Motorways of the Sea: Impact of Ferry Services and New SSS Concepts

Annex 2.2.5 to the Final Report

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PREFACE

This paper has been written by Professor Alf Baird at Napier University’s Transport Research Institute (TRi) as part of the SUTRANET project (Work Package 2: Motorways of the North Sea). SUTRANET (‘Sustainable Transport Research & Development Network in the North Sea Region’) is a project within the framework of the European Commission’s (EC’s) Interreg IIIB North Sea Programme.

The aim of the paper, which was submitted in April 2007, is to present some experiences and findings related to already implemented ferry and short sea shipping services in Europe. On this basis the paper identifies a set of conceptual requirements and some barriers to the implementation of Motorways of the Sea schemes in the North Sea Region.

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1. Introduction

SUTRANET (Sustainable Transport Research & Development Network in the North Sea Region) is a project funded under the EC Interreg IIIB North Sea Programme. The vision of SUTRANET is to improve the knowledge-base for developing efficient and sustainable transport networks in the North Sea Region. SUTRANET is led by Aalborg University in Denmark and consists of ten partner organisations, including many of the major transport and logistics research institutes in Europe. For further information concerning the SUTRANET Project please consult the website: www.sutranet.org.

Work Package 2 relates to Motorways of the North Sea (MoS). This part of WP2 investigates the impact of new ferry SSS services and their effectiveness as MoS alternatives to long-distance road transport. The report makes suggestions based on the evidence for policy initiatives to be implemented in order to assist the start-up of MoS services.

2. Policy overview

Short sea shipping (SSS) is the only transport mode that has been able to keep up with the growth of road transport. Railways and inland waterways have been unable to slow down the growth of road freight transport. SSS is therefore considered to be the main mode that can generate significant modal shift.

EU policy concerning Motorways of the Sea has been revised through Art. 12a (TEN-T rev. of 29/4/04) and which made Motorways of the Sea’ into TEN-T Priority Project No. 21. Motorway of the Sea are defined as:

“…high quality logistics services based on short sea shipping transport which could be compared, because of the quality features, to road motorways…”

Figure 1 demonstrates the challenge faced by SSS, showing the dense road traffic flows throughout the EU. However it also highlights the significance of SSS already, and the scope for SSS to remove even more freight from road.
Four Motorways of the Sea have been proposed, basically covering all of the EU (Figure 2):

- Motorway of the Baltic Sea
- Motorway of the Sea of western Europe
- Motorway of the Sea of south-east Europe
- Motorway of the Sea of south-west Europe

Within the EU TEN-T (supporting infrastructure) and the complementary Marco Polo Programme (helping to fund SSS services), member states have also been asked to bring forward their own MoS schemes. However no member state has done this so far, and the only states known to be working on a joint initiative are Spain and France. Until now almost all member states have left SSS/MoS services more or less to the market/private actors to initiate.

Here in this report we consider a number of MoS services that have started up in different parts of Europe and elsewhere. Some of these services have been started with limited support from the EU (via Marco Polo etc.), whereas others have simply been introduced by the market acting on its own initiative. Within SUTRANET, many more MoS services were analysed and further details of these can be viewed in the Task 1.4 report.
3. **Seaway economics**

In SUTRANET WP2 Task 1 (Report Task 1.4) it was demonstrated that sea transport (i.e. the ‘seaway’), particularly from an economic perspective, differs markedly from road and rail transport. For the most part, governments provide roadway and railway infrastructure. However, governments tend not to provide the alternative seaway running parallel to land transport modes (road and/or rail). Figure 3 illustrates this point. SUTRANET has therefore established that the seaway has a distinct disadvantage to begin with, in a MoS context, in that the state tends to finance alternative roadways and railways, but the state does not finance seaways.

This issue also relates to transport ‘nodes’ (terminals) as well as transport ‘ways’. In this regard, motorway intersections and rail terminals are generally also funded by the state. Ports, however, are increasingly having to be funded by the private sector, and in some EU states (e.g. the UK), there is no government support for ports. So SSS, it seems, has a double disadvantage in that the state tends to finance roadway and railway infrastructure, including the nodes, whereas for sea transport the market is expected to provide the transport ‘way’ (i.e. seaway), and also increasingly the nodes (terminals) as well.
This raises a further question, and that is – what is the seaway? In a sense policymakers appear to have assumed that the sea offers some kind of a ‘free highway’. But, as Figure 4 emphatically demonstrates, the sea is anything but a free highway, if it is a highway at all. Place a container or a trailer into the sea and it will not be able to go anywhere.

![Figure 3: State funding of transport ‘ways’](image)

![Figure 4: The sea is not a free highway!](image)

There is much the same outcome if an attempt were made to move a trailer or container across rough land in the absence of a man-made road or a railway track. All intermodal freight units require a platform of some sort, irrespective of whether the
freight unit is being pulled by a truck/tractor, a rail engine, or moved via ship propulsion. In the case of land transport, that platform is either the roadway, or the railway track. In the case of sea transport, as the sea itself is not a transport platform, the transport ‘way’ has to be something else.

Figure 5 indicates that the seaway platform must therefore be the deck of a ship. Most vividly, seaway infrastructure is the deck of a RoRo vessel, upon which the truck and trailer (or unaccompanied trailer/container) can be moved on and off. This implies, according to the SUTRANET results, that the seaway-equivalent infrastructure of roadway/railway infrastructure is the deck of a ship. Ultimately, it does not really matter whether the ship is RoRo, RoPax, container or bulk; at the end of the day the ‘seaway’ platform infrastructure is still the deck of a ship.

Figure 5: The deck of a ship is the seaway-equivalent of roadway/railway infrastructure

While some may argue that ports are sea transport infrastructure, within the SUTRANET study it has become self-evident that ports are simply nodes, or in other words, the interface between sea and land transport. In this regard ports provide exactly the same function as railway terminals, or motorway intersections interfacing different road connections. Ports are not, however, the transport ‘way’. Ports do not provide the long-distance transport platform running parallel to state-funded roadways and railways. And, as illustrated above, the sea by itself does not provide such a platform that trucks and trailers might be move upon.

The significance of this finding from the SUTRANET project should not be underestimated. For the past several decades, state financing for transport throughout the EU and neighbouring states has been directed towards providing mass roadway and railway infrastructure. In this regard it has been assumed, by policymakers, as well as by industry and academics, that the sea offers some sort of ‘natural highway’ and this therefore means that sea transport (i.e. the ‘seaway’) does not require state funding.
Within SUTRANET it has been recognised that the sea is not a natural transport highway; going even further, the sea is arguably not even a highway. In the real world the ‘seaway’, from a transport perspective, still has to be created and maintained by somebody. This conclusion is drawn from our analysis of many recently developed Motorways of the Sea, some of which are highlighted in subsequent sections of this report. It seems inevitable that in a transport market where roadway and railway infrastructure is provided by the state, but seaway transport infrastructure is not, there will not be a level playing field between land and sea modes and that consequently significant distortions to competition prevail. Moreover, as governments’ continue to finance roadway/railway infrastructure (capital and maintenance costs), but not seaway infrastructure, this means that these market distortions will be expected to worsen in future.

To a large extent the greatest barrier to MoS services starting up must therefore be the continuing policy/economic treatment of transport, which is very much in favour of roadway and railway infrastructure.

In the following section of this report we consider a number of MoS services with a focus on ferry services (RoPax). We look at how and why these services have developed, the type of ship technology employed, the route characteristics, and the level of success or otherwise that has been achieved.

### 4. Impact of new Motorway of the Sea services

(a) DFDS LISCO

The DFDS LISCO service between Kiel-Klaipeda began in the late 1990’s (Figure 6). Two vessels each of 22/23 knots service speed maintain a daily service on what is a 390-mile route, with voyage time of 21 hours. Port turnaround is achieved in 3 hours. The service operates 6 days a week in each direction, giving each ship one night of layover/week. The ships each offer about 2,300 lane metres, capable of loading approximately 150 trailers plus 100 cars. Over 300 passengers can be accommodated in cabins, with lounge and restaurant facilities also provided. This gives the service useful passenger revenues in addition to freight income. Evening departure times are offered to suit truckers, with sailings between 1700 and 1900, and arrival next day at between 1300 and 1500. In 2005 an estimated 60,000 trailers were carried on the route, plus 54,000 passengers and 8,500 cars. The main advantages of the service are avoiding German road tolls, poor road quality in the east, and border delays also in the east. Reducing wear and tear of vehicles is another important consideration. Most of the traffic carried is for Russia. The principle reason for freight logistics firms to use the Kiel-Klaipeda MoS services are therefore the high cost of roads through Germany for freight, plus inadequate road infrastructure and border delays in the east. Most of the traffic is unaccompanied,
enabling transport companies to better utilise truck/tractor units and drivers. The service receives no subsidy, and while no figures have been obtained, it is understood that the service does not achieve a satisfactory level of profit.

(b) Grimaldi Ferries

The Grimaldi Ferries service between Civitavecchia (Rome) and Barcelona began in 2004 (Figure 7). Two fast vessels each of 28 knots service speed maintain a daily service on what is a 439-mile route, with voyage time of 19 hours. Port turnaround is achieved in about 5 hours. The service operates 7 days a week in each direction. The ships each offer 1,900 lane metres, and are capable of loading approximately 120 trailers plus 200 cars. Over 1,000 passengers can be accommodated in cabins, with lounge and restaurant facilities also provided. Evening departure times are offered at 1900, with arrival next day at 1400. In 2005 an estimated 29,000 trailers were carried on the service, plus 130,000 passengers and 20,000 cars. The main advantages of the service are avoiding road tolls (in Italy and France), and the significant road congestion at a number of points along the land route, plus reduced wear and tear on vehicles. In 2006, the freight rate by sea for a 16m accompanied trailer/tractor unit was €600 (driver-cabin included), which is almost the same as the by-road fuel cost (€350) plus the road toll expense (€200). The principle reasons for freight logistics firms to use the Civitavecchia-Barcelona MoS services are therefore to avoid the cost of road tolls, and avoid road congestion. The service also allows for driver rest periods, and enables drivers to maintain their productivity whilst working within a reduced working-hours-per-week environment. The service has received a small Marco Polo subsidy, though this is known to be well below service start-up costs. The high cost of the operation, particularly fuel cost given the high 28-knot service speed,
plus pressure on rates, means that the service does not yet achieve a high level of profit. As such the service is still in a developmental period and more needs to be done to ensure its long-term viability.

Figure 7: Civitavecchia (Rome) – Barcelona (Grimaldi Ferries)

(c) Grimaldi/LD Lines

The joint venture Grimaldi/LD Lines service between Civitavecchia (Rome) and Toulon in France commenced in 2005 (Figure 8). One RoPax vessel (built by Visentini) of 23 knots service speed maintains a 3 times a week service on the 275-mile route, with voyage time of 14.5 hours. The relatively short duration of the link means that the vessel stays in port for around 9 hours. The service operates 3 days a week in each direction, with a 1-day/week layover. The ship offers over 2,200 lane metres, and is capable of loading approximately 150 trailers plus 160 cars. The ship also has 370 beds, with lounge and restaurant facilities provided, and is designed to carry up to 820 passengers in total. Evening departure times are offered at 2100, with arrival next day at 1200. In 2005, the first year of the service, only an estimated 7,000 trailers were carried, plus 21,000 passengers and 30,000 new cars. The service was supposed to carry larger numbers of Peugeot-Citroen and Fiat trade cars but some of this business has been slow to materialise. In 2006 the truck traffic increased to 11,000 units, with passengers more than doubling to 35,000, plus 27,000 new cars. Forecasts for 2007 suggest the link will transport 15,000 freight units, 30,000 new cars, plus 55,000 passengers. In theory the ship capacity provided means that the service could more or less handle double the current amount of freight carried. The main advantages of the service for road hauliers are avoiding road tolls (in Italy and France), and significant road congestion at a number of points along the land route. The price by sea for a 16m accompanied freight unit in 2005 was approximately €420
(driver-cabin included), which was almost the same as the by-road fuel cost (€240) plus the road toll expense (€167). The principle reasons for freight logistics firms to use the Civitavecchia-Barcelona MoS services are therefore to avoid the cost of road tolls, reduced wear and tear on vehicles and trailers, avoid road congestion and the Alps crossing, plus reduced risk of road accidents and fines. The service also allows for driver rest periods, and enables drivers to maintain their productivity whilst working within a reduced working-hours-per-week environment. This service was awarded a EU Marco Polo grant which amounted to approximately €1.0 million over 3 years. However the relatively low volumes of traffic carried in the initial stages means the service has incurred a significant loss well in excess of the rather small grant level. This implies that the private operators are themselves underwriting the losses in order to take freight traffic off roads. A further perceived weakness is that the service is not daily, but with just one ship is only every second day. Ideally the trucking market would prefer a daily service and this would require two vessels. Such an enhanced schedule would require a significant increase in demand, and places a considerable additional risk burden on the private sector.

![Figure 8: Civitavecchia-Toulon (Grimaldi/LD Lines)](image)
5. Motorway of the Sea conceptual requirements

Within SUTRANET the ‘seaway’-equivalent infrastructure of roadway and railway has been defined as being the deck of a ship. This finding has implications for policy and for state investment of transport infrastructure more generally. Historic as well as continued state funding of roadway and railway infrastructure (capital and maintenance), but not seaway infrastructure, serves to worsen market distortions between land and sea transport modes, implying that SSS will become rather less competitive than it is today. This goes against the vision of the EU MoS policy for a rapid and substantial expansion of SSS and MoS services in particular.

The (shipping, logistics) market is increasingly willing and able to implement and use SSS services, or Motorways of the Sea (MoS). Recent examples of newly implemented SSS/MoS short-range initiatives reflect some common characteristics, including:

- High service frequency (usually daily or better);
- Fast RoPax vessels (23-30 knots), with high freight capacity (100 trucks plus) as well as moderate passenger capacity (300 beds or more);
- Route distances of around 300-500 miles, allowing a ship to achieve one single trip per day (i.e. 2 ships = daily schedule);
- Fixed time departures and arrivals to meet trucker needs;
- Minimal paperwork requirements in port, as with road transport.

Unlike road and rail infrastructure, new SSS/MoS services are decided on and implemented by the market, not by the state. This means that the state is dependant on the market to come forward and provide SSS/MoS solutions as an alternative to state-funded land transport infrastructure. However, at the same time the state continues to invest heavily in trunk road and rail infrastructure; a market does not provide land transport infrastructure as such. This leads to further problems and barriers for SSS/MoS providers, including:

- Users of alternative roadway and railway infrastructure do not pay the full costs of using that infrastructure, even where tolls are applied, and this provides a disincentive to change modes;
- Whereas road tolls are a useful incentive for truckers to use an alternative MoS service, they are not on their own sufficient justification for such a change to occur;
- It takes considerable time (at least 3-4 years) for a new MoS service to become established and reach break-even, with substantial start-up losses having to be paid for by the operator.

Currently it can be concluded that state investment in roadway and railway infrastructure distorts the transport market, and this results in a significant disincentive for the market alone to provide and finance alternative MoS transport infrastructure (i.e. ships). For MoS to succeed, the state (regional, national and at EU
level) needs to rethink what it should do to help alternative SSS services develop. In this regard, a number of strategies could be pursued, some perhaps collectively, in an effort to expand the role of MoS, including:

- Introduce a subsidy/incentive scheme to help equalise the costs of MoS with state-funded road/rail infrastructure, such as the proposed trucker Ecobonus to be introduced in Italy (i.e. a payment made to truckers who shift mode);
- Introduce and/or increase trunk road toll charges for freight vehicles;
- Offer realistic start-up aid to MoS services (this needs to be well above the rather low Marco Polo levels), which could be promoted and implemented through state/regional government tenders, leaving optimal ship design/port location decisions to service providers);
- Provide subsidies for MoS-specific port infrastructure and equipment.

In essence, one of the main findings from SUTRANET is that there still needs to be a fundamental change in the way governments’ look at the financing of sea transport infrastructure before MoS can realise their full potential.