Risks in Oil Transportation in the Gulf of Finland
“Not a Question of If – But When”

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The CIVPRO Civil Protection Network is an international group of civil protection experts and institutions fostering research and collaboration in risk management, emergency preparedness and civil protection. CIVPRO was established in 2006 by the EUROBALTIC II Project for Civil Protection, an initiative of the Council of the Baltic Sea States supported by the EU Interreg IIIB BSR programme. After its establishment, CIVPRO’s activities have expanded from the Baltic Sea Region to collaboration with a wide variety of actors at both the European and global level, in order to promote comparative perspectives and synergies between different regions. The network is coordinated by a steering group representing the participating institutions and administrated by Aleksanteri Institute, Finnish Centre for Russian and Eastern European Studies, of the University of Helsinki.

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<th>Description</th>
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<tbody>
<tr>
<td>AIS</td>
<td>Automatic Identification System</td>
</tr>
<tr>
<td>BSR</td>
<td>Baltic Sea Region</td>
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<tr>
<td>COFREP</td>
<td>Gulf of Finland Mandatory Ship Reporting System</td>
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<tr>
<td>EC EIA</td>
<td>Espoo Convention on Environmental Impact Assessment in a Transboundary Context</td>
</tr>
<tr>
<td>ECI</td>
<td>European Critical Infrastructures</td>
</tr>
<tr>
<td>EMSA</td>
<td>European Maritime Safety Agency</td>
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<tr>
<td>EPCIP</td>
<td>European Programme of Critical Infrastructure Protection</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>IMO</td>
<td>International Maritime Organization</td>
</tr>
<tr>
<td>IALA</td>
<td>International association of Marine Aids to Navigation and Lighthouse Authorities</td>
</tr>
<tr>
<td>HELCOM</td>
<td>Helsinki Commission – Baltic Marine Environment Protection Commission</td>
</tr>
<tr>
<td>MA</td>
<td>Maritime Authority/Authorities</td>
</tr>
<tr>
<td>NCI</td>
<td>National Critical Infrastructures</td>
</tr>
<tr>
<td>SSA</td>
<td>Special Sea Area</td>
</tr>
<tr>
<td>PSSA</td>
<td>Particularly Sensitive Sea Area</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>VTS</td>
<td>Vessel Traffic Service</td>
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<tr>
<td>WWF</td>
<td>World Wildlife Fund</td>
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</table>
1 Introduction

The Baltic Sea is one of the most important passages for trade and tourism between the Nordic and Baltic countries. It has gained in importance due to the enlargement of the European Union and to the boost to Russia’s economic development. Oil transportations from Russia have increased drastically with the opening of the new Russian oil terminals.

The Gulf of Finland, in addition to the Danish Straits, forms the narrowest and shallowest waters in the Baltic Sea. It is one of the most heavily trafficked sea areas in the world. According to HELCOM (2006a), the Helsinki Commission – Baltic Marine Environment Protection Commission, over 2,000 passenger or cargo ships sail the Baltic at any time. This increases the area’s risk level.

This case study examines the situation of the increasing oil transportations in the Gulf of Finland, and the present sea transport safety solutions for the region. By studying what is being done, the aim is to identify the possible safety gaps in the maritime transportations and consequently make recommendations on how to improve the safety situations in the form of actual policy proposals.

1.1 Methodology and previous research

This study combines quantitative and qualitative approach. The data used in the maps and illustrations is gathered from existing research reports, whereas the qualitative input has been gathered from interviews with experts in Estonia, Finland and Russia. In the interviews, the main point has been to ask the experts to discuss and evaluate the level of risk, to consider the importance of recommendations and guidelines already made, and to reflect on whether they see their role as being sufficient and what they consider to be lacking in the safety and security measures.

There are many studies on the state of the Baltic Sea. The majority of them emphasize the environmental protection, especially those made by HELCOM, but there are plenty of research (reports, recommendations, analyses) into the risks and threats related to maritime traffic. This study is less academic and more policy-oriented. Many studies include recommendations and policy guidelines for the Baltic Sea States to use. Some examples include VTT Technical Research Centre of Finland (e.g., Rytkönen 2006 and 2007, Rytkönen & Semanov Gennady 2005, Meriturvallisuusseminaari 2007, Cleaner Seas 2007, the Conference on Dangerous Goods Transportation 2006), and Baltic Master.1 The Finnish WWF released recommendations in 2007 regarding maritime safety and the close calls that took

1 Baltic Master is a EU Interreg BSR IIIB part-financed international project that aims to improve maritime safety by integrating local and regional perspectives. The focus is on the Baltic Sea Region and issues concerning preparedness, prevention and marine spatial planning. See http://balticmaster.org
place on the Gulf of Finland during winter 2007 (WWF Finland 2007a). At the Karlskrona workshop held in Sweden (Räddningsverket 2001), one of the conclusions was the identification of the need to connect all the Baltic Sea States’ rescue services in order to fulfil the main objective of increased understanding and the effective use of common resources in oil spill prevention.

1.2 Premises for studying oil transportations in the Gulf of Finland

The subtitle of this study tells much about current thinking concerning the situation in the Gulf of Finland. There has not yet been a large-scale accident, but if an oil accident should take place in the Gulf of Finland, it would be catastrophic, especially to areas with extensive archipelagos. Collecting oil in a fragmented archipelago is far harder than from a continuous shore line. All this is well known, and it is usual for human nature to live with a certain level of risk.

However, this outlook might be changing. Comprehensive approaches to maritime safety issues are called for by many forums and they include issues such as risk assessment, preparedness and prevention plans, alarm and warning systems, investigation of accidents and environmental crime and planning of response operations, including for oil spills.

The emphasis is therefore on prevention and on efforts to stop accidents from happening. The oil transports are part of, and consequently maintain, the critical infrastructure in their destination areas. Their securing is vital, and has been included in the EU agenda in the protection of the European Critical Infrastructures (ECI) and National Critical Infrastructures (NCI). Passenger traffic is also included in rulings on the protection of people’s movements. It is therefore essential to look at these two dimensions of traffic together when evaluating the safety situation in the Gulf of Finland. However, because maritime security is to be enhanced relating to the European Programme of Critical Infrastructure Protection (EPCIP) and its goals, it is important to bear in mind that protective security measures should not be more intrusive than are strictly necessary.
2 Oil transportations in the Gulf of Finland

2.1 Description of the area

The Gulf of Finland forms the 400 km long easternmost part of the world’s largest area of brackish water, the Baltic Sea. The shores of the Gulf are occupied by a fine grain archipelago, especially on the Finnish side of the Gulf. There is also an extensive archipelago in Russia’s national waters, adjacent to the Karelian Isthmus. Estonia’s shores do not have an archipelago, which is the consequence of sand and limestone bedrock found in the area. However, in the westernmost part of Gulf of Finland there are two large islands, Saaremaa and Hiiumaa, belonging to Estonia. The Northern shores of the Gulf of Finland are formed of granite and other old bedrock minerals, making the area rich in smaller islands. Fact Box 1 and Figure 1 indicate how shallow the Gulf is in the Eastern and Northern archipelago.

Gulf of Finland

Physical dimensions:
- Approximate length 400 km
- Width 60-135 km
- Maximum depth 60 m
- Average depth 37m (Neva Bay only 5-10 m)

Environmental indicators:
- Brackish water, salinity ranging from 0,4 % in the Neva Bay to 1,1 % in the Western part of the Gulf of Finland (in the Atlantic Ocean 3,5 %)
- Bottom layers of water are oxygen free (lifeless layer) and surface waters occupied yearly by algae blooms due to excessive nutrient load
- Partly ice-covered from December till April

Fact Box 1 The Gulf of Finland (Sources: Merentutkimuslaitos 2006 and Sonninen et al. 2006, pp. 14-16.)
2.2 Oil tanker traffic among cargo and passenger ships

The EU’s external dependence on energy is increasing and the Russian oil transported by sea plays ever more important role. Europe represents about a third of the global market for crude oil. Ninety percent of that oil and refined products are transported by sea to and from Europe. The volume of oil transport is especially heavy in the Gulf of Finland, because Russia is building more port infrastructure here.

Many estimates say that the overall traffic and transportation of potentially hazardous cargo, especially oil, have more than doubled since the late 1990s. This has increased the volume of traffic and has made the traffic routes increasingly congested, especially during winter. Furthermore, the role of the Gulf of Finland has increased, because Russia wants to transport oil through its own ports, thus diminishing the importance of the Baltic States as oil transit countries. The increase in the volume of transported oil will most probably also be the trend in the future (Ministry of Transport and Communications in Finland 2005), as shown in the figure below.

Figure 1 Seabed depth in the Gulf of Finland.
Oil transportation in the Gulf of Finland through major oil-terminal ports 1995-2005 and estimated development to year 2015

There are several oil ports on the shores of the Gulf of Finland, including Muuga, Primorsk, Porvoo, Naantali and St Petersburg, which are among the biggest on the Baltic Sea (HELCOM 2006b). The turnover of Muuga, Primorsk, Porvoo and St Petersburg oil terminals has grown by over 250% since 2000, and over 400% since 1997 (HELCOM 2005). Primorsk has experienced the largest growth due to the fact that its oil terminal, connected to the Baltic Pipeline System (BPS), was opened only late 2001 (Figure 2). Figure 3 shows the amounts of overall traffic, i.e. vessels of all types entering and leaving the largest ports of the Gulf of Finland. It describes well the equation of growing cargo traffic combined with the heavy passenger traffic and oil transportations forming the smallest part.

In addition to the increasing oil and cargo transportation traffic, the Gulf of Finland is burdened by heavy passenger traffic, especially between Helsinki, Finland, and Tallinn, Estonia (Figure 4 page 6). In 2005, this traffic comprised 40,000 vessels (HELCOM 2006b), including both passenger and freight transport. The criss-crossing traffic of oil transports and passenger traffic in the Gulf of Finland constitutes a big challenge for the surrounding countries, both in the western part of the Gulf of Finland, with traffic lanes from Finland, Estonia and Russia (Figure 5 page 7), and in the eastern part closer to Russia where traffic from St. Petersburg / Primorsk and Vyborg / Vysotsk exits and enters the main traffic lane of the gulf (Figure 6 page 8).
Figure 3 Traffic through the major ports in the Gulf of Finland 2006.

Figure 4 Number of passengers travelling through the ports of Helsinki and Tallinn.
Figure 5 Maritime traffic through the entrance to the Gulf of Finland 2006.

Maritime traffic through the entrance to the Gulf of Finland 2006
Passage line histogram according to the Automatic Identification Systems (AIS)

<table>
<thead>
<tr>
<th>Passage</th>
<th>West</th>
<th>East</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>4,778</td>
<td>4,779</td>
<td>9,557</td>
</tr>
<tr>
<td>1</td>
<td>1,729</td>
<td>1,981</td>
<td>3,710</td>
</tr>
<tr>
<td>2</td>
<td>10,784</td>
<td>1,254</td>
<td>12,038</td>
</tr>
<tr>
<td>3</td>
<td>2,405</td>
<td>9,912</td>
<td>12,317</td>
</tr>
<tr>
<td>4</td>
<td>1,101</td>
<td>2,476</td>
<td>3,577</td>
</tr>
<tr>
<td>5</td>
<td>2,183</td>
<td>2,540</td>
<td>4,723</td>
</tr>
<tr>
<td>6</td>
<td>221</td>
<td>237</td>
<td>458</td>
</tr>
<tr>
<td>7</td>
<td>21</td>
<td>23</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>23,222</td>
<td>23,202</td>
<td>46,424</td>
</tr>
</tbody>
</table>

Traffic by type of vessel

- Passenger: 6,009 (13%)
- Cargo: 27,175 (59%)
- Tanker: 6,657 (14%)
- Other: 6,563 (14%)

Data source: Gatehouse 2007
Figure 6 Maritime traffic through the entrance to Russia’s Baltic ports 2006.
3 Risk evaluation

3.1 Risk perceptions of the Finnish, Estonian and Russian Maritime Authorities

Close-calls and accidents in maritime transport are not new phenomena in the Gulf of Finland. This is due to the challenging geographical conditions of the sea, difficult weather conditions in the winter time and increasing traffic. However, the Baltic Sea Region (BSR) and especially the Gulf of Finland can be determined as a fairly low risk area from safety (accidents) and security (terrorism) viewpoints, so far with only minor-scale incidents. There have e.g. never been any terrorist strikes in the area (during the time of the modern states of Estonia, Finland and Russia), neither have there been large oil accidents. The biggest catastrophe in the Baltic Sea happened in the 1994 when the passenger ferry MV Estonia sunk near the Finnish coast due to a technical failure. Despite the still ongoing discussion about the possibility of terrorist-related cause in the sinking of ship, it is the consensus in the area, expressed in the evaluations made by Maritime Authorities (MA) of the respective countries, that guaranteeing the safety enhancing procedures of vessel traffic in the Gulf of Finland is far more important than security-related procedures.

This study uses published material as a background against which the risk perceptions of the interviewed marine specialists, representing the MA and related institutions of Finland, Estonia and Russia respectively, are compared. Identification of risks, or what is at risk, is always contextually and culturally specific. In this case, despite culturally and politically representing different contexts, interviewees all belong to the same professional reference group. Each of them has a maritime background in terms of education and practical work, subsequently accompanied by experiences in marine traffic control. The following sections will elucidate the safety risks that rise from the views of marine authorities when they were asked about the risks.

We have tried to analyse this qualitative data bearing in mind that the conceptions of the interviewees should not be taken as fact, but as personal, though

2 The authors are most thankful to the following people who kindly agreed to be interviewed for this study: Mr Matti Aaltonen, Director, Vessel traffic management, Finnish Maritime Authority, 6.6.2007 in Helsinki; Mr. Kari Kosonen, Vice director, Vessel traffic management, Finnish Maritime Authority, 6.6.2007 in Helsinki, and 25.9.2007 by telephone; Mr Rein Haavel, VTS Project Office Manager, Cybernetica Ltd., 7.6.2007 in Tallinn; Mr Are Piel, Head of Vessel Traffic Services Department, Estonian Maritime Authority, 7.6.2007 in Tallinn; Mr René Sirol, Deputy Director General, Head of Maritime Safety Division, Estonian Maritime Authority, 7.6.2007 in Tallinn; Mr. Ivan Gotovchits, Head of Regional Vessel Traffic Service, Ministry of Transport of the Russian Federation, State Enterprise “ROSMORPORT”, St. Petersburg’s branch, (answers to an e-mail questionnaire received) 31.8.2007; Mr. Vladimir Vasilyev, Deputy Director/Associate Professor, Safety of Navigation and Radio Communication, Central Marine Research and Design Institute, (answers to an e-mail questionnaire received) 22.8.2007.
professional, views about the vessel traffic safety (and security) situation in the Gulf. Naturally, these views are formed and moulded by the personal and professional histories of the interviewed MA.

The risks in the Baltic Sea can be described as cross-border ones. One definition describes a cross-border risk as a potential civic and systemic risk that affects more than one country by creating potential or actual losses across governmental borders (Hellenberg & Hedin 2006, p. 8).

3.2 Excessive environmental risks

The narrow and shallow geographical conditions of the Gulf of Finland sea area make it a high-level risk zone. The traffic volume is high its central parts, in international water, where the lanes of “the motorway of the seas” are located. Despite the heavy use of the sea as a transport route, the Gulf of Finland is not seen solely as a traffic route, but as an area of important cultural heritage and environmental value.

The Baltic Sea is environmentally vulnerable and has been identified as the Particularly Sensitive Sea Area (PSSA) by International Maritime Organization (IMO) in 2005: “A Particularly Sensitive Sea Area (PSSA) is an area that needs special protection through action by IMO because of its significance for recognized ecological or socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities.” This means for example, that the estimation for the renewal of the water of the Baltic Sea is approximately 25-20 years, which causes pollutants to remain in the water for a long time.

Even if there is common understanding that on a daily basis most of the pollution in the Baltic Sea is derived from the surrounding land areas, a routine ship operation inflicts pollution too. For example, WWF Finland released a study according to which at present only 13 out of the 50 shipping companies are committed to proper treatment of sewage (WWF Finland 2007b). All the states at the Baltic Sea area are included except the Russian Federation.

Despite the shared will of all the Baltic Sea States to protect the Baltic Sea, there are differences in how the countries’ representatives perceive and value the state of the environment of the Baltic Sea, and why its protection is considered important. Estonia’s worries about an oil accident are understandable, because Estonia currently lacks equipment to collect spilt oil from the sea. Then again, the country to suffer most from an oil accident would probably be Finland, since the prevailing winds and sea currents in the Gulf of Finland area would divert oil pollution to the Finnish archipelago and the long Finnish coastline. In addition, despite what magnitudes of oil pollution combating equipment a country or region possesses, the consequences of a 100,000 ton oil tanker accident, if all of the oil were to be released, would be devastating for the whole Gulf of Finland and the Baltic Sea in general. At least one aspect of the Russian view comes from the fact that even if it has signed, it has not ratified e.g. the convention regarding the environmental protection of the Baltic Sea, the so-called Espoo Convention on Environmental Impact Assessment in a Transboundary Context from 1991 (EC EIA 1991).
3.3 A specific high-level risk: Wintertime ice conditions

Oil transportations have to be guaranteed all the year round and their importance is highlighted in winter, when weather conditions are at their most challenging. The Gulf of Finland freezes each year, which demands a special design and construction of the vessels intended to sail in the Baltic all the year round. Tanker traffic is faced with the challenges caused by the ice thickness, as well as the pressure from the ice ridges, and especially when manoeuvring in convoys led by icebreakers (Liukkonen 2006).

Even if the Baltic Sea has open water for the most of the year, the easternmost end of the Gulf of Finland is encumbered by ice for almost as long as the Gulf of Bothnia between Finland and Sweden, making it 5-6 months during a year. The ice conditions in the Gulf of Finland are exceptionally difficult. It is noteworthy that during four consequent winters in the new millennium the Gulf of Finland has frozen entirely. The easternmost end of the Gulf of Finland is also the place where the most important Russian oil terminals are situated. (Figure 7)

![Figure 7 Winter ice coverage in the Gulf of Finland 1997-2006.](image)

Because winter navigation, especially, is a growing challenge for the safety of oil transportation, it is no surprise that most of the interviewees emphasized the need for training in winter navigation. The severity of the climate and the extreme weather conditions make the Gulf of Finland among the most risk prone sea areas in the world. Navigating in ice conditions naturally causes special risky traffic situations, especially when ships are sailing in convoys led by an ice breaker. In 2005 rear-end collision led to the sinking of one of the ships in a convoy when a Russian icebreaker was halted by pack ice.
3.4 Human error and technical failures

Accidents are most often of unintentional nature and caused by human error or technical failures. According to HELCOM (2006b), the main factors leading to accidents in 2004 were human factors (39%) and technical failures (20%). These figures were backed by the perceptions of both Estonian and Finnish MA, since they accentuated the importance of human factor as the main cause for accidents. Representatives of the Russian MA did not explicitly mention human factors as the main cause for accidents, but emphasised the central role of ships crews, especially in guaranteeing safe winter navigation.

The number of collisions has not decreased despite the many efforts to prevent them. HELCOM’s statistics show that collisions have increased in relation to ships running aground, which used to be the most common type of accident. (Figure 8) These accidents involved cargo vessels (60% of all accidents), tankers (15%) and passenger ferries (12%).

![Accidents by type in the Gulf of Finland 2000-2006](image)

*Figure 8 Accidents by type in the Gulf of Finland 2000-2006. (Source: HELCOM 2007)*

3.5 Growing criss-crossing traffic

According to the MA of Estonia, Finland and Russia the rapidly growing oil tanker traffic causes one of the main risks in the traffic in the Gulf of Finland. The Gulf of Finland’s risk level has risen at the same rate as the traffic volume. Both the number and size of oil tankers have been growing steadily in the recent years. According to HELCOM (2006a), by 2015 an increase of 40 % is expected in the
volume of oil shipped yearly on the Baltic Sea. Other estimates are even greater, and they are related e.g. to the fate of “Druzhba” oil pipeline that runs through Byelorussia to Central and Western Europe. If it is closed, as has been mooted in Russia, the volume of oil transports in the Gulf of Finland will rise to a new level. Currently, the figure is around 150 million tonnes of oil per year.

In addition, the use of bigger tankers carrying 100,000-150,000 tonnes of oil, is expected to rise, according to Semjon Vainshtok, the head of the Russian state-owned oil pipeline monopoly Transneft (HS 2007e). The consequence is a lower risk probability due to the reduction in the amount of tankers, but with the higher risk of a large-scale accident, because of the vast amount of oil transported by one vessel. Naturally, this is true only during a certain, limited time-span, before the volume of oil transported in the Gulf will be of the magnitude that even the number of larger 100 000 tonne tankers will surpass the present number of tankers travelling in the Gulf.

All MAs shared the view that the combination of growing oil tanker traffic in the Gulf of Finland and the crossing fast passenger traffic between Helsinki and Tallinn cause a very high risk (Figure 9 page 14). However, the Estonian MA did not consider passenger traffic as the main cause of the risks in maritime transport. This is understandable, taking into account the importance of the passenger traffic for Estonia (but naturally for Finland as well). Seagoing passengers are a central asset for Estonian tourism, which forms a significant part of the Estonian economy.

In the event of a large scale oil accident the consequences could be multiple. The so-called first-order consequences of environmental degradation would be very important and they could extend to economic and even political ramifications e.g. in trying to find who was responsible for the accident. The Gulf of Finland has not yet been faced with a large-scale oil accident. However with the average figure of shipping accidents annually being around 140 and increasing every year, the odds are that a serious accident is bound to happen.
Figure 9 Maritime traffic and accidents in the Gulf of Finland 2000-2006

Data source: Helcom 2007

Approximations based on publicly available data
Data source: Finnish Maritime Administration, 2007;
Estonian Maritime Administration, 2007;
3.6 Terrorism as a low-probability risk

When thinking about the risks of oil transportations at the Gulf of Finland the risk of terrorism does not usually come to mind. However, the possibility exists that a terrorist act could be carried out related to sea transports, especially according to the Russian MA. So far this possibility and probability has not been studied properly (Hellenberg 2006). Risks are becoming increasingly international and complex, and include dimensions concerning strikes in the places never before imagined. Imagination is one of the core attributes that should be exercised in risk mapping and prevention. The central role of oil transports in the region allows the possibility of political tensions, whereas the transportations and their vital role could also be seen as targets for terrorist strikes.

One way of separating the concepts of maritime safety and maritime security is to define safety by incidents caused by natural or technical conditions and security by referring to criminal activities (Baltic Master 2007). Another separation of terms can be the nature of sensitive information. With safety issues transparency is advocated and shared, but with security issues there are often problems of referral to sensitive information. The latter view is apparent in the way the Russians describe the tasks in the region.

In general, the Russian authorities’ view of the level of risks in the Gulf of Finland resembles much the concerns of their Estonian and Finnish colleagues. The only noticeable and clearly differing view comes when the security, and not safety, of marine transport is discussed. The Russian view is that one hindrance to deeper safety cooperation, for example to share even greater amounts of information regarding the ships, is the requirements of traffic security in Russia, which demand classification of part of the information on the ships’ cargos and routes. The fear the Russian party expressed was that when giving more precise information about the ships, the Russian MA cannot be absolutely sure that this information stays away from the hands of terrorists. With Russia, therefore, we can clearly see the distinction in defining the concepts of safety and security.
4 Present safety solutions

4.1 Cross-border safety efforts: GOFREP and AIS

GOFREP – the Gulf of Finland Mandatory Ship Reporting System was developed to match the safety needs associated with the rapid growth in vessel traffic. The central idea of GOFREP is to gather information on ships, their cargo and routes, so that the authorities responsible of vessel traffic control (the Estonian, Finnish and Russian MAs) have information on ships navigating in the Gulf of Finland. In addition, the ships that are about to enter the GOFREP area have to report via radio to the operator centre, and the operators can warn and give advice to the ships about various situations (weather, ice, other vessels, manoeuvrable routes etc.) in the Gulf.

In July 2005, a system called the Automatic Identification System (AIS) was launched to give more and precise information about the maritime traffic in the Baltic Sea. The preparation of the system was initiated in 2001 and it is now the dominating automatic system to observe the vessel traffic in the Baltic Sea. The AIS is incorporated into the GOFREP system, but at the moment the information provided through it for vessel traffic operators does not help the operators predict near future traffic situations. The significant amount of information gathered by the AIS is not available to be used in real-time by the operators.

![The Gulf of Finland Mandatory Ship Reporting (GOFREP) area and territorial waters.](image-url)
The international waters of the Gulf of Finland, which equals the GOFREP area, has been divided into three areas of responsibility (Figure 10). Southern part and eastbound route (ships entering the Gulf of Finland from the West) are controlled by the Estonian operator centre, the northern route is controlled by the Finnish operator centre and the easternmost strip of international water is controlled by the Russian operation centre. This easternmost strip was annexed into the GOFREP system on the 1st of July 2007.

A large part of the eastern Gulf of Finland is under the jurisdiction of the Russian national vessel traffic service system. When a ship enters national waters it is simultaneously handed over from the GOFREP system to a national Vessel Traffic Service (VTS). The national VTS is quite similar to the air traffic control system, since with the VTS MA (traffic controllers) give not only advice but also commands about movements in national waters.

The northern GOFREP mandated and Finnish controlled route in the Gulf of Finland is very crucial what comes to safety of oil traffic. Full-loaded oil tankers, which have started their voyage from the Russian oil ports in the Karelian Isthmus or St. Petersburg, travel along the coast of Finland, and during winter, in difficult ice conditions. In addition to the Russian part of the route, this lane of the motorway of the seas is the most risky one, due to the criss-crossing of traffic.

When justifying the further development of safety-enhancing systems in the Gulf of Finland, the Finnish authorities referred first to the internal safety assessment that they had done in the area. According to the Finnish authorities by using routing systems, risks can be reduced by only 30%, but if reporting, surveillance and traffic control are carried out, risks can be reduced by 80%. Despite this, the accident risk induced by human factors will still remain as high as for 20%. The ship and its crew are still in a central position to avoid risks and accidents induced by human factors.

The Estonian authorities also said that the AIS and GOFREP systems are the best things that can be done at the moment in order to guarantee the safety of oil transports and marine safety at large in the Gulf of Finland. This reveals the difference between the Finnish and the Estonian authorities' views, since the Finnish more categorically view this phase just as a good beginning on the way towards a more comprehensive system.

A central shortcoming of the present system, according to the Finnish authorities, is that the system has merely an advisory role in directing and controlling sea traffic in the Gulf of Finland. The objective of the Finnish marine safety authorities is to develop the system into a sea traffic control system that resembles the one of air traffic in its legal and functional forms. To back this view, the Russian authorities emphasized similarly the fact that despite the newly-introduced AIS and GOFREP systems, the risk level in the Gulf of Finland is getting worse.

Estonian, Finnish and Russian MAs are trying to put forward, through national ministries of transport, and eventually the International Maritime Organization (IMO), a developed version of GOFREP and a common (in contrast to national) VTS for the whole Gulf of Finland. High hopes exist that this would be operational in the Gulf of Finland in 2008. At the moment, the VTS system is functioning only in national waters, which means that ships entering them are more profoundly under the direct control of the operational centres than the ones
navigating in international, GOFREP mandated water. The GOFREP system was taken into use in 2004, and its development was the result of intense cooperation between the MA of these countries.

The view shared by MAs, especially the Finnish and Russian ones, is that many people were thinking that with the introduction of the GOFREP “the world would be saved”. However, the national maritime authorities emphasise that the present version of the GOFREP does not abolish risks completely, not even those beyond human factors. Despite the possibility of warning ships, for example those on an incorrect route, it is evermore challenging for the GOFREP operators to follow the vessel traffic situation in the Gulf, simply because of the grown traffic. It has to be stressed that GOFREP is not an intelligent or “wise” system at the moment.

The above mentioned technical and system-based solutions can evade only part, albeit a big share, of the risks in marine traffic in the Gulf of Finland. The specific winter time conditions (Figure 7 above), especially the difficult ice conditions from January to April, form a central part of risks for traffic in this area. Navigation in ice is difficult, which accentuates the role of the human factor in vessel traffic safety. For example, when vessels maneouvring in the Gulf of Finland are given the coordinates of icebreakers’ routes, the information always refers to a situation that has already passed, thus the open route on the ice might have changed. Heavy vessel traffic also forms queues of ships that line up after icebreakers, which multiplies the risk of rear-end collisions. Risk of collision is the greatest when smaller and bigger ships form these queues. Vessels and tankers of greater tonnage cannot stop in short distances, whereas smaller ones can and do.

All these risks are part of the 20% of risks, induced by human factors, which cannot be erased at the moment by technical solutions and systems. However, the cooperation around safety issues and the establishment of the GOFREP system between Estonian, Finnish and Russian MA has enhanced also this ice manoeuvring safety, despite its above mentioned deficits.

4.2 Legislative framework

More agreements usually mean more cooperation. However, different agreements may cause differences in delivery. This has happened in the BSR in such a way that some apply HELCOM recommendations for exemptions, while others apply EU regulations. The Baltic Sea is now surrounded by EU Member States, so it is reasonable to assume that EU regulations and directives will gain more weight. However, since Russia is a major player in the region but not a member of the EU, it is important to hold onto the existing regional agreements and update them to meet the new challenges of the widened EU by anyway following the EU principle of complementarity, i.e. avoiding the duplication of work.

A significant range of European legislation addresses maritime transportation and safety (e.g. COM (2005) 0589). The European Council is committed to oil spill preventive action, and after the tanker “Prestige” accident decisions were taken by the European Council aimed at defining the general political guidelines for the European Union. In the European Union, it is mainly the Transport Council and
the Environment Council that are responsible for this action. The establishment of the European Maritime Safety Agency (EMSA) strengthens EU’s role in the field of maritime safety and pollution prevention.

After the 2004 EU enlargement Russia remains the only non-EU member state in the BSR, thus ensuring that the Baltic Sea will not form an internal sea of the EU. For this reason it is not possible to rely only on European action and legislation, even if the Commission does consider the transport and energy sectors amongst the most immediate priorities for action (COM(2006) 787 final, p. 9).

The so-called Helsinki Convention, Convention on the Protection of the Marine Environment of the Baltic Sea Area, was established in 1992 to protect this marine environment from all sources of pollution through intergovernmental cooperation between Denmark, Estonia, the European Community, Finland, Germany, Latvia, Lithuania, Poland, the Russian Federation and Sweden. The intergovernmental body HELCOM was established to govern the convention, but since then HELCOM has produced many other decisions and recommendations, e.g. the Copenhagen Declaration on the Safety of Navigation and Emergency Capacity in the Baltic Sea Area 2001. HELCOM decisions or recommendations are not legally binding, but work almost as legislative instruments, since they are adopted unanimously with a serious endeavour by the parties to comply with them.

In addition, there exist the international conventions of the IMO, which is part of the United Nations administration. The IMO named the Baltic Sea as a Special Sea Area (SSA) in 1995. This translates into several restrictions for e.g. discharges of oil, oily water, oily waste and garbage into the sea as well as for the emissions into the air (IMO 1973/78). Many IMO conventions and resolutions deal expressly with maritime security in the Baltic Sea (e.g. IMO 1972 and 2002; IMO Resolution A 978(24), IMO Resolution MSC 138(76)). Despite the regulations and in direct contravention of e.g. the MARPOL, about 300 operational discharges of oil take place annually (HELCOM 2004).

En-route states with their national legislations cannot bind adjacent nations, and any regulatory and enforcement actions must be consistent with the international law e.g. UNCLOS (United Nations Convention on the Law of the Sea) or IMO Conventions. These regulations, however, do not seem to be enough for coastal states burdened by the increasing traffic, and the likelihood of a major maritime disaster keeps growing.

Most of the recommendations that come from the EU, HELCOM, IALA, EMSA, IMO and other international sea traffic-related organisations are being turned into a binding rule of marine safety procedures. However, the Estonian MA accentuated that problems also arise with the fact that there are so many international organisations with similar or largely overlapping functions, and thus, with similar recommendations to be followed. These organisations are also competing with each other over the question of which of the institutions should get

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3 The Commission’s proposal for a wider EU ban on all single-hulled oil tankers operating in EU waters was agreed upon recently. Internationally the deadline for the phase out for such vessels is 2015.
more tasks in maritime safety regulation. Hoarding up these tasks seems to have been a way to justify their existence, which has resulted in a concentration more on the development of technical systems with little value for practical day-to-day work.

The Estonian and Finnish authorities expressed the view that one central problem in putting forward new safety enhancing regulations in this field is the meta-conflict between EU and Russia. A meta-conflict approach is one that can address the many facets of a conflict, be they structural (political or constitutional arrangements, legislation, economic or other factors) or psycho-cultural (attitudes, relationships, divided histories) in a comprehensive and complementary manner (Fitzduff 1989 and 2004). All the regulations and procedures agreed among EU member states are, one could almost say, naturally contested by the Russians, if such regulations taken as a starting point for marine safety cooperation. It should be mentioned here again that Russian safety regulations are also well developed. Thus, a prerequisite for good EU – Russian cooperation is to use as a point of departure those procedures and regulations that seem to be close to both Russian and European practices. This requires, among other things, knowledge about the way the Russian MA interprets international maritime law and regulations.

4.3 Cooperation based on partnership and common will

Hard law comes through the EU and eventually the IMO, but actually the working procedures (traffic surveillance and control) adopted by marine safety authorities of all three countries have been gained through cooperation on the level of professional, practitioners. Thus, the role of regional cooperation is accentuated in enhancing the safety of Baltic Sea energy transportation. It seems that this type of somewhat informal cooperation may be the best way to enhance safety, in the sense that the steps taken towards cooperation are not obliged by the law, but result from practical need. It is therefore evident that a mere top-down approach does not improve the situation, but responding to and moreover anticipating the actual close-call traffic situations do. This is even more apparent when operators have to deal with ships that are operating according to different environmental, technical and social standards.

The hard core of the safety-enhancing system was agreed among marine authorities, although the adoption of the GOFREP system itself is mandated through the IMO. Most procedures that guarantee safety in the Gulf of Finland are based, therefore, on agreed standards of procedure. In this light, the most important feature in safety cooperation in the Baltic Sea is this type of day-to-day joint work between the professional maritime safety authorities of the three countries. As a result, the things agreed in the Document of Joint Procedures, the document of the three MAs to define and describe the things to be done and followed by operators on a very detailed level, go far further than the IMO GOFREP obligation demands.

This is also a tacit criticism of IMO policy, which only concentrates on ship safety itself and not on traffic control systems. The criticism is justified not least because the need for this type of a system that is much more demanding towards ship navigation is also globally evident.
5 Conclusions

Increased traffic density has made oil-related accidents with broad environmental and societal consequences more probable. Many of the experts interviewed referred to internal statistical risk analyses. It is a cause for concern that the estimation is that it is a question of when rather than if a severe oil tanker accident will take place. The maritime safety and security issues need to be given more weight on national as well as international agendas. This was a common view expressed in all the interviews carried out. This motivation has also recently been reflected in the Finnish media (e.g. HS 2007a-d, MTV3 2007, YLE 2007). The following presents the conclusions of the study, which lead to several recommendations on how the maritime safety could be improved.

5.1 Combining AIS, VTS and GOFREP

A central innovation in the technical and practical field would be that the vessel traffic operators would have an access to the planned route of vessels in a real time. This implies that a system resembling the vessel traffic service, VTS, in national waters of Estonia, Finland and Russia, combined with the information available through AIS, should be adopted in the whole Gulf of Finland area. In addition, a strict agreement on vessel traffic control procedures should be introduced.

The system would be similar to that of air traffic control. Ships would thus have to follow certain routings, announced in advance, and the maritime traffic control operators would communicate with and monitor ships to ensure they are on their designated routes. The system would also follow the near future situations (vectors of ships) and provide warnings as well as commands to ships if they are about to run to danger. Similarly, the authorities could in advance see if the announced route is suited to the tonnage and other features of the ship.

It is therefore clear that all maritime administrations from the three countries would like to see GOFREP developing towards this kind of “wise” system. The worries expressed by the Russian authorities were that at the moment the GOFREP system, with all its data requirements, is too demanding and time consuming. These procedures can divert the attention of ship crews and operators from the main safety tasks of safe navigation. However, these concerns relate to the current and not the fully developed version of the traffic control system envisaged.

In order to create a system of this order we would need the decision by the IMO to make it binding according to international maritime regulations. There are no obstacles to obtaining this, but the bottleneck at the moment is the low standard of equipment on vessels, such as a lack of e-navigation readiness. Ship owners do not see the need for this equipment, without an IMO obligation even if basically the question concerns relatively inexpensive investments, mainly transponders. The Baltic Sea would act as a very good testing ground in the EU and globally in this matter, since there are already many advanced technical solutions in use, backed up by long-lasting cooperation between the Gulf of Finland states.
In addition, the MA emphasised that a system of penalties regarding ships that disregard safety and GOFREP reporting rules should be agreed upon. The restrictions should be severe enough to have an economic effect on ship owners. At present there is no such system, and in order to be effective this type of regulation on pain of sanctions should be enhanced throughout the whole EU. However, by building safety procedures and systems like the GOFREP and VTS, it is possible to cover only part of the “safety menu” needed for a safe Gulf of Finland. The above-mentioned systems and procedures can diminish the risks entailed by growing tanker traffic but it would not eliminate them. Risk related to human factors and in many cases to the level of professionalism of ship crews, remains at about 20% of all risks, despite what procedural and technical measures are taken.

5.2 A driving licence “ice passport”

Solving the problem of navigating in dangerous ice conditions needs both political and technical responses and solutions. The view of the MAs interviewed is that the specific geographical context of the Gulf of Finland is not thoroughly understood by the EU authorities, or by the IMO. For the MAs the most worrying issue is not the quality of tonnage, as it was few years ago, but the quality and numbers of personnel onboard the ships. However, having a well-qualified crew is a costly business for shipping companies who may decide to prioritize their expenses differently. An ever bigger share of the ships and shipping companies that navigate in the Gulf of Finland are Russian. Taking into consideration the winter-time conditions and the requirements this imposes on ships’ personnel it is a positive trend that more ships in the Gulf of Finland are navigated by personnel with experience of winter navigation. For example, it can be speculated that the running aground of the Greek oil tanker Propontis, which took place in the Gulf of Finland in February 2007, might have been avoided if its crew had had a deeper knowledge and experience of winter navigation. However, the maritime authorities emphasized that winter navigation training for shipping companies and the crews of the ships would be highly necessary, which would enhance the safety of vessel traffic in the whole Baltic Sea, but especially in the narrow and shallow areas of the Gulf of Finland.
Finland. Therefore, the need to develop an education and testing system, which was several times referred to as an ice passport, is immense. This should be put on the political agenda of EU traffic authorities, which would in turn develop the issue, including for discussion by the IMO.

5.3 Practitioner –level cooperation

Neither safety nor security can be achieved through a one-size fits all approach. It is worth of considering too whether it can be achieved regionally. Despite common goals, safety and especially security measures remain issues that emphasize the sovereign and national decision-making in the globalised world. This analysis has shown that issues of sovereignty still dominate at the higher political level, but that at the more practical (lower) level they do not create an obstacle to deepening cooperation. A perfect example is the development of the GOFREP system.

Considering the risks present in the Gulf of Finland, high marks are due for the cooperation carried out. On such a heavily used sea with high probability of oil accident, the risks are being handled exceptionally well. However, there is a need for political decisions and commitment on the level of IMO and EU, to give a mandate for safety cooperation to evolve further. This mandate would enhance the adoption of existing technical solutions to battle the risks of growing vessel traffic. This is necessary because it is probable that the volume of oil transports will double by 2015. A larger volume of oil transported through the Gulf of Finland will not cause a problem in itself because the size of the ships will increase. But a traffic situation with more and bigger vessels has to be controlled in a much more profound way than is the case today.

However, it would be too simplistic to think that cross-border action only at the level of practitioners is enough. It is important to raise the issues to the international as well as national agendas and get binding instruments e.g. in the environmental protection issues. This should be done in the same cooperative spirit as the operational cooperation.

5.4 Afterword

The Gulf of Finland has become one of the risk areas for oil transportation. Taking into account the generally narrow ship routes, due to the shallow waters, as well as winter conditions the probability of collisions and groundings is significant. There are, however, currently several advantages within the area of Gulf of Finland regarding the safety of oil transportations. On the plus side, the fleets sailing in the Baltic Sea are mostly modern. Moreover, transportation with single hull vessels will be a thing of the past by 2010 or at the latest by 2015 and, importantly, the legislation around maritime transportation is strict.

“In order to best improve safety it is important to enhance cooperation on a professional practitioners’ level i.e. “harmonize by doing”. In addition it is of utmost importance to put this on political agenda, since no progress can be made without a firm political will.”
Russia as a central player in the Gulf of Finland and as a global great power wants all decisions to go through the IMO, thus emphasising the UN system rather than the EU system. However, in most cases when Finland and Estonia have tried to operate the system according to EU directives, Russia has not been reluctant to cooperate. This potential barrier to cooperation has been avoided thanks to good and personal contacts with the Russian authorities. Furthermore, it has been especially important that those Russian authorities present at maritime safety cooperation meetings have recently had a full mandate to make decisions. This implies that Russia too has a sincere will to promote safety in the Gulf of Finland. Without this mutual trust and adequate openness, based on common professional background of the people involved, questions that have been negotiated would have easily turned political. This would have meant unnecessary obstacles in putting forward important traffic safety measures.

The political nature of practically all cooperation questions with Russia has thus been avoided to that extent that in a politically sensitive neighbourhood\(^4\), as the region is described in many EU neighbourhood programmes, concrete steps forward have been made possible. It is no surprise that all the parties to the GOFREP cooperation see the present system as globally unique. Barriers of a historical, political and national nature have been overcome by a professional attitude to the questions at hand.

All in all, the Gulf of Finland countries should promote the region as a pilot area within the European Union and worldwide in the field of cross-border risks prevention in maritime transport. This would provide the citizens of the EU in general and particularly the people living by the Gulf of Finland comprehensive safety across their borders and enhance the mutual trust that is needed in developing the safety systems and procedures even further – eventually, towards a traffic control system with high-tech navigation surveillance qualities and traffic command powers delegated to traffic control operators.

\(^4\) See the presentation by Chaplinskaya in June 2007 (ISBMSC 2007).
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