



North Sea - Mediterranean TEN-T Core Network Corridor

*Final Report
Loop 2, 2020-2022*

August 2022

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STUDIES ON THE TEN-T CORE NETWORK CORRIDORS AND SUPPORT OF THE EUROPEAN COORDINATORS

Lot 8, North Sea - Mediterranean Corridor

Final Report, Loop 2

Consortium: This report is the final report of the second loop of the 2018-2022 Corridor study, prepared by the contractors Panteia, EGIS, MDS-Transmodal, STRATEC and BG.

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Abstract

This report summarises the work carried out by the team of consultants (Panteia, EGIS, MDS-Transmodal, Stratec and BG) on behalf of DG-MOVE in relation to the contract, Studies on the TEN-T core network Corridors and support of the European Coordinators, DG-MOVE Reference: MOVE/B1/SER/2018-216/SI2.782702 (Lot 8), during the second half of the contract, covering the period 2020-2022.

During this period, the team has carried out data gathering and analyses for the North Sea - Mediterranean Core Network Corridor (NSMED CNC), in support of the European Coordinator, Professor Péter Balázs, as well as support for the Corridor forum activities, working groups and ad-hoc requirements. The work has provided inputs for the European Coordinator's Fifth Work Plan, completed in 2022.

Since the Corridor work began in 2014, the teams have developed common methodologies and approaches which permit comparisons to be made across Corridors and to merge the information collected. The work is therefore organised to provide regular updates of these key elements, including the analysis of technical compliance, the key performance indicators (KPI), the market study, the project list and the project implementation report. The methodologies are described in this document, covering the period 2020-2022, and the main results are also summarised for future reference.

Regulation (EU) 2021/1153, establishing the Connecting Europe Facility for the period 2021 – 2027, adapted the alignment of the Corridor. The modification consists of:

- the extension of the Corridor in Ireland westwards to connect the Port of Shannon-Foynes;
- the addition in France of the connection from Paris to Le Havre via Rouen following the Seine River;

the addition of maritime links between the three Irish core ports of Dublin, Cork and Shannon Foynes, and core ports in the range from Le Havre to Amsterdam (Le Havre, Calais, Dunkerque, Zeebrugge, Antwerp, Ghent, and Terneuzen (North Sea Port), Rotterdam and Amsterdam). This new alignment reflects the exit of the United Kingdom from the EU and reinforces the connectivity of Ireland with the continent - putting emphasis upon direct maritime connections to important ports of the Northern range, therefore offering connectivity to the rest of the EU, as well access to global maritime connections. While the ports of Le Havre and Rouen are added to the Corridor, the River Seine, which is part of the Seine - Scheldt project, is now included in its entirety in the Corridor. This section in France is shared with the Atlantic Corridor. The addition of Shannon Foynes also means that all core ports in Ireland are now included.

To date, the Corridor is well placed to achieve the minimum technical standards by 2030 and to exceed them in many areas, but there is still a great deal of work to be done to achieve the full range of TEN-T objectives; cohesion, efficiency, sustainability, and user benefits. After several years of economic and population growth, the outlook following Brexit, the COVID-19 pandemic, and the war in Ukraine is uncertain, creating new challenges and new opportunities for the transport industry.

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Abbreviations

CEF	Connecting Europe Facility
CEMT/ECMT	Conférence Européenne des Ministres des Transports
CNC	Core Network Corridor
CNG	Compressed Natural Gas
CO ₂	Carbon Dioxide
COOPERE	Le Comité des Opérateurs du Réseau (French Rail Network Operators Committee)
DG MOVE	European Commission – Directorate General for Mobility and Transport
EDP	ERTMS Deployment Plan
EFSI	European Fund for Strategic Investments
EIB	European Investment Bank
ESIF	European Structural and Investment Funds
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
GDP	Gross Domestic Product
GSM-R	Global System for Mobile Communications – Railway
INEA	Innovation and Networks Executive Agency (EU)
ITS	Intelligent Transportation System
IWT	Inland Waterway Transport
KPI	Key Performance Indicator
LGV	Ligne à Grande Vitesse
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MFF	Multiannual Financial Framework
MoS	Motorways of the Sea
NSMED	North Sea - Mediterranean
P400	Railway loading gauge offering four metre corner height
RIS	River Information Services
RFC	Rail Freight Corridor
RORO	Roll-on, Roll-off
RRT	Rail–Road Terminal
SESAR	Single European Sky ATM Research Programme
TEN-T	Trans-European Transport Network
TEU	Twenty-foot equivalent unit (container)
TKM	Tonne Kilometre
UIC	International Union of Railways

Country ISO Abbreviations

BE	Belgium
FR	France
IE	Ireland
LU	Luxembourg
NL	Netherlands
UK	United Kingdom

1 Executive Summary

In 2014, following the publication of the TEN-T Regulation, the European Commission (DG-MOVE) launched nine Corridor studies, to provide technical support to the appointed European Coordinators, leading up to the first generation of Corridor work plans at the end of the year, outlining key elements of the strategy leading up to 2030. These studies would collect and analyse information about the respective Corridors, including their alignment, their technical characteristics, bottlenecks, missing links, traffic flows and market evolution, as well as compiling a list of current and future infrastructure projects. Each Corridor's progress was coordinated through their respective Corridor forum, comprising stakeholders from Member States, EU Institutions, infrastructure managers, including the Rail Freight Corridors (RFCs), and the Corridor regions. Since 2014 the work has continued until the present, and this report (2022) coincides with the publication of the European Coordinators' fifth work plans.

Amongst the nine Corridors, the North Sea – Mediterranean (NSMED) Corridor covers the primarily north-south axis connecting Ireland, France, Belgium, Luxembourg and the Netherlands, stretching from Dublin and Amsterdam to the Mediterranean coastline in Marseille. It includes some of the largest metropolitan regions in Europe, a number of Europe's largest international gateways, and is well served in terms of modern infrastructure including, notably, high speed rail connecting the principal urban nodes.

Together, the nine Corridors form an interlocking network, which is the backbone of the TEN-T core network, and in the case of the NSMED Corridor, it connects to the Atlantic Corridor towards the Iberian Peninsula, the Mediterranean Corridor connecting to Spain and Italy, the Rhine Alpine Corridor through Germany towards Italy, and the North Sea – Baltic Corridor stretching east towards Poland and the Baltic States. Until the UK's withdrawal from the EU in 2020, the NSMED Corridor was the only one including the UK.

NSMED is truly a multimodal Corridor, with heavily used rail (including intermodal rail freight and high-speed passenger rail), road, and inland waterway infrastructure, as well as interconnecting maritime links. While the railway network covers the entire Corridor, waterborne transport (short sea and inland navigation) is limited to certain regions of the Corridor, meaning that there needs to be complementarity between freight modes in order to make full use of the available transport assets. The same is also true for passenger transport, where for example the high speed network provides an alternative to short-haul air transport, as well as an extension of the long distance network.

Like the other Corridors, the NSMED Corridor includes a number of high-profile developments which have the potential to create a step-change in the way that the network functions, rather than incremental adaptation. The Seine-Scheldt project will open up a new high-capacity link for inland navigation between France and Belgium, while the completion of the central part of the RFC-NSMED between Belgium, Luxembourg and France, through to the Swiss border, with harmonised standards for train length, signalling and loading gauge will allow this route to compete more effectively with road and provide the capacity to do this effectively.

Looking at the demand side, it is clear that the Corridor is connecting some of the most economically active regions of Europe, so it is characterised by high levels of traffic. In aggregate, demand has been quite stable up to the end of 2019, but it is clear that traffic associated with international gateways such as main airports and container ports have been growing rapidly, thereby putting pressure on connections to inland networks and the urban centres, requiring multimodal hinterland solutions.

Until now, the study has examined the longer-term demand trends, and in both the third (2018) and fourth (2020) work plans, forecasting exercises have been carried out, in the first instance to analyse climate change impacts, and in the second to analyse the role being played by TEN-T investments in terms of growth, jobs and traffic impacts such as modal shift. Based on the long-term trend (and not adjusted for the as yet unknown impact of the COVID-19 crisis) these would imply growth of around 20-25% in total freight and passenger traffic volumes by 2030, but with only a slight net reduction in expected CO₂ emissions. However, these projections do not take full account of the planned investments, either in the area of the transition towards more sustainable modes of transport, or in the area of alternative fuels. The former requires long-term investment and the build-up of capacity in rail and inland waterway infrastructure, while the latter depends upon the combination of technological innovation and market uptake. Today, the Corridor's networks are almost completely electrified, but there is still great scope for greater energy efficiency and lower pollution from road and waterborne transport through the use of alternative fuels. With COVID-19, for which to date, some of the heaviest impacts have occurred in NSMED regions, stakeholders are now moving away from the period of stability and predictable growth and entering a period of increased uncertainty, which needs to be followed closely.

From the start of 2021, the NSMED Corridor has a new alignment, reflecting the withdrawal of the UK and the need to maintain the continuity of the Corridor. Ireland is now connected via maritime links to the core ports in the northern continental range, and two new branches have been added, along the Seine to Le Havre and towards the Irish west coast port of Shannon-Foynes. Thus, three new ports will be added in total, namely, Rouen, Le Havre, and Shannon-Foynes, and with this arrangement, the full scope of the Seine-Scheldt development, including the lower Seine will be in the NSMED Corridor. The UK, despite not being part of the Corridor anymore, will continue to be an influence upon traffic flows in the Corridor, especially for the adjacent regions in Ireland, France and Belgium.

TEN-T sets out four main objectives: (a) cohesion, (b) efficiency, (c) sustainability and (d) benefits for users, and it sets priorities for both the core and comprehensive networks, aiming to improve harmonisation of networks across borders. Within this framework, there are minimum technical standards, or compliance criteria, which need to be achieved by 2030 in order to permit greater interoperability across the whole network. Each Corridor study has therefore been monitoring the extent to which the network is converging towards these specific requirements.

On the whole, the NSMED Corridor is now well-placed to achieve the TEN-T standards, and in many areas it will exceed the requirements, for example with many high-speed rail sections operational, and with the existing network of high-capacity waterways, but there are still bottlenecks which are not yet resolved, as described in the 5th Work Plan.

Moreover there are important capacity bottlenecks, especially for the rail network in the main urban nodes and in the immediate access points to the major seaports.

In addition to these points there are also identified missing links remaining in the network. The most important missing link, the Canal Seine-Nord Europe is now in the preparatory stages of construction, but it is not expected that the Rhône-Saône-Moselle-Rhine links will begin construction before 2030. Likewise the two missing sections of the high-speed line LGV-Rhone-Rhine (second phase of the project, 50kms of line) are not foreseen to be built by 2030, and neither is the new high-speed branch Dijon - Lyon.

Loading gauge for rail freight remains an issue as well, with bottlenecks found between Metz and Strasbourg, and close to Marseille, as well as just across the Swiss border in Basel. This is an important priority for the development of unit-load traffic

on the Rail Freight Corridor towards Italy, as it would allow the rail sector to offer a closer substitute for existing road freight users.

Meanwhile, investment in the Corridor has been progressing rapidly. As of April 2022, the project list contains 498 separate projects affecting the NSMED Corridor, with a combined investment in excess of €77.3 billion. Around 71% of this sum is for projects which have either been completed or which have started construction, while the remainder is for projects which have yet to start or for less mature projects for which the start or end dates are unknown.

Amongst the completed projects or projects nearing completion are:

- Lifting of bridges over the Albert Canal (BE)
- Dunkerque Container Berth upgrade (FR)
- Opening of the Marseille-Fos LNG Hub (FR)
- Construction of the road rail terminal in Bettembourg/Dudelange (LU)
- Modernization of the Luxembourg-Kleinbettingen Line (LU)
- The 406km East High Speed line (LGV Est) (FR)
- Construction of the Beatrix Lock and upgrade of the Lek Canal (NL)
- The new sealock in IJmuiden (NL)
- Construction of the A4 Rijnlandroute (NL)
- Opening of the Cork Container terminal (Ringaskiddy) (IE)
- Rail Connections to Maasvlakte II (NL)
- Maasroute upgrade (NL)
- Completion of the new Vb Harelbeke lock on the river Lys (BE)
- New 7m bridge in Wervik (BE)
- Raising of the Ingelmunster bridge over the Roeselare-Lys canal (BE)
- Removal of the bottleneck along the Upper Scheldt in Tournai (BE)
- Construction of new infrastructure in the port of Calais (FR)
- Realisation of the Theemsweg railway section (NL)

Ongoing or future projects expected to be completed by 2030 include:

- Seine Nord Canal (BE/FR)
- Optimisation of the Brussels and Antwerp Ring Roads (BE)
- Further upgrades on the River Lys (BE)
- EuroCap-Rail: modernisation of the Brussels-Luxembourg axis (BE/LU)
- New lock Terneuzen (NL)
- Lyon node rail upgrade (FR)
- New rail connection to Paris Orly Airport (FR)
- CAP2020, Dunkerque (FR)
- Dublin Port Alexandra Basin upgrade (IE)
- Dublin Metrolink project (IE)
- Bettembourg and Luxembourg station upgrades (LU)
- Upgrade of Amsterdam Central Station

- Marseille node (multiple projects) (FR)
- Second Rail access to Antwerp (BE)
- Phase 2b of the Maasroute upgrade (NL)
- ETCS deployment in Belgium (BE)
- New public transport links to Schiphol Airport (NL)
- Second tidal dock in the Port of Antwerp (BE)

These projects are expected to make significant contributions to the Corridor network by extending the high capacity waterway network, extending the high speed rail network, relieving rail congestion in cities, improving maritime and inland access to ports, increasing the availability of alternative fuels, improving public transport access to airports, increasing the resilience of the waterway network, and extending the deployment of ERTMS. All of these projects are expected to be realised before 2030, and many by the middle of the decade. In the waterway sector, the complex planning of the inter-related Seine-Scheldt upgrades is now underpinned by the Commission's 2019 Implementing Decision, which sets out in detail the respective commitments of the different parties, and links the infrastructure programme to the deployment of clean fuels.

For the future, the Fifth Work Plan puts greater emphasis on sustainability, and achieving far greater improvements in energy efficiency and reduction of GHG emissions through the use of alternative fuels especially in road and waterborne transport. Exploiting the full potential of rail remains a key priority, building upon what has already been planned, and ensuring that the targets for 740m trains and ERTMS are met, as well as the major works planned to relieve congestion in urban nodes. Loading gauge upgrade to P400 for a larger part of the Corridor is also emphasised.

The combined impacts of Brexit, COVID-19 and the war in Ukraine create ongoing uncertainty, but the European Commission has restated its commitment to maintaining Ireland's connectivity with the rest of the EU, and to set out new and stronger financial instruments for maintaining progress and momentum towards long term goals.

2 Introduction

2.1 NSMED Corridor Study

The TEN-T Core Network Corridors (CNCs) were formally introduced by the European Commission in 2013 as the main vehicle for co-ordinating and prioritising transport investments in Europe and for concentrating EU financial assistance from the Connecting Europe Facility (CEF). The nine designated core network Corridors form the backbone of the network and the basis for a new era of transport policy in Europe.

In 2014 the European Commission launched a series of (first phase) studies to prepare work plans for each of the nine Corridors. The North Sea Mediterranean (NSMED) Corridor, was taken up by a consortium consisting of Panteia, Egis, MDS-Transmodal, Stratec, and BG.

Figure 1: Overview of Corridor study phases 2014-2022



These first phase studies were followed by 2015-2017 Corridor studies which developed the nine Corridors further, refining the 2014 work plans, and continuing the high level of stakeholder engagement through the Corridor forum meetings and working groups, leading towards the second and third generation work plans, with the third work plan completed in the first half of 2018.

The 2018-2022 study is a continuation of the 2015-2017 work with an emphasis maintaining a high degree of up-to-date information about the Corridor and its project list and further developing the TEN-T network in Europe by close collaboration between EU stakeholders and the EC. It is organised into two loops, each with the same structure. This final report marks the completion of the second loop, also coinciding with the publication of the Coordinator's Fifth Work Plan.

The NSMED Corridor is led by European Coordinator, Professor Péter Balázs, and by DG-MOVE Advisor, Alexis Padoy.

2.2 Consortium

Our consortium contains all the partners who successfully undertook the 2014 and 2015-2017 North Sea Mediterranean Core Network Corridor Studies.

Panteia B.V. is a Netherlands based consultancy firm with more than sixty years of experience in fields of research including transport, traffic, infrastructure and logistics.

EGIS is a French consultancy, specialising in transport and urban infrastructure, water, energy and the environment. In engineering and consulting, its sectors of activity include transport, urban development, building, industry, water, environment and energy.

MDS Transmodal Ltd. is a UK-based consultancy with more than thirty years of experience in undertaking multimodal transport studies within the UK, Ireland and worldwide.

Stratec is a Belgian consultancy with more than thirty years of experience in undertaking multimodal transport studies within Belgium, Luxembourg and across Europe.

BG INGÉNIEURS CONSEILS, founded in 1954, is a firm of consulting engineers in the fields of infrastructure, environment, building and energy, with subsidiaries in Switzerland, France and Algeria.

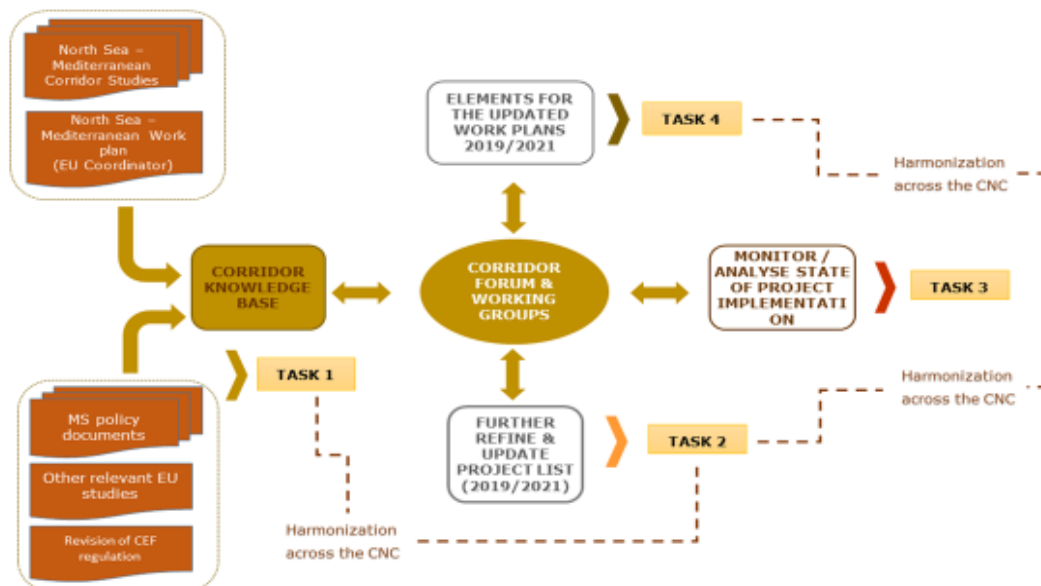
Table 1: National and EU Coverage by the consortium

	BE	IE	FR	LU	NL	EU
<i>Panteia</i>					✓	✓
<i>MDST</i>		✓				✓
<i>EGIS</i>			✓			✓
<i>Stratec</i>	✓			✓		✓
<i>BG</i>			✓			✓

2.3 Organisation of Tasks

In common with all CNCs, the study is structured into five work packages, as presented in the following figure below.

Figure 2: Organisation of tasks



As in previous studies it is understood that there will be a high degree of interaction across all the nine Corridors, so there is a need to develop and apply common approaches which will provide the EC with a complete and consistent view across the whole network.

There are five main tasks:

1. Updating the knowledge base
2. Maintaining and updating the project list

3. Monitoring project implementation
4. Updating the work plan
5. Supporting the EC and European Coordinator in the Corridor forum and working groups.

As in previous studies it is understood that there will be a high degree of interaction across all the nine Corridors, so there is a need to develop and apply common approaches which will provide the EC with a complete and consistent view across the whole network. By combining resources across Corridors it has been possible to strengthen the methodologies and results and to avoid important inconsistencies. The five study tasks and sub-tasks are listed below:

Table 2: Overview of tasks within the study

Task 1	Further elaborating the Corridor knowledge base
1.1	Transport market study update
1.2	Update of the analysis of the characteristics of each Corridor
1.3	Analysis of EU studies and policy actions
1.4	Expert review and impact assessment of related main MS policy documents
Task 2	Further refining of the Project List
2.1	Regular review of the project list composition
2.2	Completion of the project list and its individual project fiches
2.3	Critical review of projects submitted by stakeholders
2.4	Proposal for additional projects
2.5	Information on obtained parameters and realised KPIs
2.6	Projects' contribution to indicators
2.7	Projects' feasibility/maturity
2.8	Analysis of the synchronisation of projects regarding the contribution to Corridor development
2.9	Further identification of projects promoting sustainable and future-oriented mobility
2.10	Identifying rail breakthrough projects
2.11	Preparing project data for TENtec
Task 3	Monitoring Project implementation and reporting
3.1	Monitoring the implementation of Corridor projects and providing information on the project implementation
3.2	Analyse the progress of projects
3.3	Prepare regular and ad-hoc project implementation status reports
3.4	Providing tailor-made information for the Coordinator
3.5	Preparing additional documents incl. all task's results
3.6	Using/updating the technical parameter data in TENtec OMC
Task 4	Provide elements for the update of the Work Plan
4.1	Removal of physical and technical barriers (incl. interoperable systems)
4.2	Identification of administrative & operational barriers
4.3	Analysis of Corridor's state and future innovation potential

4.4	Identifying climate impacts and possible measures for resilience enhancement
4.5	Identifying the Corridor impact on emissions, noise and mitigation
4.6	Ex-post economic impact evaluation of accomplished projects
Task 5	Corridor forum meetings and WG meetings
5.1	Supporting the organisation of Corridor Forum meetings
5.2	Organisation of working group meetings
5.3	Presenting the progress of the study at the meetings
5.4	Managing and updating the established list and communications of/with stakeholders

2.4 Aim and Structure of this Report

The report describes the work carried out by the Consultancy team during the second loop of the study (Month 25-48) presenting the latest status of the results and activities (from 2020 up to 2022).

This report is based on the following deliverables completed in the second loop of the study:

1. Inception Report – phase 2 (July 2020)
2. Project Implementation Report 2/2020 (October 2020)
3. Corridor Study Update 2 (March 2021)
4. Project List Update 2021 (May 2021)
5. Project Implementation Report 1/2021 (May 2021)
6. Intermediate Report Phase 2 (August 2021)
7. Project Implementation Report 2/2021 (October 2021)
8. Project Implementation Report 1/2022 (planned May 2022, delivered July 2022)
9. 5th Work Plan (1st version December 2021, final version to Member States July/August 2022)
10. Final Report II (August 2022)
11. Monthly Management Reports
12. Regular Press Reviews
13. Answers to specific requests by the Coordinator on Corridor-related matters

The report is structured as follows:

- Chapter 1 provides an executive summary
- Chapter 2 provides an overview of the work aims and organisation
- Chapter 3 covers Task 1, Elaboration of the Corridor knowledge basis
- Chapter 4 covers Task 2, The Project List
- Chapter 5 covers Task 3, Monitoring project implementation
- Chapter 6 covers Task 4, Elements for the update of the Work Plan
- Chapter 7 covers Task 5, Corridor Forum and Working group meetings
- Chapter 8 highlights the main conclusions and open issues for the next phase of Corridor studies.

3 Corridor Knowledge Base

The task is undertaken by the consortium as a whole, each partner acting as national expert, either for collection of information or for the checking and evaluation of external information. The information is then centralised and then shared across the consortium, and with DG-MOVE, using OneDrive (cloud sharing).

Task 1 is focused on establishing a knowledge base for the Corridor for further strategic analysis. During the previous studies, a large amount of data has been collected and many analyses have been undertaken. This task is continuing this work and further analysing the development of the Corridor. The nine CNC study teams are applying a consistent and comparable methodology with respect to the previous studies.

This task has been performed between **December 2020** and **February 2021**. This task builds forth on previous studies, and in particular the previous Corridor Study Update carried out in 2018. The Corridor Study Update provided inputs for tasks 2 and 4, leading into the Coordinator's 5th Work Plan.

The Corridor Study Update was originally scheduled for November 2020. However, delivery was **postponed to February 2021** to allow for the inclusion of the Corridor extensions. While it was originally foreseen to include the years 2018 and 2019, the rescheduling offered the opportunity to also include the year 2020. In doing so, this study is no longer synchronous with the update of the project list, which serves as a basis for the study. During this phase of the study, the last update of the project list dated back to September 2020. Therefore, there was still some uncertainty with regard to the projects that were planned to be completed between October and December 2020. Where possible, the completion of these projects was verified with stakeholders.

The main development areas in Task 1 are:

- Multimodal Transport market study for the Corridor,
- Update of Corridor characteristics, the state of the infrastructure with respect to Article 39 of the Guidelines, as a result of the on-going Corridor infrastructure projects,
- Identification and analysis of other EU studies and relevant policy actions.
- Review of the main national policy documents of the Corridor Member States and assessment of the impact on CNC development.

With the start of the second part of this study phase (06/2020), task 1.1 on the Multimodal Transport Market Study has been omitted. For the team involved on this task in the previous round, a large extent of time was dedicated to the collecting data on base-flow. In this regard, it was agreed during the Management Meeting held on 25 June 2020 to suspend the MTMS analysis

The following sections summarises the results of tasks 1.2, 1.3 and 1.4.

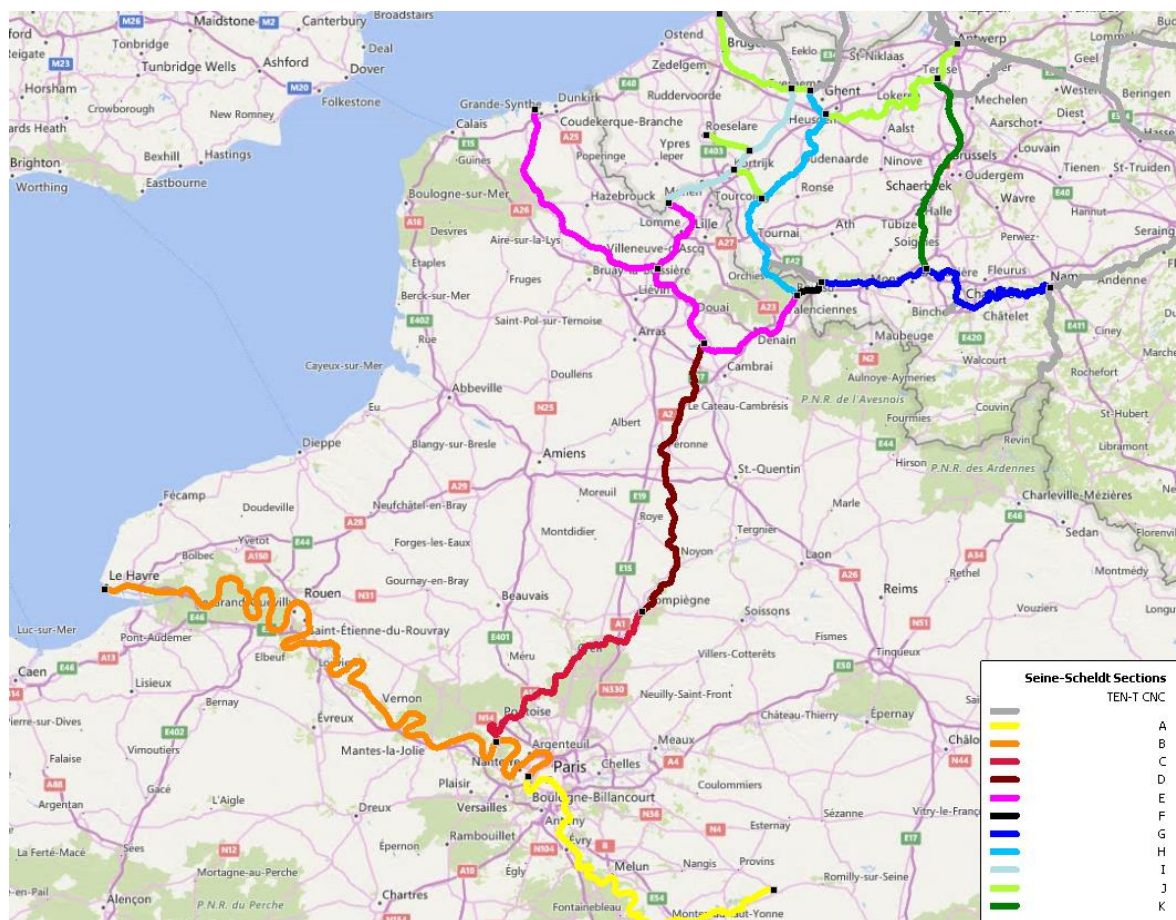
3.1 Characteristics of the Corridor

3.1.1 Alignment

Up to 2020, the alignment of the Corridor, which is the basis for most of the analyses performed in the study, followed the definitions agreed in 2014. Then, the alignment changed, with the withdrawal of the UK from the EU and subsequently the Corridor, and the CEF2 extensions. Now, the NSMED CNC covers five countries, namely Belgium, Ireland, France, Luxembourg and the Netherlands, leading to the German and the Swiss borders, connecting to the Rhine Alpine Corridor with onward links through the Alpine region to Italy. It consists of 5,452km of railways, 3,233km of roads and 4,061km of inland waterways¹.

Within the overall alignment it was also necessary to code the sections of the Seine-Scheldt project, following the 2019 Implementing Decision. See Figure 3.

Figure 3: Categorisation of waterway sections



¹ Includes existing sections as well as sections categorised as “new construction”, i.e. sections to be constructed in future.

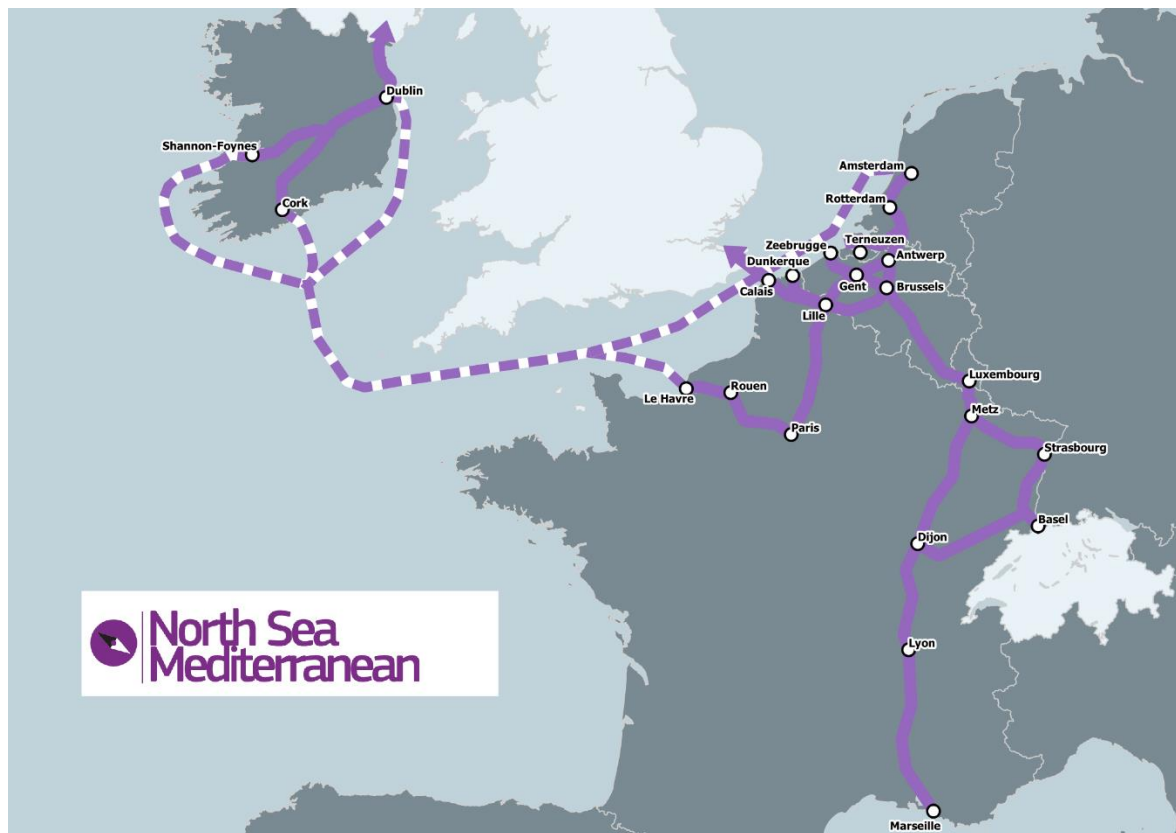
3.1.2 Alignment extensions

Moving into the second half of the study, in common with other CNCs, the alignment has changed to incorporate more of the non-Corridor core network, following the Connecting Europe Facility (CEF) revision.

In Ireland the Corridor has been extended westwards to connect the port of Shannon-Foynes, and in France the connection along the Seine river from Paris to Le Havre and Rouen has been added. The Corridor now also includes maritime links between the three Irish core ports of Dublin, Cork and Limerick, and core ports in the range from Le Havre to Amsterdam (Le Havre, Calais, Dunkerque, Zeebrugge, Antwerp, Ghent and Terneuzen (North Sea Port), Rotterdam and Amsterdam).

Unlike any of the other CNCs, there have also been changes arising from Brexit and the Withdrawal Agreement. On the 31st of December 2020, the UK has officially left the European Union, and as a consequence, the UK has also been removed from the NSMED Corridor alignment. Projects in the UK completed by the end of 2020 are still in the project list, but the UK has been excluded from all analyses from 2021 onwards. The changes arising from the CEF revision, taking account of Brexit, have resulted in the following Corridor alignment:

Figure 4: New Corridor alignment, post 2020



These changes have been registered in the TENtec system in 2020, and are now used for all Corridor analyses, such as compliance checks, KPIs, selection of projects, and traffic analyses, during the second loop of the study.

3.1.3 Technical data collection and analysis

One of the main tasks accomplished during 2019 was the consolidation of the technical data gathered for the Corridor into a single dataset aligned with the EC's TENtec dataset. This data has been collected over several years, so at the start of the 2018-2022 study there were important discrepancies between the datasets being used within TENtec, for the KPI analysis, and for the compliance analysis, leading to problems in interpreting the results and making comparisons between them.

In July 2019, a new geographical dataset was provided to the Consultants by TENtec (17-Jul-2019), containing the updated Corridor sections (SHP file), and the new parameter data, containing information gathered for the years 2014 and 2015. The aim was therefore to fill the parameter data for 2016 and 2017, and then to use this information as a single dataset for all Corridor analyses. TENtec has also been updated with this new data. A further round of updating will take place in the second loop of the study for the years 2018-2020.

The objective of this task is to provide an update to the characteristics of the Corridor for the years of 2018, 2019 and 2020. This is carried out by tracking and monitoring the achievements in terms of KPIs per TEN-T Core Corridor section and node, according to the infrastructure targets and definitions set out in Regulation No. 1315/2013, Article 39.

The analysis of task 1.2 concludes with an overview of the critical issues that remain to reach compliance. These critical issues were updated based on the most recent project list and presented in the 5th Work Plan.

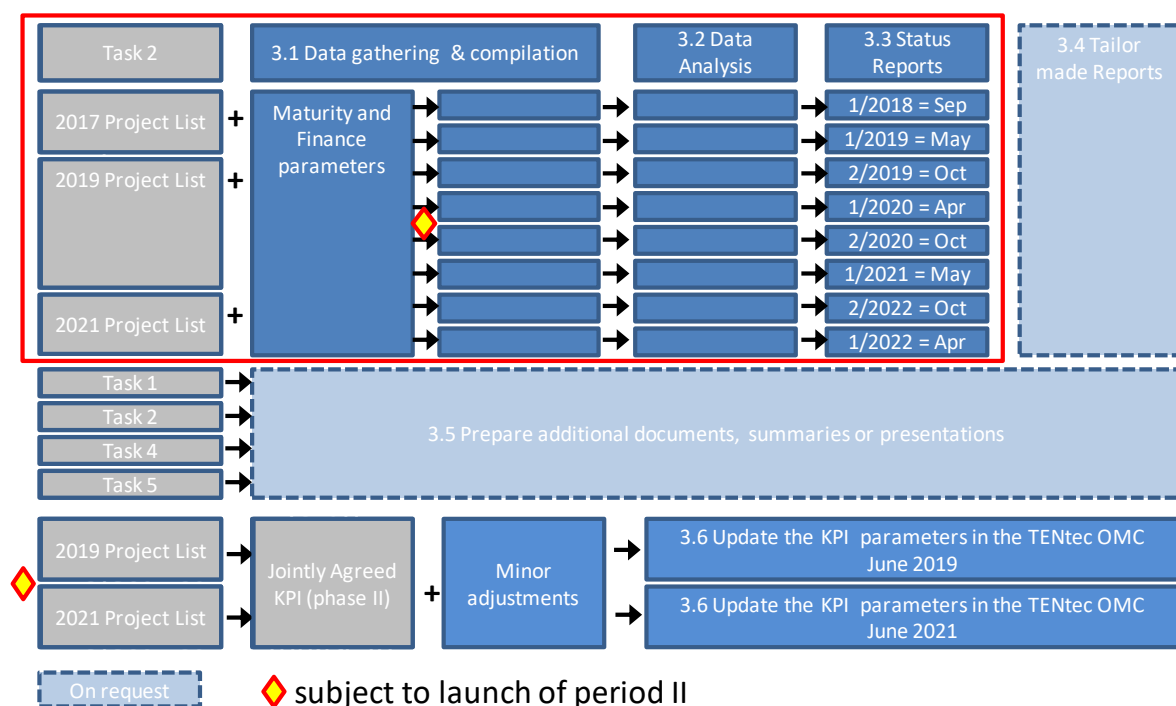
4 Project List

4.1 Project List Methodology

One of the central tasks for the Corridor studies is the production of a list of projects containing information about ongoing and future investments, their objectives, their contributions to TEN-T goals, their status, timing, costs and so on. Following previous practice, the Corridor teams divide the work between national experts for the whole network, so that there is a single point of contact for each Member State, and the result is a single list covering all Corridors. At the start of the 2018 contract the most recent project list was the one based on data collected in 2017. There is a designated group of consultants working on this task, and the NSMED team are the respective national experts for their home countries.

An overview of the methodology is shown below. Note that there are linkages to Task 3 (Project Monitoring).

Figure 5: Overview of Project List Tasks



According to these work steps, there are two major revisions of the project list carried out during the four-year contract, the first of which was completed in 2019, and the second in 2021. For the interim periods, there are six-monthly updates (Task 3), the latest being update No1/2022 (April 2022), in which stakeholders are requested to provide updated information of project costs and maturity. For the NSMED situation, there were also adjustments needed to rectify certain omissions found in the June 2019 list.

In November 2021 a version of the list was prepared for circulation amongst the Forum members. It included an Excel-based, user-friendly tool making it possible to apply various filters to simplify the list. Overall there are in excess of 3,500 project IDs and over 110 columns of data per project. This 2021 list was the basis for the Fifth Work Plan.

For the NSMED Corridor key issues regarding the project list were:

- Aligning the Seine Scheldt projects in the list with the Implementing Decision of 2019, so that the linkage with the Seine-Scheldt sub-sections is made, and updated accordingly.
- Assessing the UK projects, which must be completed before the end of 2020.
- Gathering projects, as well as information on those projects that regard the newly added CEF2 extensions.

In common with other Corridors it was also necessary to fill in geographical coordinates so that the projects could be mapped against Corridor sections, and to match the projects with TENtec section IDs. These tasks were carried out in mid-2019 and mid-2021.

Furthermore it was necessary to make estimations of project costs for projects for which no costs could be given by the project promoters. A common methodology (developed by M-Five) was used in order to allow for greater consistency. Currently in NSMED, 75% of total project costs are based on cost figures provided by stakeholders and 25% are based on estimates.

4.2 April 2022 Project List Update

Discussion and agreement on common views as well as coordination of work was carried out by a cross-Corridor working group. This working group consisted of the project list lead partners from all consortia and tackled all project list related issues from Task 2 and Task 3. The working group was led by Hacon (in relation to Task 2) and KombiConsult (in relation to Tasks 3.1-3.3).

During this phase, several working group meetings took place (online), particularly in order to prepare the management meetings with the Commission and the “big” project list update. This “big” project list update started with the preparation phase in autumn 2020 and ended with the formal approval of the project list by DG MOVE on 3 May 2021. During this period, the following main work steps were executed:

- Preparation of the common Project List structure – September 2020;
- Merging of all Corridor Project Lists to one cross-Corridor list;
- Data gathering at project promoters; merging of all contributions to one Corridor list;
- Coordination with Member States, other stakeholders and European Commission in different check/validation rounds; after each round merging to one cross-Corridor Project List;
- Finalisation of the cross-Corridor overall Project List: several consistency checks (HaCon), whereas responsibility of contents remains with the indicated responsible partner.
- Final Project List serves as an input for the user-friendly tool (developed and implemented by Panteia);
- Modification of Project Fiche layout and data feeding mechanisms;
- Check, gathering and creation of project maps;
- Creation of Project Fiches and provision in a web space – 31st May 2021.

The main outcome of Task 2.1 and 2.2 is the updated set of project fiches. These fiches comprise information on a 2-page document for each project.

In 2022, an interim update was carried out based on a “narrow” version of the project list – meaning that stakeholders were approached for updated information concerning project maturity and project finance. It was also possible to make corrections where projects had been wrongly omitted. As with the main update, the work is split between the national experts, and co-ordinated centrally by HaCon, and the timings were designed to meet the deadlines for Task 3 and for the TEN-T Days in June.

Table 3: Update of project list in 2022

31.01.2022	Sending of total project list separated in sub lists to consultants by HaCon
03.02.2022	Sending of “narrow” Project List for Maturity/Finance update to CF Members
15.03.2022	Deadline for CF Members to send comments to consultants Checking and consolidation of comments by consultants Quality check of all columns according to “check-list” by consultants
20.03.2022	Sending of quality checked consolidated sub lists to HaCon Compilation of sub lists and generating draft total list by HaCon
27.03.2022	Sending of draft total list to Corridor consultants by HaCon for comment
02.04.2022	Checking of draft total list by consultants and final feedback to HaCon
08.04.2022	Sending of final total list to Corridor consultants for reporting by HaCon
24.04.2022	Project Implementation Reports 1/2020 to DG MOVE by Corridor consultants

5 Project Monitoring

The structure of the regular Project Implementation Report (PIR) for all nine CNCs has been jointly elaborated in the Task 2/3 Cross-Corridor Working Group. It included a detailed approach of analysis, results and detailed structure and allows for monitoring the development of project implementation in 6 months periods. This structure and the associated methodology of analysis were agreed with the Commission in 2018.

Based on this approach, six **Project Implementation Reports (PIR)** have been delivered:

- PIR 2/2019
- PIR 1/2020
- PIR 2/2020
- PIR 1/2021
- PIR 2/2021
- PIR 1/2022

For each of the first three of them and the last two a dedicated “narrow” update of the project list has been performed. “Narrow update” means that Member States and other stakeholders are requested to update only selected project parameters, which are particularly relevant for the semi-annual monitoring. These are parameters on project maturity and implementation as well as project costs and financing/funding. In contrast, deactivation of projects not pursued anymore and adding of new projects as well as the modification of other project parameters are not in the focus of the “narrow” updates.

The PIR 1/2021 was elaborated on the “big” update of the project list.

Task 3, Project Monitoring aims to provide short-term or tailor-made information updates to the Coordinator, especially on the progress on projects.

Table 4: Task 3 Structure

Subtask	Subtask heading
3.1	Monitoring the implementation of Corridor projects and providing information on the project implementation
3.2	Analyse the progress of projects
3.3	Prepare regular and ad-hoc project implementation status reports
3.4	Providing tailor-made information for the Coordinator
3.5	Preparing additional documents incl. all task's results
3.6	Using/updating the technical parameter data in TENtec OMC

The project list updates (also described under Task 2) are set out in more detail below.

5.1 Press reviews

Regular updates have been provided in the form of press (news) reviews, collected across the consortium partners and submitted regularly to DG-MOVE, mainly covering developments in national transport projects, new updates on traffic statistics, major national infrastructure, and technological innovations being deployed. Each national expert covers each of the Corridor countries, providing a few key press articles, with a summary and a link to the original article.

The aim has been to update the press review monthly, but sometimes, for example due to holidays or periods of low activity, it is provided every two months.

An example of the format is shown below. See Table 5: Example of Press Review.

Table 5: Example of Press Review

Belgium	
Title:	Port of Zeebrugge 2019 : 14.2 growth
Link:	https://portofzeebrugge.be/en/news-events/port-zeebrugge-2019-142-growth
Abstract:	The port of Zeebrugge handled a total volume of 45.8 million tonnes in 2019. This 14.2 percent growth is the result of advancement in all important sectors in the port of Zeebrugge: roll-on/roll-off, liquid natural gas, containers and new vehicles. With nearly 25 percent growth over the last two years, Zeebrugge starts the new decade very positively.
Title:	Flemish government announces definitive preference for "Extra Container Capacity in Antwerp"
Link:	https://www.portofantwerp.com/en/news/extra-capacity-containers
Abstract:	<i>The container volume handled by Port of Antwerp is growing year after year and now represents a large share of the total freight volume. In 2019 the number of Twenty-foot Equivalent Units (TEU) rose by 6.8% to 11.86 million. Additional space is now required in order to cope with this growth. In December last year the Flemish government announced a definite preference in the choice of alternatives for the complex project entitled "Extra Container Capacity in Antwerp."</i>

5.2 Tailor-made Reports

In addition to the regular study elements there is also scope for the consultants to provide additional information in the form of briefings to be used by the Coordinator, either for Corridor events such as working groups or for his visits to Member States or Infrastructure Managers and Project Promoters.

Several such briefings have been compiled including:

- Paris WG, February 2020
- COVID-19 NSMED & RALP, June 2020
- Maritime WG, April 2021
- EuroCap-Rail, July 2021
- Rail freight parameters WG, July 2021
- Ireland mission, June 2022

5.3 Project Implementation Update – April 2022

Each Corridor provides a twice yearly analysis of project implementation, following a common format. To date, eight such project implementation reports have been prepared since 2018, with the latest being compiled in April 2022.

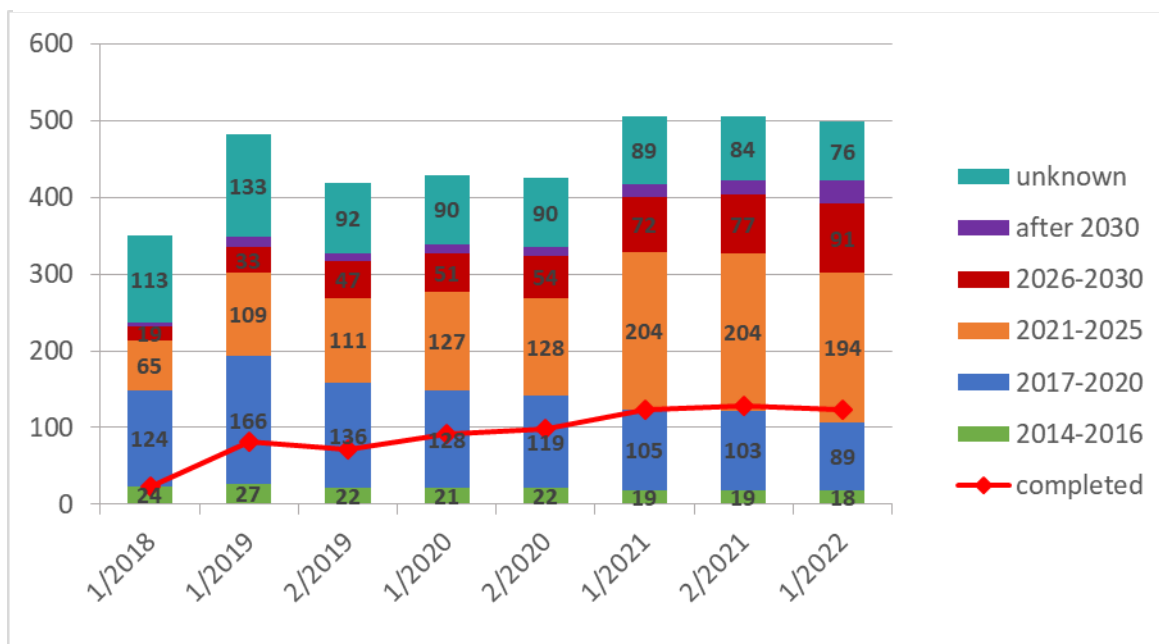
Main results for the latest version of the project list are provided below.

Table 6: Evolution of expected completion time

Report N°	1/2018	1/2019	2/2019	1/2020	2/2020	1/2021	2/2021	1/2022
Reporting Date	09/2018	05/2019	10/2019	04/2020	10/2020	05/2021	10/2021	04/2022
List Status	11/2017	05/2019	06/2019	12/2019	06/2020	12/2020	06/2021	12/2021
2014 - 2016	24	27	22	21	22	19	19	18
2017 - 2020	124	166	136	128	119	105	103	89
2021 - 2025	65	109	111	127	128	204	204	194
2026 - 2030	19	33	47	51	54	72	77	91
after 2030	5	13	11	12	12	16	18	30
unknown	113	133	92	90	90	89	84	76
Total	350	481	419	429	425	505	505	498
Thereof Completed	24	81	72	91	98	124	129	124

Source: Consortium analysis based on 2022 Project List of CNC NSMED

The number of projects in the cluster time of 2021-2025 has decreased from 204 to 194 since the previous analysis, which is mainly due to projects being delayed. The majority of delayed projects is still set to be completed by 2030 though. In addition, the number of projects with unknown start or end dates has decreased over the years, which highlights that more and more information is becoming available on the projects.

Figure 6: Project Maturity - expected completion time – number of projects


Source: Consortium analysis based on 2022 Project List of CNC NSMED

In total, the project costs of the last updated version of the project list sum up €77.3 billion. This figure has been calculated using official cost figures, verified and approved by Member States and stakeholders. In comparison to the previous Project Implementation Report 2/2021, this means an increase of €550 million.

However, for 98 projects the official costs are unknown, so following methods agreed at the Management Meeting in May 2019, the CNC study consultants estimated costs for 71 of those projects, accounting for another €21.4 billion. The remaining 27 projects have no official or estimated costs.

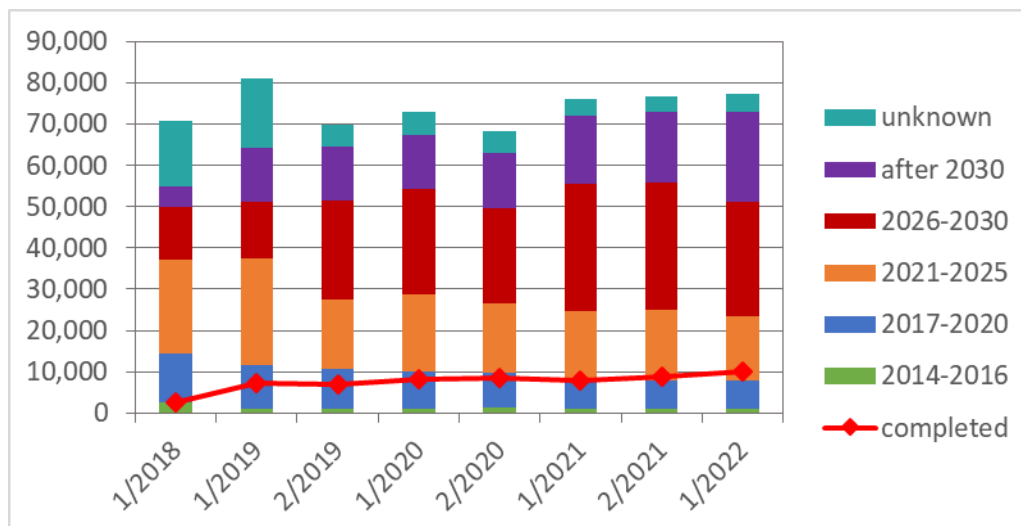
Table 7: Evolution of official project costs – by completion date cluster

Report N°	1/2019	2/2019	1/2020	2/2020	1/2021	2/2021	1/2022
Reporting Date	05/2019	10/2019	04/2020	10/2020	05/2021	10/2021	04/2022
List Status	05/2019	06/2019	12/2019	06/2020	12/2020	06/2021	12/2021
2014 - 2016	1,054	943	937	1,188	1,051	1,051	1,050
2017 - 2020	10,626	9,701	9,216	8,453	6,948	6,902	6,760
2021 - 2025	25,788	16,716	18,484	16,915	16,687	16,921	15,558
2026 - 2030	13,593	24,287	25,664	23,154	30,999	30,920	27,689
after 2030	13,091	12,852	13,250	13,250	16,541	17,100	22,062
unknown	17,098	5,558	5,359	5,350	4,041	3,848	4,202
Total	81,250	70,056	72,910	68,320	76,267	76,741	77,321
Thereof Completed	7,146	6,981	8,210	8,525	7,991	8,665	9,870

Source: Consortium analysis based on 2022 Project List of CNC NSMED

As can be seen from Table 7, the proportion of costs have remained close to the previous analysis undertaken in October 2021. The information is displayed below in Figure 7.

Figure 7: Evolution of project costs (official) - by completion time [€ mn]



Source: Consortium analysis based on 2022 Project List of CNC NSMED

5.4 Update of TENtec

The update of TENtec data, taking stock of projects concluded in 2018-2020 as well as the general check of TEN-T compliance parameters, has been discussed with the TENtec team in several online meetings. According to agreement with the Commission, these works were executed on basis of the “big” update of the project list and finalised by June 2021.

In preparation of these activities, the TENtec team had enabled the software to filter the Corridor extensions from the CEF-2 Regulation. The Consultants organised the workflow across the Corridors, with particular respect on the responsibilities for overlapping sections.

6 Work Plan

The principal public document prepared within the scope of the second loop of the study is the Coordinator's Fifth Work Plan, outlining progress towards Corridor objectives, and setting priorities. The document requires technical inputs from the Corridor study in areas such as infrastructure characteristics and compliance, as well as analysis of market developments and summaries of the project list. These items are described above in Chapters 3-5. Additional inputs were based on documents shared at the Corridor forum and working groups by stakeholders, including the RFC analysis, updates from the Seine-Scheldt projects, and discussions concerning urban nodes and Irish maritime links.

The aim was for the document to contain the key messages, rather than technical details. Important elements of the Work Plan derived from the Corridor study tasks are listed below.

As far as possible, graphical formats (maps and diagrams) are used to present the information concisely.

For the elaboration of the 5th Work Plan, a coordination work among the consortia and the Commission took place to align contents to be included in the document. The first common draft structure of the 5th Work Plan was originally sent to the 9 CNC consortia and discussed at the 6th Management Meeting (April 2021).

The agreed common content includes the following:

- ERTMS Corridor specific analysis: ERTMS deployment and EDP compliance delivered by ERTMS DMT Consultant (Sections 2.2 and 3.2).
- Motorways of the Seas: MoS Deployment Plan common text (generic for all 9 CNCs) delivered by MoS Consultant Circle (Section 4.1).
- Deployment of alternative fuels infrastructure: common text delivered by DG MOVE B1 (Section 4.2).
- Urban Nodes: common text delivered by DG MOVE B1 (Section 4.3).
- Green Deal and the Recovery and Resilience Fund: common text delivered by DG MOVE B2 (Section 5.2).
- New Connecting Europe Facility (CEF2): common text delivered by DG MOVE B2 (Section 5.3).
- Military Mobility in the network development plans: common text delivered by DG MOVE B1 (Section 5.4).
- TEN-T Revision: common text delivered by DG MOVE (Section 5.5).

Continuous feedback from stakeholders, and particularly Member States has been promoted, including:

- Analysis of updated KPI information
- Compliance maps based on project list
- Discussion of the draft version of the work plan with the advisor and the Member States during the first semester of 2022.

The Work Plan is expected to be presented during the next Corridor Forum meeting in September 2022 in Brussels.

7 Corridor Forum and Working Groups

7.1 Corridor Forum

The nine Corridor Forums were set up in 2014, and have continued to meet regularly as a means for discussion of Corridor progress.

A further forum meeting had been scheduled for May 2020, to coincide with the TEN-T Days in Croatia, but this was cancelled due to COVID-19 restrictions. In 2021 two Corridor Fora have been held online, using videoconference software. This way all stakeholders were still updated on the latest status of the NSMED Corridor.

▪ Informal Forum meeting, 8th January 2021

An informal online meeting was held in February to update stakeholders on recent news from the Commission, as well as on the status of national recovery plans by Member States.

Corridor Forum 15: 23-Mar-2021, online

The new alignment of the NSMED Corridor, which has changed considerably since the last Corridor Forum with the withdrawal of the UK and the inclusion of CEF2 extensions, was presented by consultants. Also the results of the major 2021 Project List update were shown, which included the addition/removal of projects, and updates of all project parameters. In addition, presentations were given by DG Move on the EU funding that supports the Smart and Sustainable Mobility Strategy, and by INEA on the CEF grants portfolio.

Corridor Forum 16: 24-Nov-2021, online

Corridor Forum 16 included mostly regular updates by consultants on the project list (narrow update), the technical parameters, and the expected compliance by 2030. The timeline towards the 5th Work Plan, set to be published in June 2022, was shown as well. Other subjects discussed during the Forum were the CEF grants portfolio, the activities of the Coordinator, and Working Groups.

17th Forum meeting, 28th September 2022

The 17th Corridor Forum meeting will take place in Brussels on the 28th September 2022. The indicative agenda includes the presentation on the results of the latest Corridor Study, as well as of the 5th Work Plan and any other news from the EC and Member States.

7.2 Working Groups

In addition to the forum meetings, more specialised working groups have been regularly organised for the Corridors, since 2014.

Since 2018, four working groups were carried out, all in coordination with other Corridors.

Urban Nodes Working Group, Paris, 19-Feb-2020

A new working group concerning Urban Nodes, organised in coordination with the Atlantic Corridor was held in Paris at the offices of SNCF Réseau. The aim was to increase the participation of urban nodes within the planning of the Corridor. Participation from NSMED urban nodes was strong, with presentations made by Paris, Grand Est (Strasbourg and Mulhouse), Lyon, Amsterdam and Dublin.

Impacts of COVI-19 NSMED & RALP, online 1-June 2020

This joint working group focused on the impacts of COVID-19 on both Corridors.

MoS & CNC Workshop: Smart and Sustainable Maritime Transport in the Atlantic and North Sea Region Post-Brexit, online, 22-Apr-2021

Points discussed during the workshop:

- What new maritime links are in place or being developed since Brexit?
- Reasons and perspectives: what does the future hold for maritime links between Ireland and the Continent?

Ports Working Group, online, 23-Apr-2021

Points discussed during the Workshop:

- Hinterland connections to Ports by rail and IWW
- Greening of Ports and of maritime transport
- Digitalisation of Ports and of maritime transport

EuroCap-Rail, July 2021

The aim of the meeting was to discuss the progress on EuroCap-Rail.

Rail freight parameters WG, July 2021

The aim of the meeting was to discuss the situation regarding the deployment of the rail freight parameters on the corridor (CNC and RFC together) and the planning of the authorities in this regard.

For each WG, the consultants, among the other activities, have supported the Commission in defining the agenda and select the speakers, provided tailor-made information on the speakers and a summary of their interventions, collected and organised in advance the contributions to be presented and took care of the minutes of the meetings.

8 Outlook to the future

The second loop of the study is the final one within the current contract, and will conclude later this year after the Corridor Forum in September. The next contract will fall under the new revised TEN-T Regulation. The legislative proposal was adopted by the European Commission on the 14th of December 2021 and is currently under review by Member States and EU Parliament. As part of the proposal the Core Network Corridors (CNCs) and Rail Freight Corridors (RFCs) will be integrated into new European Transport Corridors (ETCs).

The North Sea Mediterranean Corridor is to be proposed to be merged with the Rhine Alpine Corridor into the North Sea Alpine (NSA) European Transport Corridor. From the perspective of the NSMED Corridor, the Corridor would expand eastwards, with a new north-south axis which largely follows the course of the river Rhine. This means new road, rail and inland waterway sections are to be added from Arnhem to Duisburg and Frankfurt am Main in Germany, and further to Basel in Switzerland. There, the new Corridor sections continue further south, all the way up to Genova at the Ligurian Sea, passing the cities of Bern, Luzern, Novara and Milano along the way. Along all these sections, major ports and airports are also to be added to the Corridor alignment as well.

Meanwhile, there are some major large scale challenges which have an impact on the NSMED Corridor and the transport sector as a whole. While at the moment the COVID-19 restrictions are mostly lifted, it is uncertain if and in what form the COVID-19 virus will resurface in the future. It has become clear that the transport sector has to become more resilient against the impacts of COVID, to prevent the disruption of supply chains and ensure the ongoing continuity of transport. The war in Ukraine is also likely to have a permanent effect on the NSMED Corridor and the rest of Europe, with supply chains having to be shifted from Ukraine/Russia to other countries, and the increased importance of Military Mobility. Lastly, as mentioned above, the threat of climate change has given way to a call for action to all sectors, including transport, to decarbonize as soon as possible.

The Consultants' team has agreed to prolong the activities linked to this phase until September 2022, carrying out the Corridor Forum Meeting in Brussels. In addition, the Consultants' team is also expected to prolong their contracts to support the European Coordinators until December 2023, under a new phase of narrower Corridor Studies.

Areas that still need to be strengthened in the study are:

- Monitoring progress in the deployment and use of alternative fuels.
- Gaining a better understanding of innovations in the area of ITS, especially for the road sector.
- Improving the methodologies being used for analysing climate change resilience and climate change impacts.
- Understanding and measuring the extent to which inter-regional cohesion can substitute near-sourcing for global sourcing, and how this affects Corridor planning.
- Developing quantitative methods for project evaluation which relate more closely to the stated objectives of the Corridor, including operational and service performance.
- Increasing the involvement of urban nodes.

- Increasing co-ordination with overlapping Corridors, ERTMS, MOS, and with key stakeholders RFC-NSMED and Seine-Scheldt EEIG.

