

Port-2-Port Communication Enabling Short Sea Shipping: Cyprus and the Eastern Mediterranean

by

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Short Sea Shipping (SSS) is commonly defined as commercial waterborne transportation that does not transit an ocean. The EU has a strategic interest in ensuring the continuous performance of SSS. It remains central to the comprehensive strategy for a clean, safe and efficient European transport system set out in the Commission's 2001 White Paper, *European transport policy for 2010: time to decide*. Some of the main challenges identified include promoting reliability, quality and safety and removing unnecessary costs and delays at the ports. Cyprus, which is an EU member, being also an island in the Eastern Mediterranean Sea, has an important role to play in this, since more than 90% of its seaborne transport can be classified as SSS.

Many ports in the world, including the port of Limassol in Cyprus, seek to become accredited transshipment hubs. This means that large shipments from other Mediter-

ranean and Black Sea countries could be consolidated and sent to Cyprus, from where they could be efficiently distributed to various nearby ports, e.g. in Egypt, Israel and other countries in the Middle East, using smaller vessels and SSS operations. To be a successful transshipment hub, a port should be able to plan its operations precisely and ensure relevant information are available to visiting ships. This

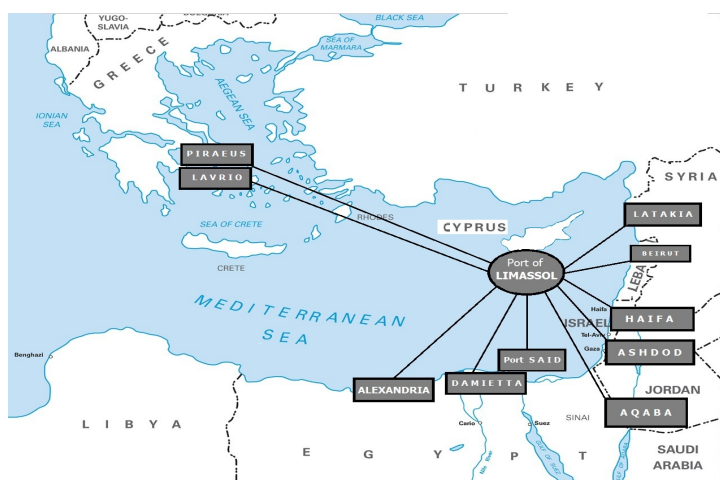


Figure 1: Limassol EU Port in the Eastern Mediterranean

involves accurate data of the various ship movements in the area by directly



communicating with ships and neighboring ports. This is particularly important for Cyprus as the distances between Limassol and its neighboring ports are quite small (see Fig. 1).

This article investigates the benefits of **Port-2-Port (P2P)** communication as a lubricant of short sea shipping. Such functionality is of particular importance to the various operators at Limassol, including the terminals. Note that since January 2017, following privatization, the operations at the port of Limassol are been handled by three private operators: DP World (general cargo and cruise terminal), Eurogate (container terminal) and P&O Maritime (pilotage, towage and mooring services). The main problem currently identified by all operators is the inability of ships / shipping agents to provide accurate estimates of their intended arrival (ETA). According to Constantinos Aristidou, the berth planner of P&O Maritime: *"Normally the shipping agents announce the incoming vessels on the PCS¹ about a week before, however, it sometimes happens that this announcement is made only 8 hours before arrival!"* This, combined with the short routes between Limassol and the surrounding ports creates a serious coordination problem for planning the various operations on the port side in order to promptly receive a ship (just-in-time) without any unnecessary delays. As Constantinos adds: *"The distance between the port of Limassol and some of the closest surrounding ports in the area is about 150 miles, which means it would only take about 10 hours to reach Limassol from those destinations."*

Successful operations require planning

Port operators need a sound framework and accurate data for planning their operations. To realize a port call that meets expectations, such as fast turn-around, just-in-time operations, and minimal waiting times for all involved, port operators need to ensure that all involved parties have access to necessary data for their own planning in a timely fashion. This includes both data related to a port's internal capabilities, such as the availability of resources and infrastructure required to serve a ship, as well as data on external conditions, such as the progress of a ship travelling towards a specific port. This means, for example, the ability to forecast with high precision the time of departure of a ship from a specific berth location, especially when another ship is planning on using the same berth location in the near future. The same goes for ship movements in that a port

¹ Port Community System

should be able to forecast with high precision the estimated time of arrival of a particular ship to its service area.

The weakest link in a port call's chain of operations often determines its success. Therefore, all actions associated with a port call need to be considered. For example, a port may have streamlined coordination of all its internal operators (pilots, tug-boats, linesmen, terminals), but a wrong estimate of the time of arrival can easily disrupt the whole process. Consider, for example a hypothetical scenario where a ship is scheduled to depart from the port of Haifa at 8pm and arrive the next day to the port of Limassol at 4am. The ETA has been properly entered into the PCS of Limassol by the corresponding shipping agent one week in advance. Now, due to unforeseen problems (e.g., bad weather, crane malfunction, strike) at Haifa, the ship is not able to depart on the scheduled time. However, nobody notifies Limassol of this change. As a result, at 4am the next day the port of Limassol is expecting to receive a ship which is still in Haifa. Note, that this situation could have been easily avoided if the ports of Haifa and Limassol were able to communicate with each other. According to Constantinos Aristidou (P&O Maritime, Berth Planner): *"Port-2-port communication can really help in improving the predictability of the vessels arrival time at the port of Limassol, especially in situations of unforeseen delays at the previous port like bad weather or strikes."*

The importance of P2P communication in providing timely and valid information to the ship owners is also highlighted by Captain Stelios Colombos, currently a VTS operator in the port of Limassol. To the question of whether P2P communication can help, Stelios reply was: *"In my opinion, of course. The ultimate purpose of the entire system is to provide ship-owners with timely and valid information about the foreseeable status of the ports so they can plan where to load and unload their ships."* The cost of bad planning for ship owners is also highlighted in the following example provided by Captain Stelios: *"For example, consider a ship which is in the port of Alexandria and is expected to be unloaded on 10-03-18 at 12.00 local time, and is expected the following day at the port of Limassol. The ship's agent will make arrangements for the arrival of the ship, that is to say, tugs, pilot, mooring men, which entails a fairly large cost to the ship-owner. Suppose now, there will be a delay in the ship's departure from the port of Alexandria either due to weather or asymmetric situations without the agent being informed at Limassol about this delay. The cost to the ship-owner will be enormous!"* Captain Colombos provides an important dimension for the need of P2P communication, that of saving money for the ship owners. In his own words: *"That*

is why I am convinced that concertation between ports is imperative for valid, timely, information of all those involved in the management of the ship in order to avoid unnecessary expenses that will result in financial suffocation and strangulation of ship-owners and possibly large job losses in the maritime sector."

PortCDM for increased efficiency in short sea shipping

In order to both manage and avoid unforeseen disruptions, Sea Traffic Management introduced Port Collaborative Decision Making (PortCDM) (see Fig. 2) for expanding the planning horizons of port call processes, and the alignment of all actors in port call operations. Coordination is based on standardized data sharing that reflects the spatial and temporal nature of a port call. These shared data can also constitute a valuable system of records for efficiency analysis and port planning.

PortCDM builds upon the idea that timestamps being used in the systems of production of port operations are captured and associated to each other in a system of records². These time stamps do concern different dimensions of the port call process, from the ship intending to arrive to the port area until it leaves again after having been served according to the purpose of call. In order for the port call process to be realized as efficient as possible, all involved actors need to be aligned in their operations and thereby, integrated performance throughout the port call process is expected to be achieved. By capturing everybody's time stamps, such as agreements of operations, planned ship movements, outcomes of service deliveries and movements, the involved actors can get insights of the consecutive progress providing a basis for the planning. PortCDM builds further on that information is being shared as close to real-time as possible, providing all involved actors common situational awareness. This enables all of them to adjust their own plans accordingly and to make updates independently as they occur (long time before, just before, or even during the actual port visit).

² Lind M., Bergmann M., Haraldson S., Watson R.T., Park J., Gimenez J., Andersen T. (2018) Enabling Effective Port Resource Management: Integrating Systems of Production Data Streams, STM Validation Project

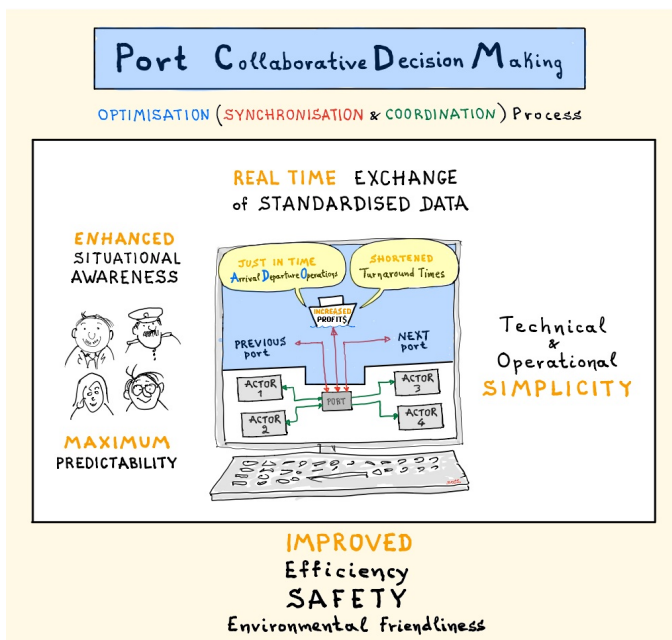


Figure 2: Philosophy and benefits of PortCDM as one of the enablers of Sea Traffic Management (STM)

Short sea shipping is particularly challenging because of the short horizon for the planning of operations. PortCDM can assist by supporting the exchange of standardized messages between neighboring ports. As identified within the STM validation project, there is a desire for the next port in line to know about the progress in the previous port and also to know about the status in the next port in a sequence of port visits. Special focus is directed towards the provision of timestamps of the estimated and actual time of departure from the previous port visit (ETD, ATD) and the estimated

time of arrival (ETA) to the next port. These timestamps when accurately communicated between ports can form the basis for better coordination of the port call activities at the port of destination, especially when there is only a short distance between the ports that the ship is steaming. Equally important, of course under SSS conditions is to continually track the vessel at sea, either by continuous ship-2-port communication or by other means of tracking, once the voyage begins. Ship-2-port communication within STM is enabled through the exchanging of voyage plans in a standardized format between the ship and the destination port. At this point we should emphasize that the various decisions made at the previous port (e.g., slowing down port operations due to insights of what is happening in the next port) can never be dedicated to the port itself. They are just an information component building up the situational awareness for everyone, including the captain of the ship and the shipping company. Do also note that the captain of the ship is the one that would decide when to leave berth.

Of course, for this to become reality the ports and ships have to be able to communicate by digital means in a common language. STM addresses this need by promoting information services using standardized data exchange formats (e.g. the route exchange format (RTZ) and the port call message format (PCMF)). For the P2P communication, this

is enabled by the Port Call Message Format (PCMF). Facilitated by PortCDM as a STM enabler, the ultimate objective is to ensure high reliability and accuracy of timestamps for all involved actors based on shared and common situational awareness. This can be achieved by adopting principles for ensuring a high degree of predictability, such as the combination of multiple data sources providing time stamps in real time and the fact that actors are aligned with each other in terms of information awareness. Adopting PortCDM for increased efficiency in short sea shipping, the systems of production capturing several ports operations is empowered by regionally connected systems of records.

Cyprus in the international maritime sector

The role of Cyprus as an international shipping centre was established about 55 years ago. Cyprus has managed to attract shipping companies due to its excellent maritime infrastructure, and a high level of expertise, particularly in the fields of surveying, ship-brokering and maritime insurance. Today, the Cyprus Registry is classified as the 22nd largest merchant fleet globally and the 3rd largest fleet in the European Union, with approximately 900 ocean going vessels of a gross tonnage exceeding 49 million tons³. It is estimated that approximately 4% of the world's fleet and around 20% of global third-party ship management activities are controlled from Cyprus. For the companies established in Cyprus, around 87% are controlled by Cypriot and EU interests⁴. The island's ports have developed purpose-built container terminals and Cyprus is one of the first countries of the Eastern Mediterranean to use specialized gantry cranes. Moreover, the island is now considered one of the most important cruise centers and transportation hubs in the region. The Cypriot Government's vision is to develop initiatives that will further expand Cyprus's role as a communication bridge between the European Union and the countries of Middle East, such as Egypt, Jordan, Lebanon, and Israel. In addition, the interest of major shipping organizations in using hub ports in the region has increased the need for upgrading the infrastructure and for providing more cost-efficient service.

³ Smart Specialisation Strategy for Cyprus. Directorate General for European Programmes, Coordination and Development (2015)

http://www.dgepcd.gov.cy/dgepcd/dgepcd.nsf/page44_en/page44_en?OpenDocument

⁴ Cyprus as a maritime centre. Department of Merchant Shipping (2017)

http://www.mcw.gov.cy/mcw/dms/dms.nsf/cypmarcentre_en/cypmarcentre_en?OpenDocument



Short sea shipping in the Cyprus context

The general objective of the STM Validation Project is the efficient management of sea traffic, while at the same time ensuring safety and environmental sustainability. Towards this end, the ports of Cyprus – and especially Limassol – will have a vital role to play due to Cyprus’ strategic location. Fig. 3 shows an analysis of the traffic from and to Limassol for the year 2015. Cyprus can become a center of gravity, exchanging information with ships in the Eastern Mediterranean region for optimizing their routes and avoiding possible hazards. Moreover, the geographical location of Cyprus encourages the use of Cyprus ports as transshipment hubs for short sea shipping. Another favoring factor is the political stability of Cyprus relative to several countries in the region.

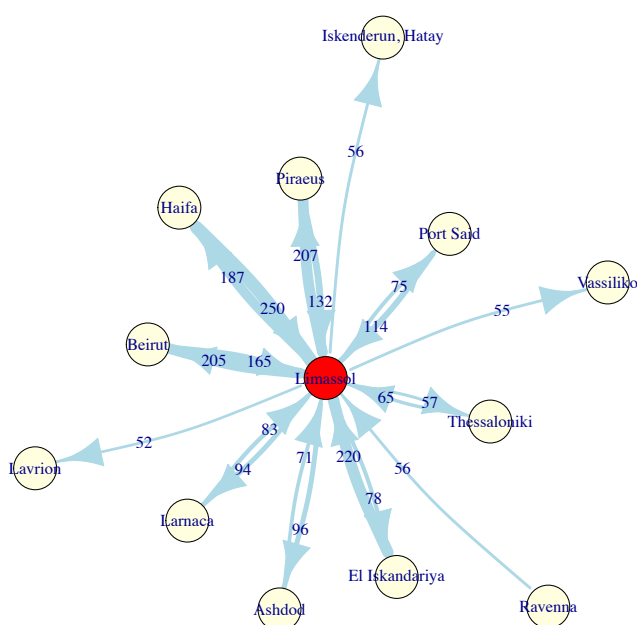


Figure 3: Traffic to and from port of Limassol (2015)

The port of Limassol is one of the 13 ports where the PortCDM will be validated during the STM project. The establishment of PortCDM at the Port of Limassol can be an important milestone in enabling short sea shipping. The PortCDM platform will enable real-time situation awareness to all participants involved in the port’s maritime activities for the purpose of increasing operational efficiency within and around the port. The scope of this work extends from coordinating port call operations within the port to collaborative decision making across ports (see port call synchronization

ship-to-port, port-to-port). More specifically, new services for port-to-port collaboration will be explored and developed as part of this objective.

Benefits of enhanced port-2-port collaboration

The STM project is expected to have a lasting impact on the maritime sector at both the national and international level. It will contribute towards the efficient management of



sea traffic in the Eastern Mediterranean sea, while at the same time ensuring safety and environmental sustainability. Towards this end, the ports of Cyprus, and especially the port of Limassol will be upgraded as information hubs, exchanging information with both nearby ports and ships in the Eastern Mediterranean. Moreover, the P2P communication can help establish the Cyprus ports as transshipment hubs for short sea shipping by improving their competitiveness in the area. Of course, a successful transshipment hub needs a complementary combination of efficient cargo handling equipment and digital data sharing to ensure the maximum utilization of investments in the hub and to enhance the value of shipping in its catchment area. This is expected to increase the maritime traffic in the Eastern Mediterranean and especially through the Cyprus ports, thus stimulating economic growth of the maritime sector in Cyprus. The proposed solutions will help enhance the political and economic position of Cyprus in the Eastern Mediterranean and will improve communication with other nearby countries and ports, such as Damietta and Alexandria in Egypt, Haifa and Port Said in Israel, and Aqaba in Jordan (see Fig. 3). Therefore, P2P communication can contribute to the creation of an appropriate environment for the reduction of goods' transport fees, to and from the aforementioned countries. The wider upgrading and optimization of the port services is expected to have a positive impact on the cost of transporting Cypriot freight, resulting in positive effects for Cypriot traders and consumers. The enhanced SSS operations can help towards upgrading the maritime significance of Cyprus, not just in the Eastern Mediterranean area, but globally.

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