Competitive and Resource Efficient Transport Services

Gerard Trant and Kevin Riordan, Nautical Enterprise Centre Ltd.

e-Freight & PROPS Workshop in Port of Cork, 19th July 2011

Abstract

This paper investigates the development of technologies and capabilities supporting the advancement and improvement of the quality and efficiency of freight transport, focusing on the Port of Cork business case within the e-Freight project. The paper begins with an estimation of Port of Cork's hinterland and the potential for accessing a greater proportion of the hinterland through improved quality ConRo / LoLo services with mainland Europe. The paper ends with a brief overview of e-Freight capabilities to improve the overall resource utilisation and reliability of freight transport.

Introduction

The study draws heavily on previous studies carried out in the e-Freight, PROPS and SKEMA projects. There are four sections to the study:

1. **Determination of Port of Cork's hinterland market**, primarily based on a methodology devised in the ATMOS[1] project.
2. **Capitalising on the potential of Cork Harbour and Ringaskiddy deep water terminals**, for which material from a PROPS / SKEMA study[2] and an e-Freight study[3] is liberally drawn.
3. **Deployment of e-Freight capabilities to improve the Reliability and Marketability of inter-regional services, focussed on Port of Cork.** This section is primarily based on a PROPS study[4] and the e-Freight paper mentioned in Ref. 3.
4. **Conclusions,** based on the findings of the study.

1. *Port of Cork's Hinterland Market*

1.1 Overview of Irelands Unitised Cargo Flows

Before discussing Port of Cork's hinterland market, this section begins with a brief overview of unitised cargo flows to and from the Republic of Ireland for the period 1999 – 2009. Figure's 1 and 2 below show the trend and volume of imported and exported LoLo and RoRo cargo's, to and from Ireland, in TEU's. TEU's are used as a common basis for comparison between LoLo and RoRo cargoes.

[1] ATMOS: Atlantic Arc Motorway of the Sea (January '07)

[2] 'Technological Capabilities facilitating Maritime Transport & Trade' (March 2011)

[3] 'Cooperative Unitised Services – a Challenge & Opportunity' (May 2011)

[4] 'Networking Strategies for Short Sea Shipping Stakeholders and Short Sea Promotion Centres' (August 2010)

Figure 1: Laden RoRo and LoLo Exports 1999 to 2009 (Laden TEU's)

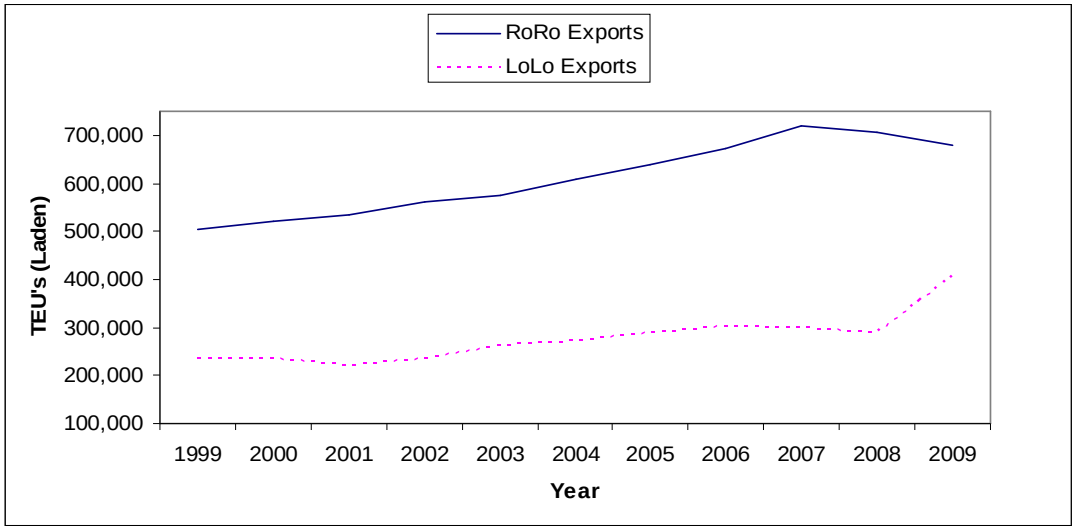
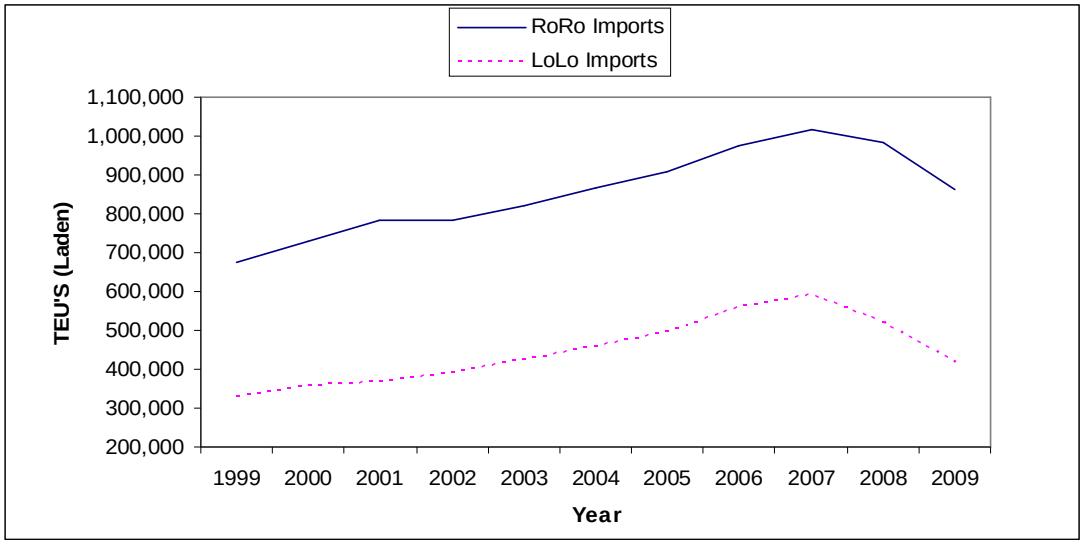


Figure 2: Laden RoRo and LoLo Imports 1999 to 2009 (Laden TEU's)



The average annual growth rate of unitised Exports and Imports over the period 1999 to 2009 was 4.0% and 2.8% respectively. What is clear from the above graphs is after experiencing steady growth in both imports and exports from 1999 to 2007, the import market took a sharp dive as a result of the 2007/2008 financial crisis, and has just about levelled. Exports after levelling off, have taken a positive trend upwards, particularly through low cost LoLo which has seen a sharp upward trend. This may be as a result of the attractiveness of the less cosly LoLo over its competing RoRo when exporters were trying to lower their distribution costs as a result of the downturn in the global economy. However, there is only so much one can infer from a simple graphical analysis. What is clear, is that even though the Irish economy has and still is suffering a severe recession, Ireland's exports are still alive and well and will be a key driver of economic growth into the future.

To get an idea of where this cargo is ultimately destined, figure 3 below outlines Ireland's total Imports and Exports in TEU's to selected states for 2009. As is evident, Ireland's biggest trading partner is the UK, with the USA following second on a value basis. As will be discussed in a later section, it is cargo destined to / from Mainland Europe that is the focus of high quality ConRo / LoLo services from Cork, and also the potential of attracting cargo to / from North America, as these vessels pass the entrance to the Port of Cork on their voyage to North America.

Table 1: Ireland's unitised trade with selected states (2009)

State	Imports (TEU's)	Exports (TEU's)	Imports (€000)	Exports (€000)
UK	316,914	363,654	€12,786,988	€12,199,060
France	39,698	44,055	€2,193,203	€4,527,070
USA	17,866	19,266	€7,815,329	€18,264,750
Spain	37,829	16,385	€568,706	€3,275,788
Portugal	3,668	3,710	€100,195	€407,180
Germany	68,702	51,411	€3,045,377	€5,974,434
Netherlands	57,625	50,886	€2,309,535	€2,848,402
Luxembourg	2,511	515	€26,818	€140,265
Belgium	27,072	19,738	€917,231	€258,794
Canada	2,484	2,806	€379,635	€439,756
Rest of Europe	290,656	369,559	€6,099,581	€11,515,212
Rest of the World	190,793	145,477	€8,407,600	€10,491,652
Total:	1,055,818	1,087,462	€44,650,198	€70,342,363

1.2 Estimation of Port of Cork's Hinterland Market

In estimating Port of Cork's hinterland market, the methodology used was that developed in the ATMOS project. Counties around Port of Cork where taken as the port's hinterland, and the GDP's and Industrial output levels of these counties in proportion to the rest of Ireland where used as a basis for computing POC's hinterland market for imports and exports respectively. The hinterland counties chosen were Cork, Kerry, Limerick, Clare and South Tipperary. The results of this exercise are presented in Tables 2 and 3 below.

Table 2: Port of Cork's hinterland market of LoLo cargoes and its current market share

	PoC's Actual Imported and Exported LoLo TEU's (2009)	Estimated LoLo Imports & Exports in PoC's hinterland market (TEU's, 2009)	POC's Share of its own LoLo hinterland market %
Imports (Laden TEU's)	62,304	108,487	57%
Exports (Laden TEU's)	62,835	123,199	51%
Total (TEU's)	125,139	231,686	54%

For the imported and exported LoLo market, Port of Cork has secured approximately 54% of its hinterland market through regular LoLo services with hub ports in North Western Europe, from where cargo can be distributed throughout mainland Europe and the rest of the world.

Port of Cork has not been very successful in the RoRo freight market. RoRo cargo flows to and from the port can be considered negligible in comparison to Dublin and Rosslare. RoRo services from Ireland are mainly targeted at the United Kingdom for geographical reasons, and therefore ports on the east coast of Ireland are favourable located for these services.

However, not all cargo being transported across the Irish sea has its ultimate destination or origin in the United Kingdom. In fact, an estimated 250,000 trailers[5] are designated for Mainland Europe, but use the British Landbridge as a conduit. It is this cargo that Port of Cork has the potential of attracting through new and improved quality ConRo / LoLo services. The proportion of the 250,000 trailers being transported via the British Landbridge that have their origin / destination in PoC's hinterland are shown in Table 3 below.

[5] IMDO Study 'Feasibility of a new RoRo/RoPax Service between Ireland and Continental Europe'

Table 3: Port of Cork's hinterland market for LoLo and RoRo cargoes.

	Estimated RoRo cargoes in PoC's hinterland with origins / destinations in Mainland Europe (TEU's, 2009)	Estimated LoLo Imports & Exports in PoC's hinterland market (TEU's, 2009)	POC's Potential Market for high Quality ConRo / LoLo (TEU's)
Imports (Laden TEU's)	82,943	108,487	191,430
Exports (Laden TEU's)	75,484	123,199	198,683
Total (TEU's)	158,427	231,686	390,113

In summary, Port of Cork's hinterland market can modestly be taken to be the counties of Cork, Kerry, Limerick, Clare and South Tipperary. The total unitised exports and imports of this market with Mainland Europe is estimated to be 390,113 TEU. At present, Port of Cork's unitised exports and imports with Mainland Europe are approximately 125,000 TEU per year.

The untapped potential for improved unitised services through Port of Cork with Mainland Europe is approximately 165,000 TEUs per year, and this is for a relatively small hinterland that is approximate to Port of Cork.

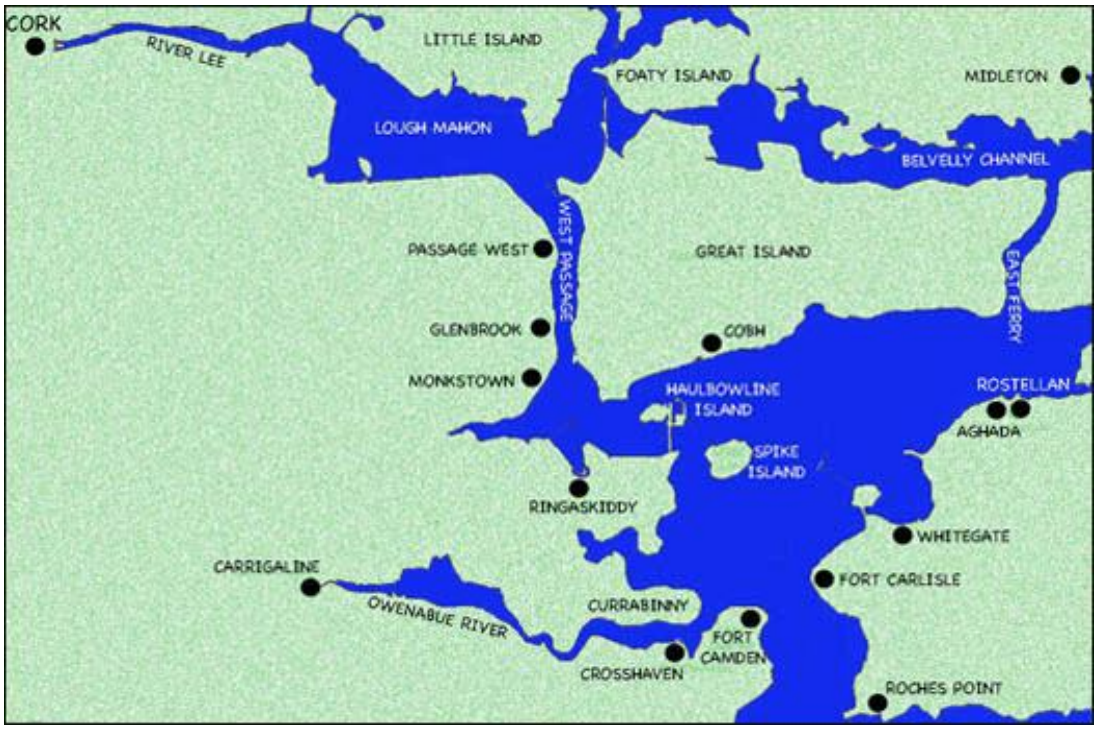
2. Capitalising on the potential of Cork Harbour and Ringaskiddy Deep Water Terminals

2.1 Overview of Cork Harbour & Ringaskiddy Deep Water Terminals

Cork city is the principal city and industrial centre in the province of Munster. It is the second largest city and port in Ireland. Port of Cork's geographical advantage relative to the East Coast of Ireland is its proximity to Mainland Europe and to the densely populated South Coast of England. It shares this advantage with the ports of Waterford and Rosslare.

A central focus of Port of Cork's Master Plan is to transfer its LoLo operations from Tivoli Container Terminal, which is close to Cork City, to a multi-purpose terminal in Ringaskiddy Deep Water Terminal in Cork Harbour. The multi-purpose terminal will be able to service LoLo, CON-Ro and RoRo vessels. The access channel to Ringaskiddy Deep Water Terminal is 11.2m at Lowest Astronomical Tide; hence the berth can accommodate vessels of 12m draft and up to 290m in length, which corresponds to LoLo vessels of approximately 4,000 TEU capacity. An area of 776 acres within the Ringaskiddy Free Zone is fully serviced and zoned for Industrial development by Cork County Council; it is owned by the Industrial Development Authority and Port of Cork Company.

Cork Harbour and Ringaskiddy Deep Water Terminals



Ringaskiddy Deep Water Terminals

2.2 Targeted services for Ringaskiddy deep water terminals

The following services are targeted by Port of Cork for Ringaskiddy terminals:

2.2.1 The deployment of large, efficient LoLo and ConRo vessels between Cork Harbour and Mainland Europe, which would reduce both the cost of transport and Green House Gas (GHG) emissions per unit of cargo, compared to vessels that currently use Tivoli Terminals, upriver near the City Centre.

2.2.2 To initiate new RoRo services between Port of Cork and states / regions that currently are poorly serviced, specifically Spain and Western France.

2.2.3 To capitalize on the fact that Port of Cork is on the route taken by transatlantic vessels plying between Liverpool and North America, which have to navigate along the south coast of Ireland before taking their departure from Fastnet Rock on a great-circle track across the Atlantic. These vessels are clearly visible passing a few miles south of Cork Harbour.

2.2.1 Advantages of deploying large, efficient LoLo vessels on the Cork – Mainland Europe corridor

The several advantages of significantly larger and more efficient vessels on the Cork – Mainland Europe corridor than currently being used are:

a. Port of Cork could service its hinterland market more efficiently, with cost savings of approximately € 9.3 M per year to exporters / importers.
b. Green House Gas (GHG) emissions for goods shipped to & from Port of Cork's hinterland and Mainland Europe would be reduced by approximately 40,000 tonnes per year.
c. Through significantly reduced transport costs and more efficient and environmentally friendly services, there is a reasonable expectation that unitised exports between Port of Cork's hinterland and Mainland Europe would increase over time by 5%. This would increase the wealth generated in Munster and Ireland by € 354M per year. Achieving this latter benefit would require a coordinated effort between exporters, transport service providers, relevant state agencies and Port of Cork Company.

2.2.2 Establishing a direct RoRo service between Cork and Northern Spain

If a direct RoRo service were established between Cork and Northern Spain, two round trips per week would be possible at an average speed of approximately 17.5 knots. At present Ireland – Spain is poorly serviced and a direct service would boost trade between the two states. A difficulty is that there is a 4:1 mismatch between the **volumes** of unitised cargoes imported into Ireland from Spain, compared to the volumes exported from Ireland to Spain. Against this, there is an approximate 4:1 mismatch between the **values** of unitised exports from Ireland to Spain compared to the values of goods imported into Ireland from Spain.

The most suitable option for direct shipping between Ireland and Spain would be a RoRo service because of the predominance of high value goods and food stuffs (fish, meat and dairy products) in Ireland's exports, for which a fast, reliable service would be necessary, and securing Irish exports would be essential for the success of the service.

The alternative to direct shipping between Ireland and Spain is trucking down through France to the focal point in Spain, which is Madrid. A direct comparison between these two options very much favours RoRo shipping, as the unit price would be considerably less than that of trucking through France i.e. €1,900 vs. €3,300 per trailer, and D2D delivery times would be 19 hours less.

The imbalance in trades between Ireland and Spain could be addressed by charging the same transport price for imports into Ireland from Spain as exports from Ireland to Spain and having a negligible charge on returning empty trailers until the trades begin to balance out. Relatively low cost, fast, secure and reliable transport from Ireland to Spain would build up Irish exports in meat, dairy products and high value products to the large Spanish market. Imports of Spanish manufactured goods, fruit & vegetables would find a ready market in the Island of Ireland.

An important factor in this two-way trade would be the reliability of deliveries, including care of refrigerated cargo throughout the supply chain, from collection to delivery. This level of care could be delivered through a **Cooperative Networked Service** where the commitment of all participants to the care of cargoes is total.

2.2.3 Establishing a direct Ireland – USA trans-Atlantic service

Accommodating the trans-Atlantic container vessels that pass close by the entrance to Cork Harbour would establish a trading corridor between Ireland and the USA, Ireland's second largest trading partner in value terms. A direct transatlantic service would avoid the transhipment costs and delays associated with having to track east to use European hub ports. It would strengthen the links that currently exist between Ireland and the USA and would open up whole new opportunities for Ireland to act as a trading conduit with North America.

3. e-Freight's Interoperable Communications Platform

3.1 Difficulties associated with management of Multimodal Networks

Flexible organisational structures are widely used in multimodal services that connect the extensive network of common-user terminals in Europe's regions with each other and with large hub ports. This flexibility facilitates relatively easy movement of ship and truck operations into and out of a service and reduces the risk to any one of them. Associated with this flexibility, however, there can be difficulties:

a. The different operational elements in a service can become unsynchronised, thus reducing the reliability of deliveries. To that extent, reliability of deliveries is a special problem with such services.
b. The system requires a considerable amount of buffer capacity for it to function, as under-performance or operational changes for short-term advantage can have serious repercussions on schedules.
c. Marketing a service and managing the multimodal issues are difficult as there is no central management. These functions are handled by third parties – freight forwarders and Third Party Logistics Providers (3PLs).

In summary, the weaknesses in some interregional services arise from the lack of central management. This results in the services being notoriously unreliable and the critical marketing function being managed by agencies whose loyalties are dispersed through several competing services.

The principal reason for the deployment of uncoordinated organisational structures in many multimodal services is that central management requires the support of an IT infrastructure that facilitates optimal coordination of the transport modes. The provision and management of such infrastructure is beyond the capabilities of many small-to-medium maritime operations.

3.2 The Importance of Reliability of Deliveries in Multimodal Services

Reliability can be taken to mean the extent to which deliveries are late, making it quantifiable for every service provision along the supply chain. The concept of **Value of Reliability (VoR)** can also be introduced. The VoR for specific situations can be established by survey, but is more difficult to determine than Value of Time. From two surveys carried out by Nautical Enterprise in this area it was found that the value attributed to reliability by shippers is three-to-five times the value attributed to time, regardless of the value assigned to time. That is, the value or cost of being one hour late is three-to-five times more important to a shipper than the value of having a one hour faster delivery. The implications of this are far-reaching and affect every aspect of multimodal transport. That is, sustainable success in multimodal transport services requires consistent reliability at every service provision along the supply chain.

3.3 The Role of e-Freight in Addressing the Difficulties

e-Freight will facilitate the exchange of secure, digitised and standardised messages –

a. Between maritime & logistics businesses (B2B),
b. Between businesses and administrations (B2A and A2B),
c. Between administrations (A2A).

The communications will be interoperable; that is, the various parties will be able to communicate with each other (inter-operate with each other) using a common conduit (essentially the web) without having to change their own IT operating systems. This has the potential of revolutionising the way in which maritime administrations and businesses will carry out their work. It will facilitate the formation of a new category of operation – a Cooperative Multimodal Service in which there is central management and coordination of a networked service, but with each transport mode independently managed,

More specifically, the features of a Cooperative Multimodal Service are:

- A Key Organisation (a *Network Manager*) is necessary to lead the formation and operation of the network. Likely candidates are a Ship Operator that would be in a focal position to manage the network and have much to gain from its success; or a 'facilitator' that may have experience in freight forwarding, port community management or exporting / importing.
- The *contractual arrangement* between the Network Manager and network participants should be such as to enable the network to function as a coordinated entity whilst retaining the low risk configuration of independently operated transport modes.
- The network must be *supported by an IT infrastructure* that facilitates central management and optimal coordination of the transport modes. The lack of an IT infrastructure is the major reason that Cooperative Multimodal Services are not in place at present. e-Freight will enable this gap to be filled with its interoperable communications platform.
- A *decision support system* is necessary to cope with the multiple variables and constraints in specifying, adjusting and managing the network; also to facilitate automated pricing and bookings with due allowances for discounts and locations; and to inform the marketing programme, identifying geographical areas and market segments for which a service has quantifiable advantages over competitors.
- The network must be operated so as to *avoid conflict with EU competition law and to cope with the liability regimes of the different transport modes.*
- There should be *clearly defined entry and exiting criteria* to & from the network, in order to avoid the formation of an organisational structure that may be deemed to be monopolistic.
- The participants in the network should have *agreed objectives*, such as improving services to clients, achieving or conserving a targeted share of a specified hinterland market, or extending the geographical range of services into new markets for which they have competitive advantage. The

objective for Port of Cork would be to win its own hinterland market, which would boost its throughput of LoLo units by over 100,000 TEUs per year, and, over time, its throughput of RoRo cargoes with Mainland Europe by approximately 70,000 trailer units per year.

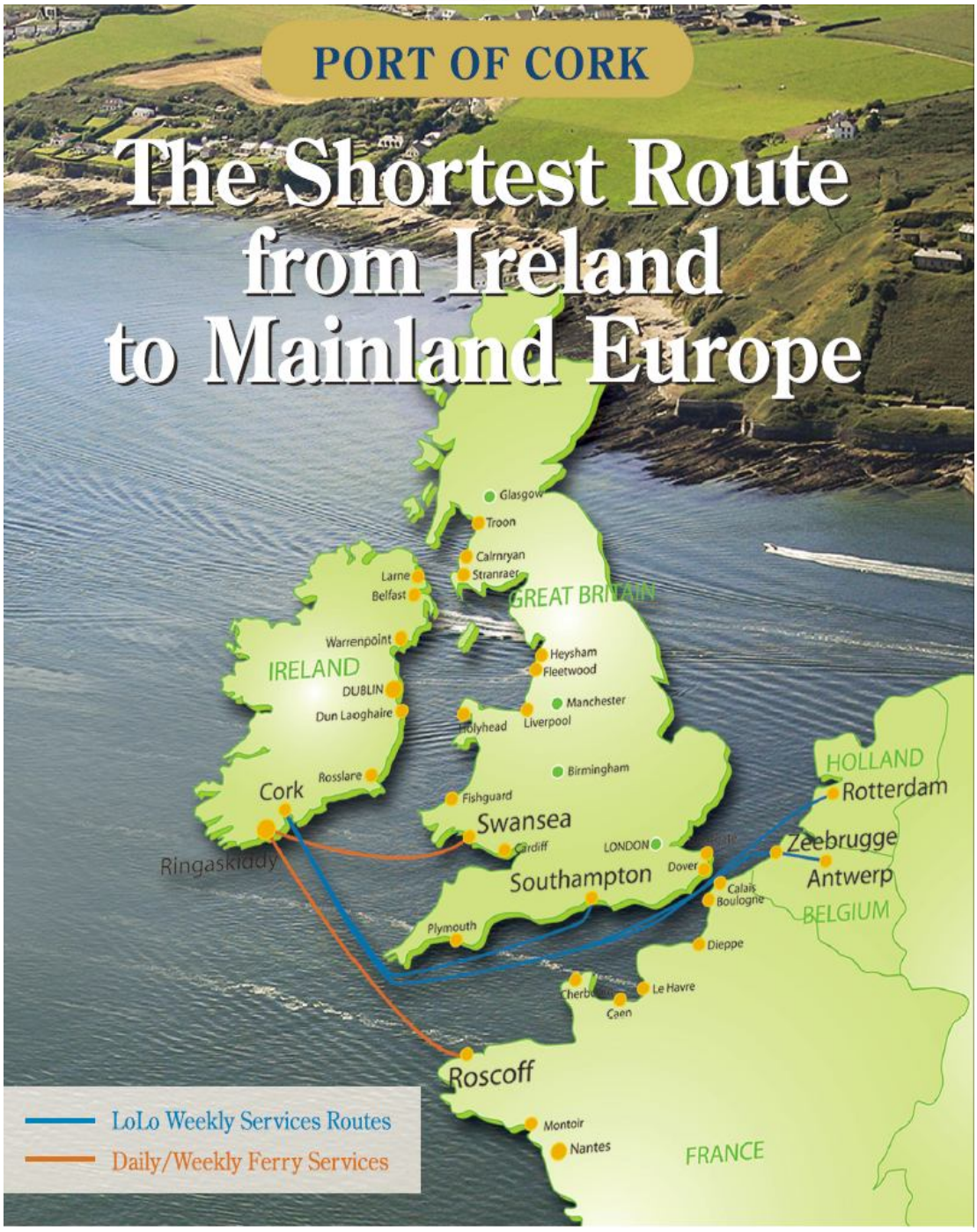
4. Conclusions

There was tremendous prior publicity regarding the strategy announcement from Eivind Kolding, the CEO of Maersk Line at the Terminal Operators' European Conference on the 7th June '11. It is reported in the IFW Newsletter that the essentials of the strategy announcement were:

a. Improvements in reliability rather than price would be the new imperative, with a target of 85% reliability set for 2011.
b. An on-line portal is being developed that will provide one-click cargo bookings, making booking cargo as easy as booking a seat on an aeroplane.
c. Reduction in GHG emissions per cargo unit, with a targeted reduction of 25% between 2010 and 2020.

As outlined in this paper, through a combination of e-Freight technologies and the realisation of Cork Harbour's potentials – all three Maersk Line strategies can be applied to the targeted services from Port of Cork, which are:

a. Deployment of large, efficient ConRo / LoLo vessels on the Cork – Mainland Europe corridor;
b. Direct RoRo services between Cork and Northern Spain & Western France;
c. A direct Ireland – USA service.


PORT OF CORK
The Shortest Route from Ireland to Mainland Europe
Glasgow
Troon
Cairnryan
Stranraer
Larne
Belfast
GREAT BRITAIN
Warrenpoint
IRELAND
DUBLIN
Dun Laoghaire
Heysham
Fleetwood
Manchester
Holyhead
Liverpool
Birmingham
Rosslare
Cork
Fishguard
Swansea
Cardiff
LONDON
Ringaskiddy
Southampton
Dover
Calais
Boulogne
HOLLAND
Rotterdam
Zeebrugge
Antwerp
BELGIUM
Plymouth
Dieppe
Le Havre
Caen
Roscoff
Montoir
Nantes
FRANCE
LoLo Weekly Services Routes
Daily/Weekly Ferry Services