.3 Description of the group of activities

Organizing seminars and workshops to promote the developed solutions among the user groups and transfer the pilot services and solutions across the Baltic Sea region (trans-sectoral cooperation). Each Core partner will organise at least 1 event. In total 10 events will be organised. The specific nature and content of the events will be determined in Communication Strategy (A.1.2). The following indicative events will be organised:

1) An introductory event will be organised to showcase the expected services/solutions that will be made available to the interested target groups. This event will be integrated with the presentation of a coastal erosion monitoring programme developed by LEGMC. The main audiences here are the marine and climate data user groups that could benefit from the Digital Twins.

2) A follow-up event will focus on the use of the services/solutions to solve specific issues within the marine/coastal area planning framework. The event will be a part of a larger coastal planning programme presentation which is conducted by LEGMC and Latvian Ministry of Environment. The event will highlight how marine climate data can be used to enhance understanding of the coastal region and help establish a flexible and justified interpretation of the zoning plans in the overlapping areas of private and public space. The audience for the event includes governmental, municipal, commercial and private entities that are interested in the management of coastal areas.

3) The hackathon communication campaign will include 3 virtual pre-events as a part of user engagement activities. Each pre-event will introduce the pilot services developed in WP2 to the potential end users, who are engaged with the pre-events through a thorough and specifically targeted marketing and communication campaign. The goal is to reach end users across the Baltic Sea region who would become the participants of the hackathon and receivers of the tailored pilot service.

4) An event organised by FMI targets user partners (shipping companies, port authorities) and potential service users for example at dedicated sessions in selected marine conferences and FMI customer events.

5) DMI event targets for Danish national users on Static DT services, mainly from offshore wind energy and marine spatial planning sectors, including consultancy companies.

6) During Demo day (G48+Taltech) each of the service solutions will be interactively presented to all target groups.

7) Final forum (TalTech) will summarise the project outcomes and pave the road to a sustainable solution uptake after the project lifetime.

2,614 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable ✔

D 3.1

Title of the deliverable

Events which will result in reports of user engagement progress

63 / 100 characters

Description of the deliverable

Each event will result in a report where the feedback and suggestions from Target Groups are listed, which will be input for the co-design of Digital Twin Services (outputs of WP2).

181 / 2,000 characters

Which output does this deliverable contribute to?

O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin

98 / 100 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.3: Transferring solutions						
A.3.1: Organizing events for user engagement						
D.3.1: Events which will result in reports of user engagement progress						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

WP 3 Group of activities 3.2

5.6.1 Group of activities leader

Group of activities leader PP 6 - Garage48

A 3.2

5.6.2 Title of the group of activities

Hackathon for facilitating solution transfer to the target groups

65 / 100 characters

5.6.3 Description of the group of activities

Organizing a hackathon to initiate New Economy businesses whose business models rely on valorising oceanographic-meteorological data.

The hackathon applies design thinking, lean startup methodology & participatory innovation for fast, problem- and user-based product development based on teamwork and includes intensive mentoring and working in a short time-frame. Each team of the hackathon will deliver a working prototype of an adapted pilot service to the end-user by the end of the hackathon. To reach this result, the end users and pilot services developers will fully collaborate in the hackathon preparation and implementation. Pilot services developed in WP2 and the customization needs of the end-users are introduced to participants in the hackathon communication activities and with pre-events. The hackathon will apply the Garage48 48-hour on-site hackathon format, that has proven successful in delivering more than 3000 working prototypes during 12 years, across 30 countries and 250+ hackathons.

The participants will come among maritime students, working experts and researchers, remote sensing, data science, software engineering and design students and experts across the countries included in the project - as a result of a thorough trans-national marketing & communication campaign. Mentors and jury will be engaged from G48 core network and from project partners' network. The hackathon format encourages transnational teamwork, exchange of knowledge and best practises.

Organizing the hackathon will happen in 4 main phases, fully led and implemented by G48 staff.
1) Preparations: developing a project management & communication plan; developing content and visual identity; preparing the pilot services and tools needed for prototyping the services for end users; preparing registration platform; hackathon rules: participants application and selection criteria, team formation, evaluation criteria, jury outreach; additional prizes, data.
2) Outreach: trans-national communication activities for engagement of participants and raising general awareness of the project; engaging with mentors, facilitators and jury; coordination of hackathon pre-events: content creation, speakers outreach, live stream provision; communication with participants; travel and accommodation setup. Outreach to business accelerators like ESA BIC and EIT ClimAccelerator to support further development of top teams of the hack.
3) Hackathon implementation: partners, mentors briefings; hackathon platform prep; live stream setup; implementation team coordination; facilitating team formation; facilitating participant, mentor and partner onboarding; coordination of the 48-hour on-site hackathon and the work of participants, mentors, pilot services partners and end users, jury; finals & awards. We expect 100 participants & min 9 prototypes of customised services for end users.
4) Follow-up: presenting results; gathering & analyzing feedback; after-communication; award provisions.

2,998 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable ☑

D 3.2

Title of the deliverable

Hackathon on the following topic: "Blue Data Services Hackathon"

64 / 100 characters

Description of the deliverable

The purpose of the hackathon is to support the implementation of the pilot services developed in the project WP2 in the use of end users. In order to transfer the pilot services into daily use, the needs of the end user are carefully considered and the prototyping during the hackathon is focused maximally towards meetings those needs by the participants and mentors (Target Groups of the project).
The pilot DT sub-services that will be addressed are:
- navigation, brash ice, route planning and renewable energy service based on Dynamic DT;
- port operations and coastal activities service based on Dynamic DT;
- coastal planning and renewable energy service based on Static DT.

The prototyping of tailored services is centered around very hands-on mentoring, checkpoints and participants' teamwork where the pilot service developers and end users are dedicated mentors/experts for the team prototyping the adapted service and making sure it is moving in the needed direction. With three pilot service categories, the hackathon will aim to develop minimally three prototypes of customized pilot services ready for implementation for the end users.

The hackathon format enables and encourages organisations cooperating across borders through the teamwork of participants, the work of mentors, the contribution of pilot services developers and end users during the hackathon, in the preparatory phase and pre-events, and follow-up activities in case of a transnational team ready to develop their prototype into a business.

A final report outlining the hackathon results will be presented, including the following indicators:
Number of participants engaged at the hackathon and pre-events and geographical reach
Number of partner organisations engaged
Prototypes developed with description of results
Number of mentors engaged
Jury
Media outreach - publications, nr of audience reached.

1,895 / 2,000 characters

Which output does this deliverable contribute to?

O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin

98 / 100 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.3: Transferring solutions						
A.3.2: Hackathon for facilitating solution transfer to the target groups						
D.3.2: Hackathon on the following topic: "Blue Data Services Hackathon"						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

WP 3 Group of activities 3.3

5.6.1 Group of activities leader

Group of activities leader PP 1 - Tallinn University of Technology

A 3.3

5.6.2 Title of the group of activities

Advisory Board recommendations

30 / 100 characters

5.6.3 Description of the group of activities

An Advisory Board will be formed to guide the project progress according to the target group needs and objectives of the following Policy Areas: Safe, Innovation, Spatial planning, Energy, Transport, Secure.

The members of the Advisory Board are the representatives of Target Groups (Associated Organisations) and Policy makers. The following institutions have been contacted with a request to join the Advisory Board: VASAB (agreed), Ministry of Economic Affairs and Communications (agreed), Swedish Maritime Administration (pending). Additional organisations will be contacted before the beginning of the project.

The Advisory Board will convene twice a year (each reporting period). Advisory Board will have 3 functions:
1) During each Advisory Board meeting the project team will share the progress and results of the solution implementation.
2) The Advisory Board will provide feedback on project progress and give common recommendations to guide the project.
3) Advisory Board members can promote the project results among their professional networks to increase the project impact and improve upscaling of the project solutions.

Advisory Board will form a common unanimous statement after each meeting. The statement will include recommendations for the project team.

1,279 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable ✔

D 3.3

Title of the deliverable

Common recommendation of the Advisory Board meetings

52 / 100 characters

Description of the deliverable

Each Advisory Board meeting (once per reporting period) will result in a report which includes unanimous recommendations and guidelines to project team for further developments.

177 / 2,000 characters

Which output does this deliverable contribute to?

O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin

98 / 100 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.3: Transferring solutions						
A.3.3: Advisory Board recommendations						
D.3.3: Common recommendation of the Advisory Board meetings						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

WP 3 Group of activities 3.4

5.6.1 Group of activities leader

Group of activities leader PP 1 - Tallinn University of Technology

A 3.4

5.6.2 Title of the group of activities

ICT support for transferring the solutions

42 / 100 characters

5.6.3 Description of the group of activities

The objective of the activity is to support the transfer of solutions to new users who were not involved in service piloting. The specific technical details (programming, OPENDAP languages and data file formats) of tailored services will be decided during co-development with each specific user. Based on the current feedback from user groups the consortia is prepared to provide near-real-time data in the following formats: NetCDF, GRIB, SHP, GEOTIFF, CSV, xlsx, etc. The identified data transfer protocols include but are not limited to: FTP, WMS, MySQL, WFS, open layers MOTU, CDS API etc. Code repositories for open source code solutions will be set up (e.g. GitHub, GitLab, SVN, SourceForge). As the needs of each user are different we have to be flexible to assure effective uptake of the services.

1) Coastal service will be transferred to 7 new ports in Finland, Estonia, Poland and Latvia (Ruhnu, Skulte, Paldiski etc). The software (BlueDataServiceHUB) provides dataflows for Coastal DT services from the Dynamical DT. The software will have flexible configuration to different geographical locations for smooth transfer to the new users.

2) Offshore renewable energy and (winter)navigation services, based on dataflows for Offshore DT services from the Dynamical DT, can be transferred from prime users to 6 new users (shipping companies, renewable energy developers, ice services) in the Baltic Sea countries. For example the brash ice service in Finland can be transferred to the ice service providers in Sweden and Estonia (icebreaking authorities, ice information providers, etc.).
The Fairway ToolBox is a collection of codes/programs running operationally and providing data extraction service based on user configured requests. The user input for data extraction locations and preferred data sources have to be flexible to make the tool easily transferable to new shipping routes. The data has to be both in a requestable format (e.g. CSV, json) and in Graphical User Interface (GUI) that can be associated with specific tags (QR-code).

3) Static Digital Twin map layers will be transferred to spatial planning and environmental agencies (2 entities) as well as to renewable energy developers (2 entities related to sea water heat potential and wind energy). Geographical Information System (GIS) software packages (ArcGIS, QGIS) will become the core tool for visualising static map layers. This allows co-visualization of different layers, allowing efficient decision making e.g. by wind farm developers. QGIS (open-source) compatible layers are preferred.

2,586 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable ✔

D 3.4

Title of the deliverable

Guide for sustainable DT solution transfer

42 / 100 characters

Description of the deliverable

Each transferred TAILORED solution (at least 17 cases) will be described in the Guide.
Guide includes description of software implementation, data formats, software and hardware requirements. User feedback and recommendations for new users are included in the description. All case descriptions are provided in a way that they are replicable in new locations with modified/tailored dataflows.
THE DELIVERABLE SERVES AS A USER GUIDE FOR DURABLE SOLUTION IMPLEMENTATION IN NEW REGIONS.

485 / 2,000 characters

Which output does this deliverable contribute to?

O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin

98 / 100 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.3: Transferring solutions						
A.3.4: ICT support for transferring the solutions						
D.3.4: Guide for sustainable DT solution transfer						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

WP 3 Group of activities 3.5

5.6.1 Group of activities leader

Group of activities leader PP 2 - Finnish Meteorological Institute

A 3.5

5.6.2 Title of the group of activities

Publications for promoting the solutions and engaging users

59 / 100 characters

5.6.3 Description of the group of activities

The activity is targeted on public outreach via various media channels (press releases, web stories, social media etc.) according to the Communication Strategy (A.1.2).
The following publications will be published to engage users and promote project outputs:

1) The Static Digital Twin dataset will be published by TalTech and DMI in a peer-reviewed journal to ensure its quality and scientific validity, which is the quality assurance for sustainable use of the datasets by planning authorities.
2) TalTech will present project outputs in a national popular science journal to popularise the use cases of the developed Digital Twin Services.
3) FMI will inform results of the work via its social media channels, press releases and direct customer events.
4) DMI will publish 3 press news at a popular website dmi.dk, and publish a manuscript on the Static Digital Twin products.
5) UL will prepare a web story which is targeted at port monitoring activities.
6) TLU will produce and publish a short video explaining the concept of Static Digital Twin Service (coastal planning and renewable energy). In the video TLU will show what an erosion area looks like and how the processes there affect coastal areas. Also collected and available data will be presented. The aspects of data use in planning of coastal areas, and what can happen with inappropriate planning, is presented.
7) LEGMC will prepare a web story on using the project outcomes in climate services.

The final plan and exact number of publications will be determined in the Communication Strategy.

1,570 / 3,000 characters

5.6.4 This group of activities leads to the development of a deliverable ☑

D 3.5

Title of the deliverable

Publications for promoting the solutions

40 / 100 characters

Description of the deliverable

The deliverables of the activity are 10 publications which will be disseminated via different channels (social media, web sites, press releases).

145 / 2,000 characters

Which output does this deliverable contribute to?

O.2.1 Dynamic Offshore Digital Twin; O.2.2 Dynamic Coastal Digital Twin; O.2.3 Static Digital Twin

98 / 100 characters

5.6.6 Timeline

Period:	1	2	3	4	5	6
WP.3: Transferring solutions						
A.3.5: Publications for promoting the solutions and engaging users						
D.3.5: Publications for promoting the solutions						

5.6.7 This deliverable/output contains productive or infrastructure investment ☐

6. Indicators

Indicators

Output indicators				Result indicators		
Output indicators	**Total target value in number**	**Project outputs**	**Please explain how the solution presented in this output serves the target group(s).**	**Result indicator**	**Total target value in number**	**Please explain how organisations in the target groups within or outside the partnership will take up or upscale each solution.**
RCO 84 – Pilot actions developed jointly and implemented in projects	3	N/A	N/A	**RCR 104 - Solutions taken up or up-scaled by organisations**	3	The components of the 3 Digital Twin Solutions will be transferred to different target groups. The DT solutions provide static data layers and operational data flows for user and associated partners. The level of involvement of users can be divided in two: (1) active users (e.g. national agencies, large ports) with their own environmental information systems and (2) passive users (small entities or users who need only fraction of DT solution) that rely on the active users (centralized service providers). 1) In case of active users the information from DT Solution is provided in a form that is compatible with their current systems. E.g. static map layers with added value and increased resolution are converted to user preferred data format so that they can visualise it in their WMS services. In case of coastal and offshore dynamic DT solutions the data flow is adjusted according to the existing operational monitoring/forecasting service (web page, mobile app). Also new mobile apps will be implemented for active users to visualizing the met-ocean information over desired regions (e.g. ports that are currently without tailored service) for new active users. 2) In case of passive users all the above mentioned applies with the reservation that the service will be provided to them by third party service provider (national agency, private company). The key aspect for passive user engagement is that the national agency adjusts the solution according to the needs of passive users. The service providers (Core Partners, national agencies) play an important role in transferring the solutions after project lifetime and engaging new passive users. 1,663 / 2,000 characters
RCO 116 – Jointly developed solutions	3	O.2.1: Dynamic Offshore Digital Twin Services	Offshore DT solution (O.2.1) components (brash ice, navigation information data flow, meteorological forecast for wind farming) will be used by or transferred to 6 project partners or associated organizations (shipping company, 3 meteo services, 2 transport administration agencies, wind farming industry). Additional users will be engaged from outside the project partnership. Target value for the new user organizations or new service locations is 3. 452 / 1,000 characters			
		O.2.2: Dynamic Coastal Digital Twin Services	Coastal DT Solution (O.2.2) components (port meteorology info) will be used by or transferred to 7 project partners or associated partners (5 ports, 2 universities, 1 meteo service, 1 transport administration agency). Additional users will be engaged from outside the project partnership. Target value for the new user organizations or new service locations is 3. 363 / 1,000 characters			
		O.2.3: Static Digital Twin Services	Static DT Solution (O.2.3) components (wind resource maps, rotor blade icing risk, coastal erosion maps, seawater energy potential, wave statistics) will be used by or transferred to 4 project partners or associated partners. Additional users will be engaged from outside the project partnership. Target value for the new user organizations or new service locations is 3. 371 / 1,000 characters			

Output indicators		Result indicators			
Output indicator	**Total target value in number**	**Result indicator**	**Total target value in number**	**Please describe what types of organisations are planned to actively participate in the project. Explain how this participation will increase their institutional capacity. These types of organisations should be in line with the target groups you have defined for your project.**	
RCO 87 - Organisations cooperating across borders	18	**PSR 1 - Organisations with increased institutional capacity due to their participation in cooperation activities across borders**	27	Project partners and associated organisations	All project partners and associated organization will increase their capacity which will lead to safe offshore and coastal operations in the Blue Economy sector. Core project partners (meteo services, universities) will increase the capability to develop tailored marine monitoring DT services. Also the customer base of these entities will increase as they will increase the ability to engage new users for the developed solutions after project lifetime. Thus they are facilitating user-driven innovation in e-navigation. User partners (ports, shipping companies, transport agencies, ice services) will improve port operations (improved planning of activities), navigation (efficient and safe routing), ice monitoring and ice breaking which in conclusion will lead to financial benefits and increased safety at sea. Associated organization (policy makers, planning agencies, environmental agencies) will improve their knowledge base (e.g. new data layers in spatial planning from Static Digital Twin) relevant for decision making. Associated organizations companies and national authorities (service providers) will improve their marine monitoring capabilities which results in better services for the public. 1,211 / 1,500 characters
				Other organisations	Entities from all target groups will be engaged. At least 9 (target value) additional entities will be engaged. They will be the entities to whom the project outputs (3 DTs) are transferred. Professional Networks of different Policy Area coordinators (SAFE, INNO, Spatial Planning etc.) will be used to engage the users of the DT services upscaled in the project. For example spatial planning VASAB network for spatial planning services. The benefits for the non-consortium members are similar to the user partners and associated organisation. They can be the receivers of the services in the upscaling and transferring phase of the project. Thus the desired DT service (Coastal, Offshore, Static) can be implemented according to they tailored needs. 754 / 1,500 characters

7. Budget

7.0 Preparation costs

Preparation Costs

Would you like to apply for reimbursement of the preparation costs?	Yes

Other EU support of preparatory cost

Did you receive any other EU funds specifically designated to the development of this project application?	No

7.1 Breakdown of planned project expenditure per cost category & per partner

No. & role	Partner name	Partner status	CAT0 - Preparation costs	CAT1 - Staff	CAT2 - Office & administration
1 - LP	Tallinn University of Technology	Active 22/09/2022	24,000.00	318,000.00	47,700.00
2 - PP	Finnish Meteorological Institute	Active 22/09/2022	0.00	260,000.00	39,000.00
3 - PP	University of Latvia	Active 22/09/2022	0.00	277,000.00	41,550.00
4 - PP	Danish Meteorologiacal Institute	Active 22/09/2022	0.00	293,000.00	43,950.00
5 - PP	Tallinn University	Active 22/09/2022	0.00	183,500.00	27,525.00
6 - PP	Garage48	Active 22/09/2022	0.00	44,500.00	6,675.00
7 - PP	Latvian Environment, Geology and Meteorology Centre	Active 22/09/2022	0.00	46,000.00	6,900.00
8 - PP	Saarte Liinid Plc	Active 22/09/2022	0.00	6,150.00	922.50
9 - PP	Eckerö Line Ab Oy	Active 22/09/2022	0.00	28,000.00	4,200.00
10 - PP	Finnish Transport Infrastructure Agency	Active 22/09/2022	0.00	28,000.00	4,200.00
11 - PP	Institute of Hydro-Engineering of the Polish Academy of Sciences	Active 22/09/2022	0.00	20,000.00	3,000.00
Total			24,000.00	1,504,150.00	225,622.50

No. & role	Partner name	CAT3 - Travel & accommodation	CAT4 - External expertise & services	CAT5 - Equipment	Total partner budget
1 - LP	Tallinn University of Tech	47,700.00	80,000.00	6,000.00	523,400.00
2 - PP	Finnish Meteorological In	39,000.00	75,000.00	0.00	413,000.00
3 - PP	University of Latvia	41,550.00	0.00	0.00	360,100.00
4 - PP	Danish Meteorological I	43,950.00	30,000.00	0.00	410,900.00
5 - PP	Tallinn University	27,525.00	17,000.00	0.00	255,550.00
6 - PP	Garage48	6,675.00	55,800.00	0.00	113,650.00
7 - PP	Latvian Environment. Ge	6,900.00	5,200.00	0.00	65,000.00
8 - PP	Saarte Liinid Plc	922.50	0.00	28,000.00	35,995.00
9 - PP	Eckerö Line Ab Oy	4,200.00	0.00	0.00	36,400.00
10 - PP	Finnish Transport Infrastr	4,200.00	0.00	0.00	36,400.00
11 - PP	Institute of Hydro-Engine	3,000.00	35,000.00	0.00	61,000.00
Total		225,622.50	298,000.00	34,000.00	2,311,395.00

7.1.1 External expertise and services

Contracting partner	Group of expenditure	Item no.	Specification	Investment item?	Group of activities no.	Planned contract value
1. Tallinn Universitv	Events/meetings	CAT4-PP1-A-0	Events for user engagement: room rent, catering (49 / 100 characters)	No	3.1 3.3	20,000.00
1. Tallinn Universitv	IT	CAT4-PP1-B-0	IT works for solutions:sub-contracting (38 / 100 characters)	No	1.4 3.3	60,000.00
6. Garage48	Communication	CAT4-PP6-C-0	Hackathon marketing: visual identity creation, social media ads, promo videos, photos and aftermovie (100 / 100 characters)	No	3.2	7,700.00
6. Garage48	Specialist support	CAT4-PP6-E-0	Experts for hackathon: moderator and mentors (44 / 100 characters)	No	3.2	4,600.00
6. Garage48	Events/meetings	CAT4-PP6-A-0	Hackathon event services: room rent, catering, live feeds production and equipment (82 / 100 characters)	No	3.2	14,000.00
6. Garage48	Events/meetings	CAT4-PP6-A-0	Travel and accommodation for hackathon participants coming outside Estonia (74 / 100 characters)	No	3.2	22,500.00
6. Garage48	Events/meetings	CAT4-PP6-A-0	Live broadcast production for DemoDay (37 / 100 characters)	No	3.1	7,000.00
5. Tallinn University	Events/meetings	CAT4-PP5-A-0	Event for user engagement: room rents, catering etc. (52 / 100 characters)	No	3.1	10,000.00
5. Tallinn University	Communication	CAT4-PP5-C-0	Video publication of the project, other communications (Taking part in events with project results). (100 / 100 characters)	No	1.2	7,000.00
2. Finnish Meteorol	IT	CAT4-PP2-B-1	Navigation app development (26 / 100 characters)	No	2.1	75,000.00
4. Danish Meteorol	IT	CAT4-PP4-B-1	Wind energy and static service portal development (49 / 100 characters)	No	2.3	25,000.00
4. Danish Meteorol	Events/meetings	CAT4-PP4-A-1	National user events communication (34 / 100 characters)	No	3.1	5,000.00
	Total					298,000.00

Contracting partner	Group of expenditure	Item no.	Specification	Investment item?	Group of activities no.	Planned contract value	
11. Institute of Hydr	Specialist support	CAT4-PP11-E-	Sub-contracting: data collection, formating and consolidation 61 / 100 characters	No	1.2 2.3	35,000.00	
7. Latvian Environm	Events/meetings	CAT4-PP7-A-1	Events for user engagement: room rent, catering 48 / 100 characters	No	3.1	5,200.00	
	Total					298,000.00	

7.1.2 Equipment

Contracting partner	Group of expenditure	Item no.	Specification	Investment item?	Group of activities no.	Planned contract value	
1. Tallinn Universitv	Machines and instru	CAT5-PP1-E-0	Marine measuring device (wave buoy) 35 / 100 characters	No	1.4 2.1	6,000.00	
8. Saarte Liinid Plc	Machines and instru	CAT5-PP8-E-0	Marine measuring devices: 3 wave buoys and 1 current meter. The devices will be depreciated. 92 / 100 characters	No	2.1	28,000.00	
	Total					34,000.00	

7.1.3 Infrastructure and works

Contracting partner	Group of expenditure	Item no.	Specification	Investment item?	Group of activities no.	Planned contract value	
Please select	Please select	CAT6-PP--01	0 / 100 characters	Please select		0.00	
	Total					0.00	

7.2 Planned project budget per funding source & per partner

No. & role	Partner name	Partner status	Country	Funding source	Co-financing rate [in %]	Total [in EUR]	Programme co-financing [in EUR]	Own contribution [in EUR]	State aid instrument
1-LP	Tallinn University of Technology	Active 22/09/2022	EE	ERDF	80.00 %	523,400.00	418,720.00	104,680.00	For each partner, the State aid relevance and applied aid measure are defined in the **State aid section**
2-PP	Finnish Meteorological Institute	Active 22/09/2022	FI	ERDF	80.00 %	413,000.00	330,400.00	82,600.00	
3-PP	University of Latvia	Active 22/09/2022	LV	ERDF	80.00 %	360,100.00	288,080.00	72,020.00	
4-PP	Danish Meteorologiacal Institute	Active 22/09/2022	DK	ERDF	80.00 %	410,900.00	328,720.00	82,180.00	
5-PP	Tallinn University	Active 22/09/2022	EE	ERDF	80.00 %	255,550.00	204,440.00	51,110.00	
6-PP	Garage48	Active 22/09/2022	EE	ERDF	80.00 %	113,650.00	90,920.00	22,730.00	
7-PP	Latvian Environment, Geology and Meteorology Centre	Active 22/09/2022	LV	ERDF	80.00 %	65,000.00	52,000.00	13,000.00	
8-PP	Saarte Liinid Plc	Active 22/09/2022	EE	ERDF	80.00 %	35,995.00	28,796.00	7,199.00	
9-PP	Eckerö Line Ab Oy	Active 22/09/2022	FI	ERDF	80.00 %	36,400.00	29,120.00	7,280.00	
10-PP	Finnish Transport Infrastructure Agency	Active 22/09/2022	FI	ERDF	80.00 %	36,400.00	29,120.00	7,280.00	
11-PP	Institute of Hydro-Engineering of the Polish Academy of Sciences	Active 22/09/2022	PL	ERDF	80.00 %	61,000.00	48,800.00	12,200.00	
Total ERDF						2,311,395.00	1,849,116.00	462,279.00	
Total						2,311,395.00	1,849,116.00	462,279.00	

7.3 Spending plan per reporting period

	EU partners (ERDF)		Total	
	Total	Programme co-financing	Total	Programme co-financing
Preparation costs	24,000.00	19,200.00	24,000.00	19,200.00
Period 1	441,250.00	353,000.00	441,250.00	353,000.00
Period 2	438,750.00	351,000.00	438,750.00	351,000.00
Period 3	499,000.00	399,200.00	499,000.00	399,200.00
Period 4	416,000.00	332,800.00	416,000.00	332,800.00
Period 5	158,300.00	126,640.00	158,300.00	126,640.00
Period 6	334,095.00	267,276.00	334,095.00	267,276.00
Total	2,311,395.00	1,849,116.00	2,311,395.00	1,849,116.00