

## Cooperative Unitised Services: a Challenge & Opportunity

Gerry Trant NECL

### Overview

This chapter details the unique features of Cooperative Unitised Services and the emerging technologies that enable them to function. The benefits of cooperative unitised services to transport service providers, shippers and the general public are examined. Two business cases are presented; a LoLo service between Cork and Rotterdam and a RoRo service between Cork and Bilbao. These business cases illustrate the deployment and advantages of cooperative unitised services.

### Objectives

There are many difficulties associated with conventional multimodal transport services that hamper their wider application and usefulness.

- Integrated Multimodal Operations can be capital intensive, albeit efficient, and can incur large contingent liabilities through chartering and sub-contracting, all of which are tolerable in a buoyant market but carry considerable risk in a recession.
- Independently Functioning Multimodal Operations have low risk profiles, as each functioning element in a network acts independently of the others. They can, however, be unreliable in their deliveries and they depend on Freight Forwards and 4PLs to manage the marketing, door-to-door (D2D) pricing and multimodal issues.
- Cooperative Unitised Services are proposed as a feasible alternative, as they would have the reliability and efficiency of Integrated Multimodal Operations and the low risk and adaptable profile of Independently Functioning Multimodal Operations.

The challenge in deploying Cooperative Unitised Services lies in the fact that they are not clearly defined and are not currently in use. In the conservative and capital intensive maritime industry, that should be sufficient reason to put them outside the remit of serious discussion. Nevertheless, in a study carried out in the European Project, PROPS, the subject of strategic alliances in the transport industry was examined in some depth<sup>1</sup>. It was found that cooperative networks of various types are widely used in the road haulage industry and that deployment of appropriate network structures is a key factor in their success. Furthermore, it was noted that an important factor in the phenomenal success of low cost airlines was their strategic alliances with regional airports, as well as accessing the un-tapped market of 'ordinary' people. These examples are not just encouraging; they indicate that the gap between Integrated Multimodal Operations and Independently Functioning Multimodal Operations can be filled with a networked structure based on strategic alliances between the different transport modes and operating under the aegis of a 'Network Manager'.

This chapter examines how cooperative unitised services can be established, the benefits they would bring to different stakeholders and to illustrate their implementation in two brief case studies.

## Target Stakeholders

This Chapter has relevance for the following groups:

1. Transport service providers, whether they be hauliers, unitised ship operators, port or terminal operators or freight forwarders – all of whom would have an interest in an operational model that could have a major influence on multimodal transport services.
2. Administrators and policy makers who would be interested in the implications for trade facilitation of the proposed multimodal structures.
3. Researchers, academics and students for whom new areas for investigation in maritime transport and logistics can be opened up.

## Multimodal Organisational Models

Currently there are three multimodal organisational models that are widely deployed; Ferry Operations, Integrated Multimodal Operations and Independently Functioning Multimodal Operations<sup>ii</sup>.

- Ferry Operations are geared to the requirements of haulage companies and passengers with sea distances minimised. They connect islands and relatively isolated areas to larger land masses, such as Britain to Mainland Europe, Ireland to Britain, Finland to Sweden and to mainland European states. Ferry operations are normally subject to intense competition and are very efficient.
- With Integrated Multimodal Operations there is central control over shipping, trucking and terminal operations through ownership, leasing or contracting. Such services usually achieve a high level of efficiency and make best use of the different transport modes. They are, however, capital intensive, difficult to establish and exposed to considerable risk in a market downturn due to large fixed costs and contractual obligations.
- Independently Functioning Multimodal Operations, in which ships, terminals and trucks operate independently of each other, facilitate relatively easy movement of ship and truck operations into and out of a service. The system is flexible and is widely used in interregional services, connecting the extensive network of common-user terminals in Europe's regions with each other and with large hub ports. Associated with this flexibility there are, however, many difficulties. Firstly, the different operational elements in a service can move out of synchronism very easily, thus reducing reliability of deliveries and incurring costs that have to be absorbed by clients. To that extent, reliability of deliveries can be a special problem with Independently Functioning Multimodal Operations. Secondly, 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. Lastly, marketing a service and managing the multimodal issues are difficult. They require the involvement of freight forwarders, 3PLs or 4PLs for the system to function.

## A Cooperative Unitised Service

A Cooperative Unitised Service can be described as possessing the advantageous characteristics of an Integrated Multimodal Operation with the risks mitigated, combined with the low risk profile of an Independently Functioning Multimodal Operation in which the different operational modes are coordinated. More specifically, the features of a Cooperative Unitised Service include the following:

- The opportunity for establishing such a network must be realistic.
- A Key Organisation (a Network Manager) is necessary to lead the formation and operation of the network. Likely candidates would be a Ship Operator that would be in a focal position to manage a network and have much to gain from the success of such an enterprise; or a 'facilitator' that may have experience in freight forwarding, exporting / importing or port community management.
- 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 Unitised Services are not in place at present.
- 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 and 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.

## Technological Capabilities facilitating Cooperative Unitised Services

Technologies are currently being developed in the European project e-Freight that will support the formation and operation of Cooperative Transport Networks<sup>iii</sup>. 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 also make possible the efficient coordination of Cooperative Unitised Networks by Network Managers.

In addition, a maritime decision support system is necessary to facilitate optimal service design; match transport services with the requirements of shippers of major cargo segments; support automated D2D pricing and inform the marketing programme in hinterlands and forelands surrounding ports of departure and arrival respectively.

The cooperative structure will enable each operational participant in a network to market the services of the network, to secure bookings and to assist in achieving an optimal balance between the provision of competitive services, Green House Gas (GHG) emission abatement and commercial service provision.

## Benefits of Cooperative Unitised Services

The initial benefit from the coordination of hitherto uncoordinated multimodal operations, supported by technological capabilities, will be the emergence of the Cooperative Network as a viable transport option. A Cooperative Network will be capable of being managed and marketed as an integrated whole, with automatically determined prices and discount allowances that will facilitate on-line bookings. It will enable operational participants in a network to engage directly in marketing the services of the network, being rewarded for their success in securing business from their circle of contacts and clients.

Optimal services can be specified that meet the requirements of major segments of shipper markets and that have quantifiable advantages over their nearest competitors. The benefit to the general public is the facilitation of trade through significantly more efficient transport services than can be achieved with Independently Functioning Multimodal Operations and through the alignment of services with shippers' transport requirements.

In summary:

- The benefits to shippers are the provision of services that meet their requirements in terms of reliability of services, competitive prices and care of perishable and high value cargoes.
- The benefits to ship operators are reduced risk in the provision of unitised services and the participation of network participants in securing business for the services.
- The benefits to hauliers are their full participation in networked services in which they are adequately paid for their haulage services, in which their trailers are tracked and returned to them carrying back-cargoes, in which they are rewarded for securing business from their shipper clients and in which their market reach extends well beyond their capabilities if operating on their own.
- The benefits to ports and terminals are increased throughput of services that are operated to tight schedules and that don't use excessive port or terminal time.

## Cooperative Unitised Services and Comodality

Comodality is a concept introduced by the European Commission to signify the use of different transport modes on their own or in combination, in order to achieve an optimal and sustainable utilisation of resources. Cooperative Unitised Services would meet the specifications for comodality in their application to a specific market segment – that of Independently Functioning Multimodal Operations, which currently have issues regarding coordinated management, marketing of their services and reliability of deliveries. Cooperative Services, deploying emerging technologies as previously described, would remedy these deficiencies and transform currently uncoordinated services into Comodal Transport Services.

## Business Cases for deployment of Cooperative Unitised Services

Two business cases are used to illustrate the deployment and advantages of Cooperative Unitised Services.

1. A LoLo service between Cork and Rotterdam.
2. A RoRo service between Cork and Bilbao.



Figure 1: Potential trading routes between Cork & Rotterdam and Cork and Bilbao.

### LoLo service between Cork and Rotterdam

This business case is based on the transportation of unitised cargo from / to the perimeter of Port of Cork's hinterland and the Ruhr district in Germany, via a LoLo service between Cork in southern



Ireland and Rotterdam. The LoLo service is based on a 1,100 TEU ship sailing from a proposed new multi-purpose terminal in Cork Harbour at an average speed of 13 knots, with an average ship utilisation of 45%. This represents a somewhat idealised LoLo service composition – a relatively large vessel deployed over a distance of approximately 570 nautical miles on a route between the Island of Ireland and a major conurbation of producers and consumers in Northern Europe.

The D2D price would be approximately €1,330 per trailer-equivalent<sup>1</sup> and delivery times would be 77 hours. These figures and others used in this chapter were derived using the Decision Support System described above. On the basis of price, this could hardly be equalled by any alternative service or combination of services. On the basis of D2D delivery time, it is very good. It is on the basis of reliability of deliveries that a Cooperative Unitised Service would really excel, because from collection to delivery, the movement of goods is centrally coordinated and each service provider is a participant in the network and committed to its success. There is also sufficient buffer time built into the service to support the objective of consistent reliability. In addition, D2D Greenhouse Gas (GHG) emissions per unit of cargo are particularly low. All-in-all the service would achieve the ideal for European freight transport of reliable, non-congesting, low cost transport with excellent carbon footprint.

Built into the D2D unit price is a charge to adequately cover a booking fee to be paid to the network participant that secures the booking, as well as a charge to cover the costs of managing the network. The combined value of these charges is estimated to be €4.4 M per year.

An estimated value can be placed on success to network participants. If, over time, through consistently reliable and competitively priced services the average ship utilisation should increase from 45% to 50%, the extra revenues earned would be €3.3 M per year, which can be broken down into €0.6 M to participating terminals, €0.9 M to the Ship Operator / Network Manager and €1.8 M to participating hauliers. There is, therefore, plenty of motivation for both participating in a Cooperative Network and in contributing to its success.

If the 5% extra cargo units were new trades, rather than winning business from competitors, the extra wealth that would be generated in the combined participating states would be approximately €220 M per year. This is based on the values of unitised cargoes between Ireland and Mainland Europe and the multiplier effect in wealth generation associated with exports. A successful Cooperative Network, therefore, would not only be beneficial to those operating within the network and to shippers availing of its services, but the principal benefit would be to participating states if new business were targeted based on the excellence of the service being offered.

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<sup>1</sup> Trailer-equivalents are used, rather than TEUs or FEUs, so that this service can be compared directly with the second Business Case, which involves a RoRo service between Cork and Bilbao.



## RoRo service between Cork and Bilbao

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. This is shown in the Top-20 Imports into Ireland and Exports 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 values imported into Ireland from Spain.

**Table 1: Top-20 Imports into Ireland from Spain ( 2008)**

Rank	SITC Code	SITC Description	IMPORTS			
			Est TEUs	% of Total TEUs	Value €000	Value/ TEU (€)
1	66	Non-metallic mineral manufactures	36,821	54.37	64,136	1,742
2	5	Vegetables & fruit	7,298	10.78	74,742	10,242
3	62	Rubber manufactures nes	3,616	5.34	11,850	3,277
4	78	Road vehicles	2,992	4.42	249,526	83,401
5	56	Fertilisers	2,948	4.35	8,576	2,909
6	67	Iron & steel	1,788	2.64	14,905	8,335
7	63	Cork & wood manufactures (excl. furniture)	1,645	2.43	9,738	5,921
8	27	Crude fertilisers & minerals,	1,377	2.03	2,306	1,674
9	64	Paper, paperboard & articles thereof	1,193	1.76	15,807	13,251
10	89	Miscellaneous manufactured articles	1,101	1.63	18,572	16,875
11	69	Manufactures of metals	781	1.15	18,418	23,569
12	77	Electrical machinery,	744	1.10	19,642	26,418
13	9	Miscellaneous edible products	642	0.95	8,193	12,769
14	79	Other transport equipment	642	0.95	17,757	27,680
15	57	Plastics in primary forms	540	0.80	9,448	17,485
16	6	Sugar, sugar preparation & honey	533	0.79	4,430	8,307
17	74	General industrial machinery	330	0.49	21,647	65,679
18	42	Fixed vegetable fats & oils	327	0.48	9,428	28,871
19	55	Essential oils, perfume materials;	255	0.38	17,984	70,648
20	59	Chemical materials & products nes	212	0.31	11,148	52,656
			65,782	97	608,253	



**Table 2: Top-20 Exports from Ireland to Spain (2008)**

Rank	SITC Code	SITC Description	EXPORTS			
			Est TEUs	% of Total TEUs	Value €000	Value/ TEU (€)
1	54	Medical & pharmaceutical products	2,158	12.85	618,190	286,402
2	1	Meat & meat preparations	1,498	8.92	64,519	43,073
3	28	Metalliferous ores & metal scrap	1,489	8.87	3,753	2,521
4	3	Fish, crustaceans, molluscs and preparations	1,234	7.35	49,224	39,900
5	59	Chemical materials & products nes2	1,182	7.04	415,542	351,677
6	55	Essential oils, perfume materials;	1,045	6.22	503,242	481,587
7	27	Crude fertilisers & minerals	1,002	5.97	3,257	3,249
8	75	Office machines	840	5.00	364,642	434,090
9	2	Dairy products & birds' eggs	735	4.38	21,096	28,712
10	69	Manufactures of metals nes	671	3.99	35,395	52,777
11	64	Paper, paperboard & articles thereof	625	3.72	1,414	2,261
12	0	Live animals other than animals of Division 03	452	2.69	8,624	19,077
13	26	Textile fibres & their wastes	391	2.33	3,469	8,862
14	9	Miscellaneous edible products & preparations	387	2.30	40,397	104,495
15	74	General industrial machinery	382	2.27	43,406	113,700
16	66	Non-metallic mineral manufactures nes	377	2.25	1,659	4,400
17	89	Miscellaneous manufactured articles nes	353	2.11	138,782	392,607
18	11	Beverages	321	1.91	24,952	77,821
19	57	Plastics in primary forms	192	1.14	6,519	34,009
20	58	Plastics in non-primary forms	171	1.02	3,872	22,630
			15,504	92	2,351,954	

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

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2 'nes – not elsewhere stated.



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 would be 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 can be delivered through a networked service where the commitment of all participants to the care of cargoes is total.

## Conclusions

Cooperative Unitised Services have the potential of revolutionising multimodal transport as currently operated. They have an impressive array of features that benefit the various stakeholders, who are transport service providers i.e. ship operators, haulage companies, port managers, terminal managers, freight train operators and inland waterway service operators; also, shippers and receivers of cargoes and the general public. To achieve these benefits it is necessary that the technologies that underpin Cooperative Unitised Services are put in place.

Many of the technologies that will make possible the implementation of Cooperative Unitised Services are being developed in the European project e-Freight. The principal technologies include an interoperable communications platform that will enable Network Managers to coordinate their services; standardised messages that will facilitate electronic information exchanges within a cooperative network, as well as between a Network Manager and administrations & businesses external to the network.

The deployment of a Maritime Decision Support system would facilitate optimal service design, as well as fine tuning of services to changing market circumstances. The Maritime Decision Support system would inform the marketing programme through delineation of hinterlands and forelands around ports of departure and arrival for which a service would have clear advantage over competitive services. It would facilitate online pricing and bookings, as well as distributed marketing throughout a



network, enabling operational participants in a network to actively engage in the marketing function. Moreover, it would help achieve an optimal balance between transport efficiency, Green House Gas emission abatement and commercial service provision.

Under the aegis of a Network Manager, the costs and risks of operating a multimodal service can be distributed amongst the operational organisations in a network. A cooperative network can be marketed as a single entity both centrally by the network manager and, in a distributed manner, by the different operational participants who can market the service to shippers amongst their circle of clients & contacts and be adequately rewarded for securing their business.

The formidable risks of commencing or extending a service can be greatly reduced. The operational participants in the network would each need to secure a modicum of cargoes through their clients and contacts that could be built upon. Also, the maritime decision support system could be used to delineate the geographical areas and market segments for which the service would have significant advantage over competitive offerings. This process would greatly reduce the start-up risks, and it would be apparent from the response from potential clients to detailed proposals from operational participants whether-or-not a proposed service would succeed.

The features of Cooperative Unitised Services that would be attractive to Shippers / Receivers are the reliability of services, competitive D2D prices and the care of perishable and high value cargoes. These features are particularly relevant to intra-European LoLo services, both liner and feeder, many of which are under-performing at present. They would equally be relevant to unaccompanied RoRo services, which, for all their cost and efficiency advantages over RoPax services, are not reaching their potential because of uncertainty issues relating to transfers between modes, as well as care of perishable and high value cargoes.

The features of Cooperative Unitised Services that would benefit the general public are the facilitation of interregional trades within Europe and the efficient interconnection of Europe's regions with the rest of the world through its hub ports. This would help achieve the economic dividend associated with trade both within Europe and with the rest of the world. It is shown in the Cork / Rotterdam business case that if 5% of cargoes on a single ship were new trades, the associated economic dividend to the trading states would be approximately €220M per year. The replication of this economic dividend from maritime services throughout Europe would be the principal benefit arising from the deployment of efficient Cooperative Unitised Services.



## References

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<sup>i</sup> PROPS, “Promotional Platform for Short Sea Shipping”, TREN/FP7/TR/218621/PROPS, Business Networking and Short Sea Shipping, 2009, NECL.

<sup>ii</sup> PROPS, TREN/FP7/TR/218621/PROPS, Networking Strategies for SSS Stakeholders & SPCs, 2010, NECL

<sup>iii</sup> e-FREIGHT – MOVE/FP7/ 233758/ European e-Freight capabilities for Co-Modal Transport.