



European Space Policy Institute



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Space Applications as a Supporting Tool for Counteracting Piracy – Outline for a European Approach

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Executive Summary

The Issue of Piracy

According to the International Maritime Bureau, in 2009 a total number of four hundred and six piracy incidents were reported, pushing the problem of piracy, or the provision of security for maritime trade, high on the agenda of policy makers. Research, articles and public debate usually centre on topics such as the most appropriate definition of piracy and how to deal with the problem of prosecuting pirates. Some cite the number of incidents to push piracy even higher on the agenda of policy and decision makers. Others put piracy in the context of terrorism and talk about an arising piracy-terrorism nexus that will soon threaten the international community. There is little analysis of the causative and sustaining factors of piracy and the determinants for an effective counter-piracy policy and even less analysis actually identi-

fies Europe's instruments at both a policy and a technology level and puts these into the wider context of Europe's approach to piracy.

The European Space Policy Institute (ESPI) has already examined maritime security in the context of the use of space applications in the provision of internal security, i.e. non-traditional security threats which might even come from within a nation's own borders. To follow on from this, it seemed appropriate to conduct an in-depth study of piracy and the benefits of space applications in the fight against it. As a consequence, and in preparation for this study, together with the Austrian Institute for European and Security Policy (AIES) ESPI conducted an expert workshop entitled "Space and Maritime Security - Strategies and Capabilities to Counter Piracy", which took place on 30 November 2009.



Figure 1: ESPI's Research: Piracy as One of the Areas of Maritime Security Threats



Causative Factors of the Emergence of Piracy and Determinants for Successful Counter Piracy Policy

Piracy is not a new phenomenon. It continues to exist at a low level of intensity, with regional hotspots emerging cyclically such as Lebanon, the Straits of Malacca, Indonesia and Somalia. Somali piracy is often said to be *sui generis*, given its unique concentration on random payments and its high level of armed aggression. Yet, the RAND Corporation, a U.S. think tank, has identified seven factors accounting for the current emergence of piracy. Removal or interruption of any one of these factors would eliminate or reduce piracy. These are:

1. Massive Increase in Commercial Maritime Traffic
2. Narrow and Congested Maritime Chokepoints
3. Lingering Effects of the Asian Financial Crisis / Profit as a Motivation
4. Difficulties with Maritime Surveillance as a result of the events of 9/11 and the concomitant pressure that has been exerted on many governments to invest in expensive, land-based homeland security initiatives
5. Lax Coastal and Port-Side Security
6. Corruption / Safe Havens
7. Global Proliferation of Small Arms and Light Weapons (SALW)

These seven Causative Factors (CF) served as the basis for the analysis of the usefulness of space applications as instruments in the fight against piracy. Clearly, technologies such as space applications cannot counter the massive increase in maritime traffic (CF 1), decentralise narrow and congested maritime choke points (CF 2), provide the Somali population with money to overcome the lingering effects of the Asian financial crisis (CF 3), or counter corruption (CF 6). Those factors have to be tackled by land-oriented policies and capacity building measures. Space applications can however improve maritime surveillance (CF 4) as well as coastal and port-side security (CF 5) and provide supportive tools to combat illegal trafficking of, for example, SALW (CF 7).

Additionally, the German Institute for International and Security Affairs (SWP) identified four factors (determinants) that are necessary for the effective fight against piracy:

1. Determinant 1: Degree of Statehood of Adjacent States

2. Determinant 2: Geography and Resources
3. Determinant 3: The Political Agenda of the Adjacent States
4. Determinant 4: Expectations of the International Community

In this analysis, these have been taken as complementary to the Causative Factors. Technologies such as space applications cannot influence the degree of Statehood of adjacent States (determinant 1), change geography, resources (determinant 2) or the political agenda of adjacent States (determinant 3), or influence the expectations of the international community (determinant 4). Yet, technologies such as space applications do have an impact on the effectiveness of counter-piracy policy as they can counter the Causative Factors mentioned previously and are an optimal tool to provide a better overview of long coastlines with large numbers of bays and isles in which pirates hide.

The International Context

Piracy matters to the international community for four primary reasons:

1. The effect on Somalia
2. The impact on international trade
3. The danger to the environment, and
4. The potential connection with the terrorist threat.

The international legal framework on piracy is drawn from the UN Convention on the Law of the Sea (UNCLOS) of 1982 and the Suppression of Unlawful Acts against the Safety of Maritime Navigation Convention (SUA) of 1988 (revised in 2005). Collective action against piracy was first codified in the Geneva Convention on the High Seas of 1958, which obliged all States to "cooperate to the fullest possible extent in the repression of piracy on the high seas or in any other place outside the jurisdiction of any State." (Art. 14). The question has arisen whether these Conventions regulate the seizure of pirates as a right or as a duty, i.e. whether States are obliged to adopt and implement anti-piracy legislation.

There have been instances of pirates being apprehended by naval forces that have subsequently had to release them because of the peculiarities of national laws, giving rise to a debate on how to prosecute pirates. Finding a model for prosecuting pirates would tackle Causative Factor 6: Corruption/ Safe Havens. While some pirates have been brought to France and the Netherlands to stand trial, it

is generally preferred to prosecute pirates within the region. An option that has been used of is to conclude bilateral agreements with a country in the region, defining procedures for the detention, transfer and prosecution of persons suspected of having committed acts of piracy, as the United States and the European Union have done with Kenya. Kenya however has recently stopped trying pirates, claiming its prisons have reached saturation point. The EU is envisaging signing similar agreements with other governments of the region, including those of Djibouti, the Seychelles and Tanzania. Several alternative options to trying suspects in Kenya are currently under discussion. They range from bringing pirates within the ambit of the International Criminal Court (ICC) or the International Tribunal for the Law of the Sea (ITLOS), to following the model of the Special Court of Sierra Leone, the Palace of Justice trials held in Nuremberg, or the ad hoc international criminal tribunals for the former Yugoslavia and Rwanda, through to the UN administrative body model.

The increase of piracy incidents in the Gulf of Aden and off the coast of Somalia, as well as pirate attacks on ships carrying humanitarian supplies to the Somali population, has prompted the international community to take action in that region. The United Nations Security Council has thus passed resolutions aimed at complementing existing international law concerning piracy. It has established a monitoring group, a panel of experts on Somalia and a Contact Group on Piracy off the Coast of Somalia (CGPCS).

It was the International Maritime Organization (IMO), which in 2005 alerted the United Nations to the rising number of acts of piracy. In January 2009, the IMO chaired a regional meeting in Djibouti which brought together 17 of the 21 countries of the region and resulted in the adoption of the so-called Djibouti Code of Conduct, in which subscribing States agreed to establish closer regional cooperation consistent with international law in order to arrest and prosecute alleged pirates. In 1981, together with the International Chamber of Commerce (ICC), the IMO established the International Maritime Bureau (IMB). Increases in piracy incidents subsequently prompted the International Maritime Bureau to create the Piracy Reporting Centre (PRC) in October 1992 in Kuala Lumpur, Malaysia, which is the main piracy reporting institution.

NATO has been involved in the region through several operations including "Operation Allied Provider" (October to December 2008), which escorted UN World Food Programme (WFP) vessels, "Operation Allied

Protector" (since March 2009) and "Operation Ocean Shield" (since August 2009). Additionally, NATO has developed a Maritime Situational Awareness (MSA) concept and is currently producing a comprehensive implementation plan focusing on doctrinal, legal, organisation, training, material & technology, facilities and interoperability aspects (to be submitted to the NATO nations in summer 2010).

Other missions in the region are the U.S.-led multinational Combined Task Force, CTF 150, a counter-terrorism mission that has taken part in counter-piracy operations on several occasions, the U.S.-led multinational Combined Task Force CTF 151 with a dedicated mission to combat piracy, and the land-based African Union Mission in Somalia (AMISOM) which is mandated to support the TFG's institutions in their stabilisation process as well as to facilitate the delivery of humanitarian aid and to create the necessary pre-conditions for reconstruction, reconciliation and sustainable development.

The Role of the EU

The EU has developed a comprehensive set of policies in the areas of four of the Causative Factors, i.e. policies improving maritime surveillance (CF 4), policies improving coastal and port-side security (CF 5) (e.g. combating illegal fishing, providing for the protection of ports as critical infrastructures), policies countering corruption and improving the degree of Statehood of adjacent States (CF 6 and Determinant 1) and policies countering illegal trade (i.e. the proliferation of SALW) (CF 7) (cf.

Figure 10). EU Institutions – the European Commission (EC), its Directorates General (DGs), the European Parliament (EP), the Council, its Presidency, its EU Military Staff (EUMS), its EU Military Committee (EUMC), its Political and Security Committee (PSC/COPS) and EU agencies (EMSA, EU LRIT DC, FRONTEX, EDA, Community Fisheries Control Agency (CFCAs)) - are to various degrees involved in these efforts.

In general, under the European Space Policy, the European Space Agency (ESA) is responsible for implementing space capabilities that respond to EU policy needs. In this regard, the EU is cooperating strongly with ESA in the development of several security related service elements of its flagship programme, Global Monitoring of Environment and Security (GMES). ESA has been actively involved in the maritime field for over twenty-five years. It is also working on the European Data Relay System (EDRS), which contributes to an improved provision of security through



improved relays of Earth observation images, and is currently in the process of developing a Global Integrated Network for iNnovative Utilisation of space for Security (formerly known as GIANUS), aimed at an improved preparedness of Europe for a variety of threats through the development of an integrated space infrastructure as part of a European security and crisis management system in coordination with existing initiatives.

Space Applications as a Supporting Tool Countering Piracy

Space applications offer the possibility of monitoring specific large geographic areas in a non-intrusive manner that is not confined to borders (i.e. the monitoring is legally valid over foreign territories). Given their multi-purpose characteristics, they can deal with the thematic diversity of maritime security threats in an optimal manner but the satel-

lites currently used for maritime surveillance were not originally designed for this purpose.

Technical Capabilities

Technical capabilities depend on the area of application. They are elaborated upon in greater detail in the related section of this study.

CF 4: Improving Maritime Surveillance

Space applications fulfil a threefold role in improving maritime surveillance,: EO, SatCom, and SatNav (collection of cooperative and non-cooperative signals). Within the chain of command, space mainly contributes to the "observe" and "detect" function. Space applications are complementary to other surveillance systems (e.g. coastal RADAR, AIS, patrol vessels and aircrafts/helicopters) and extend their surveillance range. They often cover a large zone in one shot (i.e. optimisa-

CF 4: General Difficulties with Maritime Surveillance	CF 5: Lax Coastal and Port-Side Security	CF 6: Corruption/ Safe Havens and D 1 Degree of Statehood	CF 7: Global Proliferation of SALW
<ul style="list-style-type: none"> • 2002: Dir 303/59/EC of EP and Council establishing a Community Vessel Traffic Monitoring and Information System (VTMIS) • 2007: Commission Working Document on Maritime Surveillance Systems • 2008: Non-Paper on the current state of the art of surveillance, monitoring, tracking, identification and reporting systems put in place by EU-MS and EU agencies (SEC (2008)2337) • 2009: Commission COM "Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain" (COM (2009)538) 	<ul style="list-style-type: none"> • the problem of illegal fishing • 2002: Action Plan against illegal, unreported and unregulated (IUU) fishing • 2007: Commission launches consultation process on IUU • 2007: adoption of proposal to prevent, deter and eliminate IUU fishing • 2008: Regulation to prevent, deter and eliminate IUU fishing • port-side security • 2003: Commission Regulation establishing a ship and port facility security system (COM (2003) 229 final) • 2004: Regulation 725/2004 implementing the International Ship and Port facility Security (ISPS) Code • 2005: Directive on enhancing port security • 2008: Commission Regulation (EC) 324/2008 laying down revised procedures for conducting Commission inspections • Several more policy documents in the area of CIP 	<ul style="list-style-type: none"> • long-term bilateral support for Somalia • Since 2007: Action against piracy in the framework of the Instrument for Stability programme (IIS) • Somalia Joint Strategy Paper for 2008-2013 • Council decision 2010/96/CFSP of 15 Feb. 2010 on a European Union military mission to contribute to the training of Somali security forces • Council conclusions on CSDP of 26 Apr. 2010 on EUTM Somalia • Further regional cooperative initiatives 	<ul style="list-style-type: none"> • 1998: Council Joint Action on SALW accumulation (renewed in 2002) • 2005: Strategy to combat illicit accumulation and trafficking of SALW and their ammunition (so-called EU SALW Strategy) • EU supports process within the UN framework leading towards an Arms Trade Treaty (ATT) • SALW also tackled as part of border policies

Figure 2: Overview of Policies tackling Causative Factors (CF) and Determinants (D) for successful counter-piracy policy

tion of resources) and offer a shared resource by fostering intra- and inter-nation cooperation. Space applications are already present on many vessels for communication, thus presenting the possibility of low-cost data collection or positioning. They thus prove to be supportive in finding pirate bases (intelligence satellites: EO, IMINT, SIGINT + electronic monitoring of communications: COMINT, ELINT and optical and SAR imagery satellites). Pure satellite imagery is of limited use and needs to be placed into context with all other possible sources of information (GEOINT). Change extraction techniques, i.e. change detection, categorisation and classification, help to identify changes in pirate bases.

Space-based imagery helps in tracking pirate skiffs and positioning of hijacked vessels. Difficulties in vessel-type-identification in optical imagery (> 10 meters) persist. JRC benchmarking tests of radar imagery capabilities indicate an 80% detectability rate for large vessels (45 m average) and >90% for smaller ones (35 m average) and the possibility for length estimate. Few satellites provide for speed and target estimation. No vessel type identification is possible so far. Through space-based collection of signals (e.g. AIS, LRIT, VMS, VTS, (AIS-S)) non-cooperative (i.e. pirate vessels) or the position of hijacked ships can also be identified.

CF 5: Coastal and Port-Side Security

There is a growing interest in the use of SAR imagery for maritime border control. Optical imagery and change detection techniques indicate illegal activities. Space-based collection of signals can help identify vessels involved in IUU fishery. Satellite imagery further allows for mapping of ports for emergency planning.

CF7: Global Proliferation of Small Arms and Light Weapons (SALW)

Space applications can also be used for the monitoring of illegal transport e.g. for container security (tracking of containers through SatNav) and sea border / sea transport monitoring. There is currently still the need for intelligence sources to identify something as suspicious. Large vessels used for smuggling often anchor off the coast to transfer the load to smaller vessels. These smaller ones are hard to detect in satellite imagery.

Projects and Existing Measures

Among existing projects and measures it is possible to distinguish between national and European initiatives. National initiatives can

be further subdivided into satellites (e.g. Radar: Germany's TerraSAR-X, Italy's Cosmo-SkyMed and Canada's RADARSAT-2 (commercialised by SPOT IMAGE); Optical: SPOT IMAGE (Spot 2,4 & 5, Formosat-2, Kompsat-2, Ikonos, EROS, Quickbird; SPOT IMAGE and SPOT Infoterra Group control a constellation of optical and radar satellites) which can be used for CF 4, CF 5 and CF 7 and research and development projects (CF 4: Norway's SatHav, France's GALILEOCEAN, Italy's Safety in Sea Traffic, French S MAR, French AIS-S, Germany's DeMarine, (French navy in LIMES); CF 5: Latvia's and Germany's SMART Regions, Germany's DEKO, Germany's ShipDetect; CF 7: French MODENA, French GALILEOCEAN, Germany's ShipDetect). A total of thirteen national projects directly dealing or touching upon the issue areas as covered by the three Causative Factors under discussion have been identified. It is particularly difficult to learn about the existence of national projects and initiatives.

Apart from the two flagship programmes Galileo and GMES, it is possible to identify several European research and development projects (as part of the Framework Programme, undertaken by ESA, EDA, the JRC or industrial consortia). Among these, three categories of projects can be distinguished: (1) technology development and benchmarking; (2) developing a specific service for GMES or Galileo; and (3) coordination projects (i.e. integrated approach). A total of 42 different European initiatives, services and satellites have been identified. The European initiatives mainly cover CF 4 (29 initiatives compared to 10 related to CF 5 and 6 to CF 7).

Most initiatives fall within the category of technology development and benchmarking projects (23 for all three Causative Factors compared to 6 projects related to Galileo and GMES and 15 covering an integrated approach¹) (Figure 3).

Existing systems to counter illegal fishing are well developed but not integrated with other maritime surveillance systems. There are very few projects in the area of SALW (the focus is on immigration and/or drug trafficking). Coastal security is viewed in terms of border control, fisheries and pollution but not piracy. The security of ports is considered in the context of transportation policy and critical infrastructure protection. Some attempts such as the European Patrol Network (EPN) are of a regional nature. There is a general lack of dissemination of the final results of

¹ Some projects cover more than one CF and are thus listed more than ones.

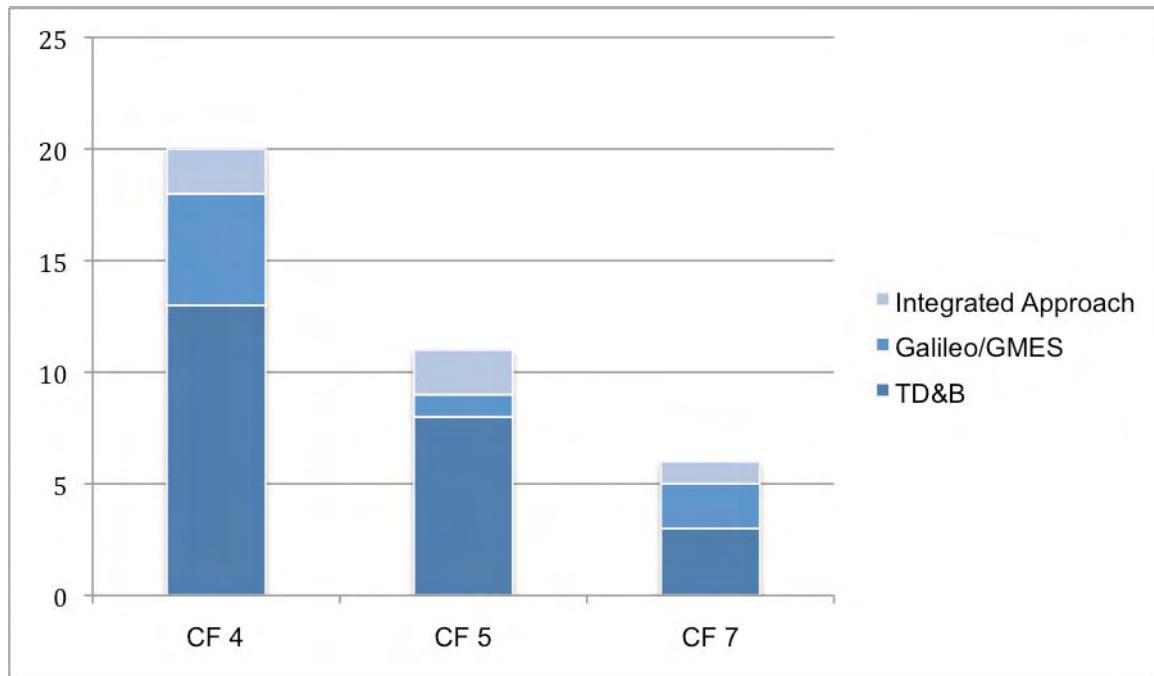


Figure 3: Number of Projects Identified within a CF and differentiated between three categories (TD&B, Galileo/GMES, Integrated Approach)

research and development projects. It is thus difficult to access and assess projects.

One of the main examples of the contributions of space applications to the fight against piracy is EUSC's support of ATALANTA NAVFOR. Relying on space applications, EUSC continuously monitors pirate operating bases and skiff activity, Somalia's borders (Ethiopian military activity) and possible terrorist training camps. It identifies potential pirate camps on the Somali coastline and offshore islands and provides battle damage assessments of Somali towns. Findings are issued in form of imagery intelligence reports or digital geographic information products (DGI).

Findings and Recommendations

The findings have been grouped into three thematic areas: (1) Regional Capacity-Building, (2) Coordination Issues and (3) Improving Technical Capabilities. The table below gives an overview of the findings in these areas. Details can be found in the related sections of the study.

Current attempts are of a sectoral nature dealing separately with issues related to the environment and to security even though factors such as IUU fishing and piracy are intertwined. In a similar vein, technologies such as satellite applications for maritime surveillance cannot be used on their own but have to be understood as complementary to other data sources and thus need to be integrated. Better shared resources between the Member States and the EU are also needed to

improve the situation. These approaches must be integrated into one single European concept, taking into account sustainability and environmental issues at the same time as transportation and the creation of jobs.

Space as an Element of a European Maritime Security Strategy

The Council has most recently invited "the High Representative, together with the Commission and the Member States, to undertake work with a view to preparing options for the possible elaboration of a Security Strategy for the global maritime domain." The European Maritime Security Strategy should not only solve the coordination issues and data-flow challenges as mentioned previously but should also clarify the competences of the institutions involved as well as institutionalising cooperation with other International Organisations. The resulting comprehensive operational joint situational awareness will allow all actors involved to develop effective action plans

This study has identified six major categories of elements for a European Maritime Security Strategy (EMSS):

1. Raising Visibility
2. Issues of Governance, Coordination and Organisation
3. The Role of Technology (i.e. Space)
4. The Role of the Maritime Authorities of the Member States

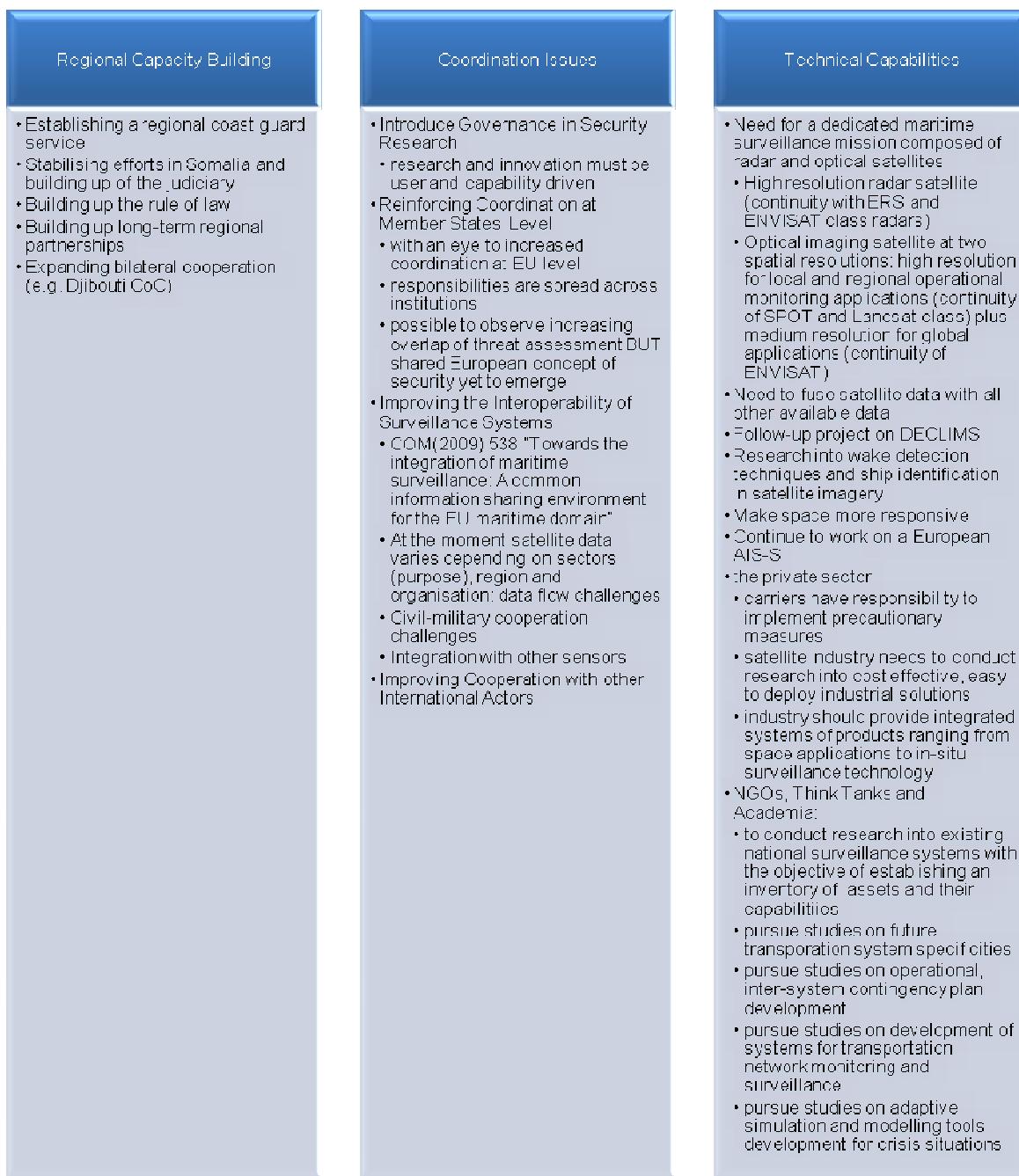


Figure 4: Findings and Recommendations in the areas of Regional Capacity Building, Coordination Issues, Technical Capabilities

5. Roles for Existing Institutional Actors, and
6. International Partners.

Thus, while raising Europe's visibility through seeking ways and procedures to guarantee that Europe speaks with one voice in the relevant international organisations such as IMO, the EMSS needs to come up with an innovative solution to support security research with a proper institutional structure, coordinate projects, disseminate their results and provide for continuity. Moreover, the EMSS needs to foresee a role for the national authorities involved as well as for candidate

or associated countries. It is of particular importance to create among Member States the political will to change things. Additionally, the EMSS needs to specify the roles of existing European institutional actors, which have evolved gradually and have thus become involved in the provision of maritime security. An integrated maritime policy also requires extensive cooperation with international organisations and relevant multilateral forums, as well as third countries. The EMSS thus needs to encompass the active cooperation of the EU with other international partners. In this regard, the U.S. and Europe should aim at presenting a unified message



to the world about both their commitment and their values. In particular, NATO and the EU should aim to work together against piracy. Their existing relationship needs to be improved, reducing duplication and creating permanent joint structures of cooperation, while respecting the independent nature of both organisations.

I. The Issue of Piracy

At the turn of the 19th century and for the greater part of the 20th century, piracy seemed to have faded away into the mists of history, which is the main reason why piracy as a crime began to disappear from some criminal codes or was not included in the first place. In the 1960's, piracy, however, slowly started its surge towards emerging once more as a regional, if not a global, menace by the 1980's. Southeast Asia was the first region to experience the upsurge of piracy (e.g. the Straits of Malacca), to be replaced only recently by the region off the coast of Somalia as the piracy hotspot of the world.²

In 2009 a total of four hundred and six piracy incidents were reported, pushing the problem of piracy and the provision of security for maritime trade high on the agenda of policy makers. The last time the number of piracy incidents exceeded four hundred was in 2003.³

Research, articles and public debate usually centre on topics such as the most appropriate definition⁴ of piracy and how to deal with the problem of prosecuting pirates. Some works cite numbers of incidents to push piracy even higher on the agenda of policy and decision makers. Others put piracy in the context of terrorism and talk about an arising piracy-terrorism nexus that will soon threaten the international community.⁵ There is little analysis of the causative and sustaining factors of piracy and the determinants for an effective counter-piracy policy, and even less analysis actually identifies Europe's instruments at both a policy and a technology level

and puts these into the wider context of Europe's approach to piracy⁶

The European Space Policy Institute (ESPI) has already examined maritime security in the context of the use of space applications in the provision of internal security, i.e. non-traditional security threats that might even come from within own borders. The related study⁷ treated maritime security as part of securing ports (i.e. Critical Infrastructures), waterborne transportation (of both goods and people, i.e. transport security) and the protection of sea-borders (i.e. border security).

While mainly tackling threats such as terrorism and illegal immigration (a potential source for instability), it seemed necessary to conduct an in-depth study of piracy and the benefits of space applications in the fight against piracy. As a consequence and in preparation for this study, together with the Austria Institute for European and Security Policy (AIES), ESPI conducted an expert workshop entitled "Space and Maritime Security - Strategies and Capabilities to Counter Piracy", which took place on 30 November 2009.⁸

I.1 The Importance of Maritime Trade

» The seas are Europe's lifeblood. Europe's maritime spaces and its coasts are central to its wellbeing and prosperity – they are Europe's trade routes, climate regula-

² Türk, Helmut. "Space and Maritime Security – Strategies and Capabilities to Counter Piracy." Presentation. Space and Maritime Security – Strategies and Capabilities to Counter Piracy. Wirtschaftskammer Österreich, Vienna, Austria. 30 November 2009.

³ ICC International Maritime Bureau. "Piracy and Armed Robbery against Ships. Annual Report 1 Jan.-31. Dec. 2009." 15 Feb. 2010 <http://www.icc-ccs.org.uk/index.php?option=com_content&view=article&id=30:welcome-to-imb-piracy-reporting-centre&catid=28:home&Itemid=12>. 25.

⁴ For a brief overview of the discussion related to the definitional questions consult the Annex.

⁵ For a brief discussion on the maritime terrorism-piracy nexus consult the annex.

⁶ See for example Vallar, Cindy. "Combating Piracy: Modern Piracy Part 5." Pirates & Privateers: The History of Maritime Piracy- Combating Modern Piracy. 2000. 15 Apr. 2010 <www.cindyvallar.com/modern5.html>. who mentions preventive measures including the use of RADAR technologies but does not take into account space applications.

⁷ cf. Remuss, Nina-Louisa. "Space and Internal Security - Developing a Concept for the Use of Space Assets to Assure a Secure Europe." ESPI Report 20. Vienna: ESPI, 2009.

⁸ Cf. "ESPI and AIES hold workshop on space and the fight against piracy." 30 November 2009. European Space Policy Institute 26 Mar. 2010

<http://www.espi.or.at/index.php?option=com_content&task=view&id=432&Itemid=37>; Remuss, Nina-Louisa.

"Space and Maritime Security - Strategies and Capabilities to Counter Piracy." Space Policy 26.2 (2010) (forthcoming).

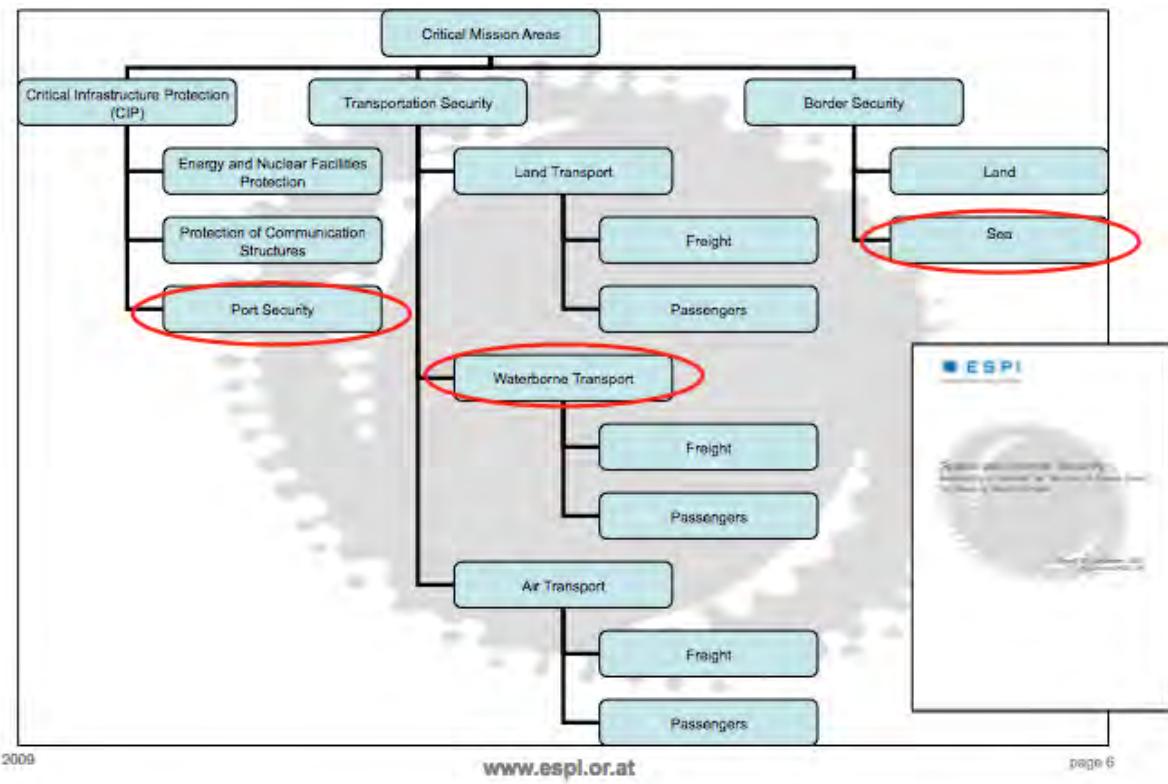


Figure 5: The Approach of ESPI's Study on Space and Internal Security

tor, sources of food, energy and resources, and a favoured site for its citizens' residence and recreation. Our interactions with the sea are more intense; more varied, and create more value for Europe than ever before. Yet the strain is showing. We are at a crossroads in our relationship with the oceans.⁹

According to the International Maritime Organization (IMO), more than 90 percent of global trade is carried by sea.¹⁰ Short-sea shipping carries forty percent of intra-European freight.¹¹ About ninety percent of the world's cargo is transported in maritime containers. Historically speaking, shipping has been an important element leading to economic growth and prosperity in Europe. Today, maritime transport services continue to be essential in helping the European economy and European companies to compete globally.

⁹ Commission of the European Communities. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. An Integrated Maritime Policy for the European Union. COM(2007) 575 final of 10 Oct. 2007. Brussels: European Union.

¹⁰ Türk, Helmut. op.cit.

¹¹ Commission of the European Communities. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Strategic Goals and Recommendations for EU's Maritime Transport Policy Until 2018. COM (2009) 8 final of 21 Jan. 2009. Brussels: European Union.

Maritime trade is constantly under threat from various types of risk, which may be political, economic, ecological or military (including terrorism, piracy and organised crime). The number of such accidents and incidents at sea that can cause loss of human life and serious pollution is rising. There is an upsurge in unlawful activity in maritime zones, particularly in drug trafficking, smuggling and illegal immigration.¹²

Among the maritime nations of the EU, coastal regions account for over forty per cent of Europe's GDP while roughly ninety per cent of the EU's foreign trade and over forty per cent of internal trade travels by water.¹³ The amount of European trade taking sea routes is rising. Europe has a 90,000 km coastline along two oceans and four seas, i.e. the Atlantic and Arctic Oceans, the Baltic Sea, the North Sea, the Mediterranean and the Black Sea. Given its 90,000 km long shores and the level of economic and social activities attached to it, Europe proves particularly vulnerable when it comes to deal with these new hardly visible and highly unpredictable

¹² European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. WEU Doc C/2051 of 3 Nov. 2009. Paris: Assembly of the Western European Union. 2.

¹³ Ibid. 4; Türk, Helmut. op. cit

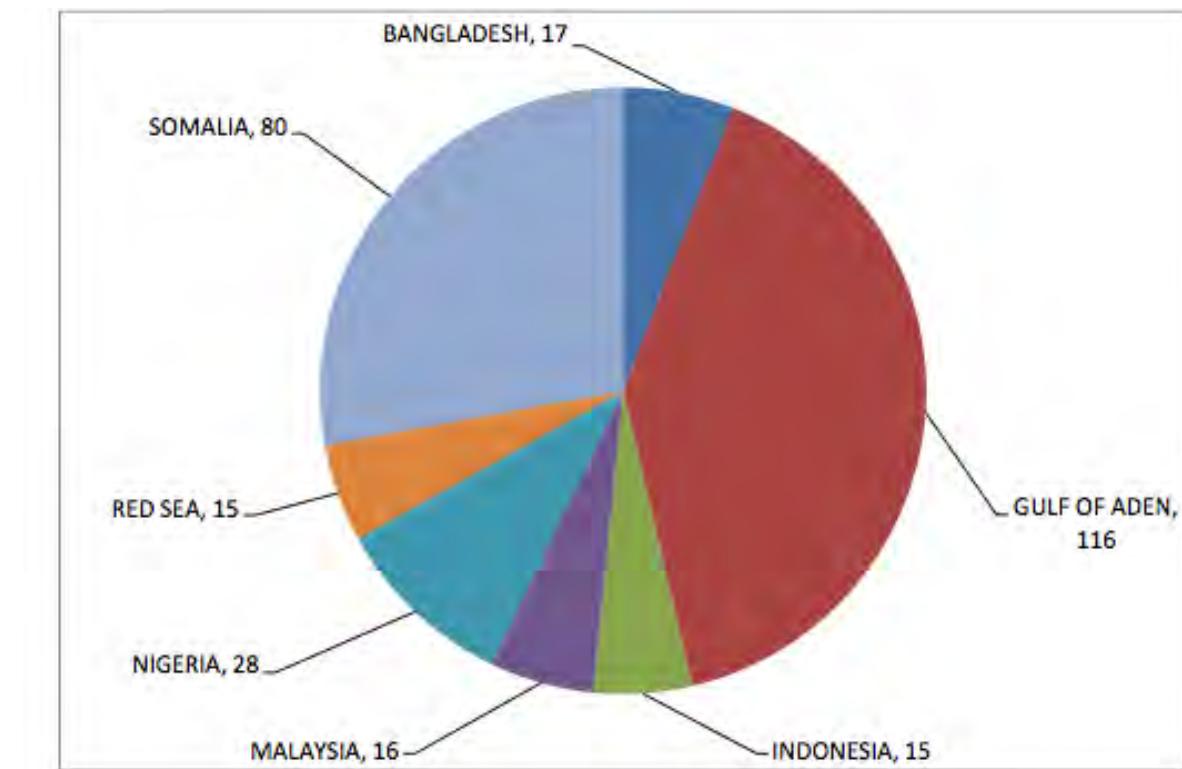


Figure 6 The locations above shared more than two thirds of the total reported incidents, i.e. 287 from a total of 406 reported attacks for the period¹⁶

threats,¹⁴ making piracy a problem for Europe to act upon.

In general, the system of maritime and port security is perceived to be poorly defended against misuse and terrorism especially due to its global and open nature. Currently, there is no clear set of safety and security criteria from either the U.S. or the European Commission. As a result, individual States take their own uncoordinated initiatives.¹⁵

Some sixteen thousand ships a year pass through the Gulf of Aden, carrying oil from the Middle East and goods from Asia to Europe and North America, making the Gulf of Aden one of the most important trade routes in the world. A significant part of European energy and commodity supplies and exports depends on transit through the Gulf of Aden.

This important trading route is now threatened by the chronic instability in Somalia.¹⁷ In spite of the increased presence of warships, Somali pirates continue to attack vessels along the northern Somali coast in the Gulf of Aden. In 2009, the IMB PRC received reports of 217 incidents carried out by suspected Somali pirates. The incidents varied in geographical location encompassing the waters off the east and south coast of Somalia including the Indian Ocean, Gulf of Aden, Southern Red Sea, Straits of Bab El Mandeb, off the east coast Oman and the Arabian Sea. 867 crewmembers have been taken hostage. A further 10 have been injured, four killed and one missing (see figures below).¹⁸ It is widely believed that as many as fifty percent of pirate attacks are not reported, due to ship owners' fears that doing so will increase insurance premiums and result in costly post-incident investigations, as well as the time consuming character of the reporting of piracy attacks.¹⁹ Keeping in mind the running sunk costs of an idle ship, in many, especially

¹⁴ Jacq, Fabienne, Jean-Yves LeBras, Antoine Mousaingeon. "CLS: Benefiting from Space for Maritime Security." Eomag! 1 Jul. 2009 <<http://www.eomag.eu/articles/55/collecte-localisation-satellites>>.

¹⁵ Voort, van de Maarten, Kevin A. O'Brien, Adnan Rahman and Lorenzo Valeri. "Security: Improving the Security of the Global Sea-Container Shipping System." Homeland Security and Terrorism - Readings and Interpretations. Eds. Russel D. Howard, James J. F. Forest & Joanne C. Moore. McGraw-Hill: New York, 2005. 186.

¹⁶ ICC International Maritime Bureau. op. cit. 6.

¹⁷ Middleton, Roger. "Piracy in Somalia – Threatening Global Trade, Feeding Local Wars." Chatham House Briefing Paper. London: Chatham House, 2008.

¹⁸ ICC International Maritime Bureau. op. cit.

¹⁹ Andersen, Elisabeth, Benjamin Brockman-Hawe, and Patricia Golf. "Suppressing Maritime Piracy: Exploring the Options in International Law." Workshop Report of 16-17 Oct. 2009. Washington D.C.

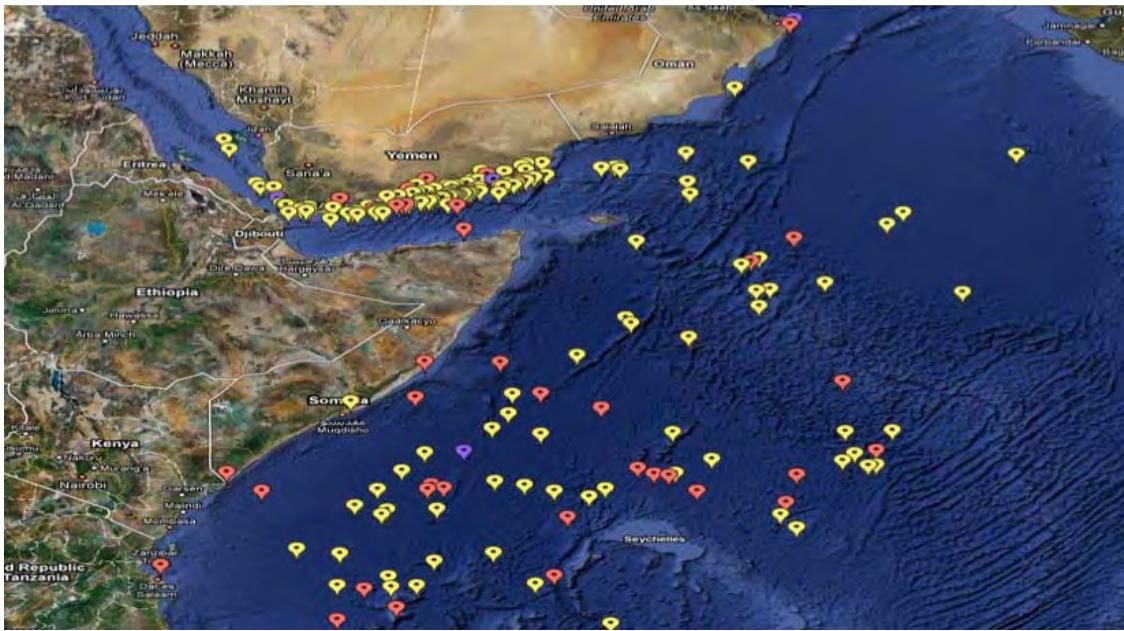


Figure 7: The Illustration shows the total number of attacks in the Gulf of Aden and the Southern Red Sea and the east coast of Africa and Oman²⁶

smaller cases, it is cheaper not to report the incident.²⁰

1.2 The Problem of Piracy in Somalia and off its Coast

Piracy is not a new phenomenon but it seems that piracy continues to exist at a low level of intensity, with regional hotspots emerging cyclically such as Lebanon, the Straits of Malacca, Indonesia and Somalia.²¹ Somali piracy is often said to be *sui generis*²² given its unique concentration on random payments and its high level of armed aggression.

Somali pirates have attacked all types of vessels including general cargo, bulk carriers, all types of tankers or containers, fishing vessels, sailing yachts and tugboats. The ICC's International Maritime Bureau (IMB) has analysed that the main weapons used by Somali pirates are guns (Rocket Propelled Grenades (RPGs) and automatic weapons), which are fired indiscriminately to intimidate the captain to stop the vessel.²³ The IMB has

also discovered that pirates adapt to counter-piracy operations by extending their reach (attacks at distances of over 1000 nautical miles from Mogadishu) and by becoming increasingly violent. Somali pirates are now attacking vessels off Kenya, Tanzania, Seychelles, Madagascar and in the Indian Ocean. "Mother vessels" are used to launch smaller boats or skiffs to attack and hijack passing vessels. These are generally fishing trawlers that pirates capture closer to the shore and then use as staging posts for attacks further out to sea.²⁴ The recent successes of Somali pirates may empower and inspire other groups.^{25 26}

Avoiding the shipping route through the Gulf of Aden would require ships to round the Cape of Good Hope at the tip of Africa. The longer distance of this route translates to an increase in annual fuel costs as well as requiring ships to reduce their round trips (i.e. amount of annual trips).²⁷ Thus, the Maritime Security Centre Horn of Africa (MSCHOA)²⁸ has established the Internationally Recommended Transit Corridor (IRTC) since 1 Feb-

²⁰ "Defining Maritime Terrorism and Piracy." Maritime Terrorism Research Center 22 Feb. 2010 <<http://www.maritimeterrorism.com/definitions>>.

²¹ Scheffler, Alessandro. "Piracy – Threat or Nuisance?" NATO Defense College Research paper 56 (2010). Rome: NATO Defence College, 2010. 8.

²² Ibid.

²³ The description of the problem of piracy in Somalia, tactics and preferred targets is largely based on the findings and statistics of the ICC International Maritime Bureau. Cf. ICC International Maritime Bureau. "Piracy and Armed Robbery against Ships. Annual Report 1 Jan.-31. Dec. 2009." 15 Feb. 2010 <<http://www.icc>-

ccs.org.uk/index.php?option=com_content&view=article&id=30:welcome-to-imb-piracy-reporting-centre&catid=28:home&Itemid=12>

²⁴ Middleton, Roger. "Piracy in Somalia – Threatening Global Trade, Feeding Local Wars." Chatham House Briefing Paper. London: Chatham House, 2008..

²⁵ Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. "Maritime Security – Fighting Piracy in the Gulf of Aden and Beyond." Heritage Special Report SR-59. Washington D.C.: The Heritage Foundation, 2009. 1.

²⁶ ICC International Maritime Bureau. op. cit. 96; Middleton, Roger. op. cit.

²⁷ Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. op. cit.8.

²⁸ <www.mschoa.org>

ruary 2009 where military assets (Naval and Air) are strategically deployed to best provide protection and support to merchant ships. Taking the IRTC however does not relieve the crew of taking precautionary measures. Vessels have also been attacked or hijacked in the corridor. This is why the IRTC is ironically sometimes referred to as „pirates alley“.²⁹ Ship cruisers try to avoid pirate attacks by driving without light at night, which increases collision risks that are already quite high in the busy IRTC.³⁰

In addition to direct damage, the main problems of piracy in South-East Asia are the increasing costs resulting from preventive measures, increases in insurance costs, time-consuming alternative routes, expensive stepping-up of personnel and weaponisation of on-board personnel as well as the risk of a “domino effect” in other unstable coastal regions.³¹ Piracy also discourages entrants from working in this maritime sector that, even before the rise of the piracy problem, lacked a suitable workforce.³² Piracy could also cause a major environmental disaster if a tanker is sunk or run aground or set on fire.³³

1.3 Causative Factors

United Nations' Secretary General Ban Ki Moon famously said: “Piracy is not a water-borne disease. It is a symptom of anarchy and insecurity on the ground.” (...) “The only lasting security solution for Somalia is one that is owned by the Somali people themselves.” Commission President Jose Manuel Barroso highlighted a similar view “If we only treat the symptoms, piracy at sea, but not its root causes - the decay of the state and poverty - we will fail.”³⁴

The RAND Corporation, a U.S. think tank, has identified seven factors³⁵ accounting for the

²⁹ Fuhrmann, Christian, and Dieter Berg. “Piraterie – Die Bedrohung auf See erreicht eine neue Dimension.“ München: Münchener Rückversicherungs-Gesellschaft, 2009. <http://www.munichre.com/publications/302-06151_de.pdf>.

³⁰ Ibid.

³¹ Galaski, Julia. “Chancen und Grenzen der Pirateriebekämpfung. Die Straße von Malakka und der Golf von Aden im Vergleich.“ Berlin: SWP, 2009. <http://www.swp-berlin.org/common/get_document.php?asset_id=5841>. 3.

³² Fuhrmann, Christian, and Dieter Berg. op. cit.

³³ Middleton, Roger. “Piracy in Somalia – Threatening Global Trade, Feeding Local Wars.“ Chatham House Briefing Paper. London: Chatham House, 2008..

³⁴ Philipps, Leigh. “Somalia wins over \$200m in Brussels donors' conference.“ EU Observer. 24 Apr. 2009. 12 May 2010 <<http://euobserver.com/9/28001>>.

³⁵ This section highlights these seven factors as found in Chalk, Peter. “The Maritime Dimension of International

emergence of piracy in the contemporary era. Removal or interruption of any one of these factors will eliminate or reduce piracy.³⁶

1.3.1 Seven Causative Factors

Factor 1: Massive Increase in Commercial Maritime Traffic

The massive increase in seaborne trade combined with the large number of ports around the world has provided pirates with a “limitless range of tempting, high-payoff targets”.³⁷

Factor 2: Narrow and Congested Maritime Chokepoints

The higher incidence of seaborne commercial traffic that passes through narrow and congested maritime bottlenecks, which require ships to significantly reduce their speed to ensure safe passage, dramatically heightens their exposure to mid-sea interception and attack. Following a period of respite in 2005-2006 when Somalia was under the Islamic Courts regime, the pirates transferred their operations from the port of Mogadishu and the south of Somalia towards the Gulf of Aden, where the denser traffic offers much richer pickings.³⁸

Critical chokepoints for maritime traffic are, in particular, the Strait of Malacca, transited by around 50,000 vessels annually transporting about 50% of the total volume of oil transported by sea and the Gulf of Aden, with about 22,000 vessels annually coming from or sailing to the Suez Canal, carrying more than 12% of that volume.³⁹

At the end of the 1990s the Strait of Malacca was known as one of the most dangerous maritime traffic routes given the high rate of piracy incidents. While pirates in the Strait of Malacca mainly hijacked ships, which they either repainted and sold or took apart to sell single pieces, Somali pirates surprised the

Security – Terrorism, Piracy and Challenges for the United States.“ Pittsburgh: RAND Corporation, 2008. xi; Similar factors were identified and analysed with regard to its applicability to several piracy hot spots by Scheffler, Alessandro. op. cit.

³⁶ Brewer, Chris. “Maritime Security and Counter-Piracy: Strategic Adaptations and Technological Options.“ Journal of Energy Security (April 2009). <http://www.ensec.org/index.php?option=com_content&view=article&id=188:maritime-security-a&counter-piracy-strategic-adaptation-and-technological-options&catid=94:0409content&Itemid=342>.

³⁷ Chalk, Peter. op. cit. xi.

³⁸ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 12.

³⁹ Türk, Helmut. op.cit.



international community by asking for high ransoms.⁴⁰

Considering the “piracy-free” Strait of Hormuz or the Skagerrak, both congested chokepoints as well, it becomes clear that vicinity to highly frequented waterways alone is not enough for a region to become a piracy hotspot. It seems to be the combination of Causative Factors that is decisive.⁴¹

Factor 3: Lingering Effects of the Asian Financial Crisis / Profit as a Motivation

The Asian financial crisis exerted a strong pull factor in piracy with more people being drawn to maritime and other crimes. It also deprived many littoral States of the necessary revenue to fund effective monitoring regimes over their coastlines.⁴² Motivation for gain is one of the main Causative Factors for piracy.⁴³ It is thus important to recognise that the payment of ransom is counter-productive as it increases the motivation for gain. Instead, strategies need to focus on either countering attacks at sea or on stopping pirates from boarding. The payment of ransom could create a precedent motivating pirates in other regions or maritime chokepoints such as Nigeria.⁴⁴ Also, profit is not only distributed to members of the pirate groups, their supporters and suppliers but it is used to expand pirates’ capabilities and scope of criminal activities.

Thus the payment of ransom helps pirates to adopt more lethal and violent tactics as well as helping them to acquire new weapons and capabilities to capture ships.⁴⁵ Pirates have improved their equipment and now use GPS systems and satellite phones. It is also likely that they are plugged into an international network that feeds information from ports in the Gulf, Europe and Asia back to Somalia. Pirates are no longer simply opportunists; their operations are becoming increasingly sophisticated and are likely to continue developing in this direction if responses do not change; this is becoming an increasingly professional operation.⁴⁶

There is also evidence that the rise of maritime piracy feeds the conflicts in Somalia and contributes to further destabilising the coun-

⁴⁰ Galaski, Julia. op. cit.

⁴¹ Scheffler, Alessandro. op. cit. 8.

⁴² A pirate can acquire circa €6870 in a successful coup. If there were jobs in Somalia he would need to work five years for a similar amount. Chalk, Peter. op. cit. Xi.

⁴³ Brewer, Chris. op. cit.

⁴⁴ Brewer, Chris. op. cit.

⁴⁵ Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. op. cit.10.

⁴⁶ Middleton, Roger. “Piracy in Somalia – Threatening Global Trade, Feeding Local Wars.” Chatham House Briefing Paper. London: Chatham House, 2008..

try by strengthening the resources available to certain groups.⁴⁷

Factor 4: Difficulties with Maritime Surveillance

General difficulties associated with maritime surveillance have been significantly heightened as a result of the events of 9/11 and the concomitant pressure that has been exerted on many governments to invest in expensive, land-based homeland security initiatives.

One example of this Causative Factor is the Malacca Straits where funding for navies and coast guards significantly decreased as land-based security measures following 9/11 were increased.⁴⁸

Factor 5: Lax Coastal and Port-Side Security

Lax coastal and port-side security play an important role in enabling low-level piracy; especially harbour theft of goods from ships at anchor. The inability of a local government to protect the coast can also lead to national grievances.

Most illegal activity originating from Somalia is connected to fishing and protecting fishing grounds. Being one of the poorest areas of Somalia, the financial attraction of piracy in Puntland is strong. Somalia’s fishing industry has collapsed in the past fifteen years and European, Asian and African ships are heavily fishing its waters. Some pirates have claimed that they are involved in protecting Somalia’s natural resources and that ransom payments should be viewed as legitimate taxation.⁴⁹

Somali pirates often display themselves as modern-day Robin Hoods⁵⁰, who defend Somalia’s fishing grounds as the local government has proved incapable of defending its fishing grounds from the predations of illegal fishing and the dumping of toxic wastes by non-Somalis. Pirates depict themselves as a successful embodiment of local grievance and call themselves “National Volunteer Coast Guard of Somalia” or “Somali Marines”.⁵¹

Factor 6: Corruption / Safe Havens

Corruption and emergent voids of judicial prerogative have encouraged official complicity in high-level pirate rings, which have im-

⁴⁷ Türk, Helmut. op. cit..

⁴⁸ Scheffler, Alessandro. op. cit. 8.

⁴⁹ Middleton, Roger. “Piracy in Somalia – Threatening Global Trade, Feeding Local Wars.” Chatham House Briefing Paper. London: Chatham House, 2008..

⁵⁰ N.B. Somali pirates do not redistribute their “wealth” to the general populace but only to their pirate clan (i.e. friends and family, supporters and suppliers).

⁵¹ Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. op. cit.9.

pacted directly on the “phantom ship” phenomenon. Effective government in Somalia ceased as of 1991. The government has no control over the country and international aid to those in need is under threat.⁵² So-called safe havens, which pirates can use for home bases from which they can market their loot, are thus one of the main Causative Factors.⁵³

The only period during which piracy virtually vanished around Somalia was during the six months of rule by the Islamic Courts Union in the second half of 2006. This indicates that a functioning government in Somalia is capable of controlling piracy.⁵⁴ After the removal of the courts, piracy re-emerged. Piracy has been a problem in Somali waters for at least ten years; however the number of attempted and successful attacks has risen over the last three years.⁵⁵ It is thus often argued that piracy in Somalia becomes possible because the pirates “have a sanctuary on land in Somalia and its territorial waters from which they can launch pirate attacks and conduct ransom negotiations.”⁵⁶ Pirates in other parts of the world are less likely to have such sanctuaries.⁵⁷

Factor 7: Global Proliferation of SALW

The global proliferation of small arms and light weapons has provided pirates with an enhanced means to operate on a more destructive and sophisticated level.

1.3.2 Space Applications and the Causative Factors of Piracy

Clearly, technologies such as space applications cannot counter the massive increase in maritime traffic (Causative Factor 1), decentralise narrow and congested maritime choke points (Causative Factor 2), provide the Somali population with money to overcome the lingering effects of the Asian financial crisis

⁵² European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 12.

⁵³ Brewer, Chris. op. cit.

⁵⁴ For information on the current situation in Somalia and the conflict dynamics and characteristics refer to United Nations Security Council Letter dated 10 March 2010 from the Chairman of the Security Council Committee pursuant to resolutions 751 (1992) and 1907 (2009) concerning Somalia and Eritrea addressed to the President of the Security Council. UN Doc. S/2010/91 of 10 March 2010. New York: United Nations.

⁵⁵ Middleton, Roger. “Piracy in Somalia – Threatening Global Trade, Feeding Local Wars.” Chatham House Briefing Paper. London: Chatham House, 2008..

⁵⁶ Ploch, Lauren, Christopher M. Blancard, Ronald O'Rourke, R. Chuck Mason, and Rawle O. King. “Piracy off the Horn of Africa.” CRS Report for Congress. Congressional Research Service. <<http://www.fas.org/sgp/crs/row/R40528.pdf>>. 10.

⁵⁷ Scheffler, Alessandro. op. cit. 9.

(Causative Factor 3) or counter corruption (Causative Factor 6). Those factors have to be tackled by land-oriented policies and capacity-building measures. Space applications can however improve maritime surveillance (Causative Factor 4) as well as coastal and port-side security (Causative Factor 5) and provide supportive tools in illegal trafficking of for example SALW (Causative Factor 7).

1.4 Determinants for Effective Counter-Piracy Policy

The German Institute for International and Security Affairs (SWP) identified several factors (determinants) that are necessary for the effective fight against piracy.⁵⁸

1.4.1 Four Determinants

Determinant 1: Degree of Statehood of Adjacent States

The political, social and economic capacities of the affected States enable them to solve the problem on their own.⁵⁹ Effective counter-piracy strategies depend on whether adjacent States can guarantee peace and stability within their own borders. Since 1991 there has been no effective government in Somalia. The Transitional Federal Government (TFG)⁶⁰ established in 2004 was in exile until the election of a new President on 31 January 2009 (Sheikh SHARIF Sheikh Ahmed). While its institutions remain weak, the TFG continues to reach out to Somali stakeholders and work with international donors to help build the governance capacity of the TFIs and work toward national elections in 2011. Diverse non-governmental actors are instead competing for power.⁶¹ Yemen is also not capable of conducting effective counter-piracy policies. It is commonly viewed as in the same category of failed States as Somalia.

⁵⁸ Galaski, Julia. op. cit. 6-7.

⁵⁹ Scheffler, Alessandro. op. cit. 11.

⁶⁰ A two-year peace process, led by the Government of Kenya under the auspices of the Intergovernmental Authority on Development (IGAD), concluded in October 2004 with the election of Abdullahi YUSUF Ahmed as President of the Transitional Federal Government (TFG) of Somalia and the formation of an interim government, known as the Somalia Transitional Federal Institutions (TFIs). CIA World Fact Book. “Somalia.” 3 Mar. 2010. CIA World Fact Book 26 Mar. 2010 <<https://www.cia.gov/library/publications/the-world-factbook/geos/so.html>>.

⁶¹ Galaski, Julia. op. cit. 6-7; CIA World Fact Book. “Somalia.” 3 Mar. 2010. CIA World Fact Book 26 Mar. 2010 <<https://www.cia.gov/library/publications/the-world-factbook/geos/so.html>>.

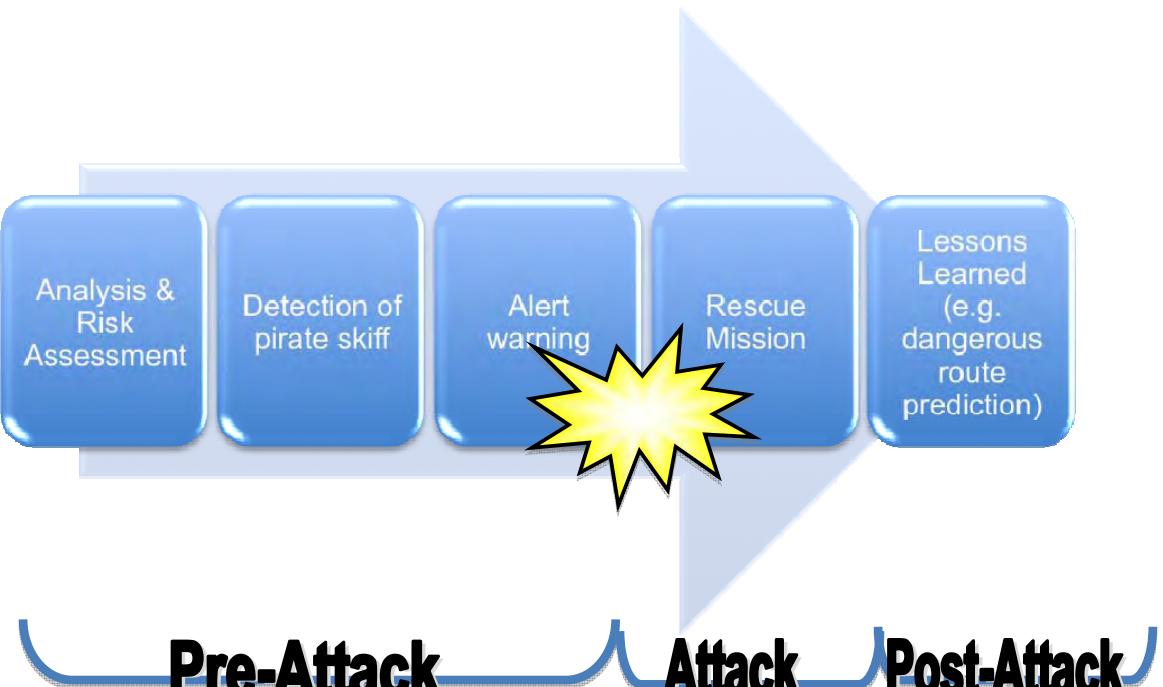


Figure 8: Three Phases of the Event Cycle

Some authors argue that Somalia's degree of a failed State is what makes it such an exceptional case. Accordingly, other States with a high degree of State failures, such as Yemen, are not comparable with Somalia.⁶²

Determinant 2: Geography and Resources

In addition to military measures, civil and political measures are a necessary complement in the fight against piracy. In case of specific geographic preconditions the emphasis might be placed on the one or the other. The longer the coastline (compare: 900 km coastline in the Straits of Malacca and 1.600 km in Puntland), the larger the number of bays and isles, the more places for pirates to hide. Whether the coast borders the open sea or is part of a strait can also be decisive.

Determinant 2 is closely related to Causative Factors 4 and 5. Thus coastal and port security (Factor 5) capabilities as well as maritime surveillance capabilities (Factor 4) more generally are decisive in limiting places where pirates can hide even if geographic characteristics allow them to do so.

Determinant 3: The Political Agenda of the Adjacent States

The degree of relevance of piracy to the political agenda of adjacent States depends on how much they feel affected and concerned by it and on the extent to which they face

other internal or external threats. The smaller the number of other topics to deal with, the greater the ability of the adjacent State to deal with the problem of piracy.

Countering piracy is not a priority of the Transitional Federal Government (TFG) in Somalia or the government in Yemen. This is why the neighbouring States Djibouti and Kenya are commonly believed to be the points of contact for this region particularly with regard to questions concerning the criminal prosecution of pirates.

Determinant 4: Expectations from the International Community

Expectations from the international community can increase the pressure on adjacent States and lead to initiatives by them or the international community itself. Indeed the main determinants of the successful anti-piracy activities in the Straits of Malacca were the international expectations that the problem could be solved.⁶³ In the case of Somalia, the international community saw its interests increasingly threatened and thus intervened.

1.4.2 Space Applications and Determinants for Effective Counter-Piracy Policy

Technologies such as space applications cannot influence the degree of Statehood of adjacent States (determinant 1), change geog-

⁶² Scheffler, Alessandro. op. cit. 10.

⁶³ Scheffler, Alessandro. op. cit. 11.

raphy, resources (determinant 2) or the political agenda of adjacent States (determinant 3), or influence the expectations of the international community (determinant 4). Yet, technologies such as space applications do have an impact on the effectiveness of counter-piracy policy as they can counter the Causative Factors mentioned previously and are an optimal tool to provide a better overview of long coastlines with large numbers of bays and isles in which pirates hide.

1.5 The Three Phases of Counter-Piracy Initiatives

It is further possible to distinguish between three different phases in the fight against piracy:

1. Phase 1: pre-attack including prediction and detection as well as preventive measures,
2. Phase 2: during an attack, including alert, tracking of the hijacked ship and rescue missions
3. Phase 3: post-attack lessons-learned such as dangerous ship routes acknowledgement etc.

The three phases are shown in the figure below.

These phases will serve as a framework when analysing the contribution of space-based applications in the fight against piracy.

1.5.1 Phase 1: Prevention, Prediction and Detection

Prevention comprises those measures that are aimed at preventing piracy incidents. These include policy actions tackling the Causative Factors mentioned above, preventive measures such as the Internationally Recommended Transit Corridor (IRTC), and mitigative measures, i.e. actions designed to reduce the impact of disasters, such as emergency planning, insurance, legislation, training etc. Actions related to this phase also include any preparatory action. Preventive measures specifically include risk assessment as well as review and development of emergency plans and procedures including related training and exercises.⁶⁴ Acknowledging dangerous shipping routes and raising awareness

⁶⁴ OASIS FP6 Consortium. "Priority 2.3.2.9 Improving Risk Management Integrated Project." Executive Summary. OASIS FP 6 Consortium, 2005. <http://www.oasis-fp6.org/documents/OASIS_SP31_RPT_244_lessons_learn_BAE_2_4_pub.pdf>. 7-9.

of how to detect pirate skiffs fall within this realm of actions.

1.5.2 Phase 2: Alert, Warning and Rescue

Early Warning in the form of alert falls within the immediate phase of the crisis. In this regard it mainly focuses on means of communication. Immediate Response relates to the activities conducted during the impact of a disaster and the short-term aftermath with the main emphasis being placed on the saving of human life. It also encompasses the protection of assets such as vessels, the supply of vital goods and services, and the protection of the environment. It includes diplomatic measures as well as the payment of ransoms.

1.5.3 Phase 3: Lessons Learned

In counter-piracy operations this covers mainly lessons learned such as how to detect a pirate skiff, what new tactics pirates have acquired, how to avoid that they can get on-board and information about the most dangerous routes etc.⁶⁵

1.6 Maritime Security

With the resurgence of sea-based organised crime, piracy was pushed high on the agenda and the fight against piracy became often equated with maritime security policy. However, maritime security "encompasses a wide range of policy sectors, information services and user communities, including maritime safety, search and rescue, operational safety for offshore oil and gas production, fisheries protection, marine environment monitoring and protection and navy operations support"⁶⁶. Maritime security threats stem from a variety of different sources among which are trafficking (drugs, psychotropic substances, arms), illegal immigration from Africa and Asia and serious pollution caused by hydrocarbons. All these issues have brought home the importance of increased surveillance of Europe's maritime approaches. Given the absence of physical borders and the global nature of the threats it is imperative for Europe to organise joint action on a re-

⁶⁵ Ibid.

⁶⁶ European Space Agency. "GMES Service Element: Maritime Security". 11 Mar 2009. European Space Agency 24 July 2009 <www.esa.int/esaLP/SEMKCU0DU8E_LPgmes_2.html>; Joint Research Centre. "Maritime Surveillance at the Joint Research Centre." Press Factsheet. Joint Research Centre, 2007. <http://ec.europa.eu/research/press/2007/maritime-briefing/pdf/33-jrc-maritime-surveillance_en.pdf>.

gional scale.⁶⁷ The fact that pirates claim to defend Somalia's fishing grounds as the local government has proved incapable of defending its fishing grounds from the predations of illegal fishing and the dumping of toxic wastes by non-Somalis, only supports the argument that the different threats to maritime security are intertwined (e.g. piracy and sustainability).

The European Parliament (EP) and the Council of the European Union (the Council) have come to adopt a broad definition for maritime security, describing it as

- » the combination of preventive measures intended to protect shipping and port facilities against threats of intentional unlawful acts⁶⁸.

Following from this definition, the EU is currently pursuing a sectoral approach, relying on "a combination of" sectoral policies. Moreover, it differentiates between maritime safety and maritime security, i.e. maritime safety means

- » to continuously maintain and enhance safety in shipping and the protection of life, health, property and the marine environment, concerning the ships, the crew and the passengers and/or cargo, safety of navigation, environmental safety⁶⁹

and

- » maritime surveillance, i.e. the ability to achieve continuity of knowledge on activities in the maritime domain in order to support a timely decision process.⁷⁰

Consequently "maritime security" in contrast to "maritime safety" does not include the environmental sector but deals solely with counter-terrorism and the fight against organised crime such as piracy.⁷¹

Controlling the risks connected with its sea-based activities has become a strategic challenge for the EU. To meet this challenge it must master naval technologies and commu-

⁶⁷ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 4.

⁶⁸ The Commission of the European Communities. Regulation of European Parliament and of the Council on Enhancing Ship and Port Facility Security. (EC) No 725/2004 of 31 March 2004. Brussels: European Union.

⁶⁹ Commission of the European Communities. Green Paper - Towards a future Maritime Policy for the Union: A European Vision for the Oceans and Seas. COM (2006) 275 final of 7 June 2006. Brussels: European Union.

⁷⁰ Definition by the European Defence Agency. In Joint Research Centre. Press Factsheet. 2007. op. cit.

⁷¹ Möller, Kay. "Maritime Sicherheit und die Suche nach politischem Einfluss in Südostasien." Berlin: SWP, 2006.

nication systems and organise permanent coordination and cooperation at EU level.⁷² Tackling threats at sea is particularly difficult due to the permeable nature of the frontiers at sea. States cannot respond to these threats, first because there is a power vacuum at sea with most countries having no navy able to react alone and, second, because in international waters States can only legally protect vessels carrying their flag. This requires a coordinated approach at the EU as well as at the international level.⁷³ One can thus say that maritime security is a global issue with a European dimension. Criminals could be deterred significantly by a concerted initiative that improves the presence of maritime security forces, enables the boarding of suspicious vessels according to internationally agreed legal rules, and provides important situational data through integrated civil-military surveillance capacities.⁷⁴

1.7 Approach of the Study

In recent decades the threats to security both internally and externally have changed drastically and now include indirect threats such as terrorism, organised crime and piracy as well as resource and energy scarcity, climate change and natural catastrophes. Science, research and technology thus increasingly complement politics, policy and economics. In order for technologies to continue to provide answers to future threat scenarios, the continuous pursuit of security research and particularly space applications is of utmost importance.

Drawing on the findings of the study entitled "Space and Internal Security - Developing a Concept for the Use of Space Assets to Assure a Secure Europe" and the previously described workshop, this study analyses how space applications can support counter-piracy policies. It points out the technical as well as political strategic limitations. Specifically, considering the Causative Factors and determinants for effective counter-piracy policy described above, this paper will analyse how far space applications can eliminate and interrupt, or support the elimination or interruption of, any of the Causative Factors and how far they can be supportive in bringing

⁷² European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 4.

⁷³ Commission of the European Communities. COM (2006) 275 final. op. cit.

⁷⁴ Chapman, John. "The Questionmarks over Europe's Maritime Security." Brussels, Security and Defence Agenda. 3 May 2010
http://www.securitydefenceagenda.org/Portals/7/Reports/2007/Final_Discussion_Paper.pdf.

about the determinants that are necessary for effective counter-piracy policy. Moreover, the study analyses the support of space applications in the three phases of counter-piracy policy.

Chapter Two will provide the international context, highlighting the international legal framework and the main international players and missions in the area. Chapter Three will deal with the European role in the fight against piracy, streamlining the main policies (e.g. documents) and institutions involved, actions in the CSDP framework as well as by individual Member States and regional cooperative initiatives. Chapter Four outlines the technical capabilities, highlighting existing space applications used in the support of successful anti-piracy actions. It describes the driving forces for an increased reliance on space applications, the specific national initia-

tives and the European initiatives, showcasing particularly the involvement of space applications in the EU ATALANTA NAVFOR mission. The final chapter will provide policy recommendations. The analysis is supported by an Annex, providing in-depth information.

The main question addressed in this study is whether Europe and particularly the European Union are prepared to counter the piracy threat both from a general and a more specific space policy perspective. The main argument put forward by this study is that Europe, or specifically the EU, needs to look at piracy from an integrated point of view as the threats to maritime security are often intertwined (see figure below). This is why Europe needs to adopt Integrated Maritime Management, pooling all actors, policy areas and data into one single approach.



Figure 9: Sectors of and Threats to Maritime Security



2. The International Context for Countering Piracy

Piracy matters to the international community for four primary reasons:

1. The effect on Somalia
2. The impact on international trade
3. The danger to the environment, and
4. The potential connection with the terrorist threat.

The international legal framework on piracy is drawn from the UN Convention on the Law of the Sea (UNCLOS) of 1982 and the Suppression of Unlawful Acts against the Safety of Maritime Navigation Convention (SUA)⁷⁵ of 1988 (revised in 2005)⁷⁶. Collective action against piracy was first codified in the Geneva Convention on the High Seas of 1958⁷⁷, which obliged all States to "cooperate to the fullest possible extent in the repression of piracy on the high seas or in any other place outside the jurisdiction of any State." (Art. 14). The question has arisen whether these Conventions regulate the seizure of pirates as a right or a duty, i.e. whether States are obliged to adopt and implement anti-piracy legislation.

In a number of instances pirates have been apprehended by naval forces that have subsequently have had to release them because of peculiarities of the laws of a particular country⁷⁸, giving rise to a debate on how to prosecute pirates. Finding a model on how to prosecute pirates would tackle Causative Factor 6: Corruption/ Safe Havens. While some pirates have been brought to France and the Netherlands to stand trial, it is generally preferred to prosecute pirates within the region. An option that has been used is to conclude bilateral agreements with a country in the region, defining procedures for the

detention, transfer and prosecution of persons suspected of having committed acts of piracy, as the United States and the European Union have done with Kenya⁷⁹. Kenya has however recently stopped trying pirates, claiming that its prisons have reached saturation point. The EU is envisaging signing similar agreements with other governments of the region, including those of Djibouti, the Seychelles and Tanzania. Several alternative options to trying suspects in Kenya are currently under discussion. They range from bringing pirates within the ambit of the International Criminal Court (ICC) or the International Tribunal for the Law of the Sea (ITOLS), to following the model of the Special Court of Sierra Leone or the Palace of Justice trials held in Nuremberg, or the Adhoc international criminal tribunals for the former Yugoslavia and Rwanda, to the UN administrative body model.

The increase of piracy incidents in the Gulf of Aden and off the coast of Somalia, as well as the pirate attacks on ships carrying humanitarian supplies to the Somali population, prompted the international community to take action in that region. The United Nations Security Council has thus passed resolutions aiming to complement the existing international law concerning piracy. It established a monitoring group, a panel of experts on Somalia, and a Contact Group on Piracy off the Coast of Somalia (CGPCS). UNOSAT, the UN Institute for Training and Research (UNITAR) Operational Satellite Applications Programme implemented in co-operation with the European Organization for Nuclear Research (CERN), provides reports containing detailed spatial analysis of pirate activity off the Somali Coast.⁸⁰

It was the International Maritime Organization (IMO), which in 2005 alerted the United Nations to the rising number of acts of piracy. In January 2009, the IMO chaired a regional meeting in Djibouti which brought together

⁷⁵ For the full text cf. <http://www.un.org/sc/ctc/pdf/conventions/Conv8.pdf>.

⁷⁶ for the 2005 Protocols to SUA cf. <http://www.aelb.gov.my/events/courses/nlaw2010/document/Consolidated%20SUA%20Protocol%201988%20and%202005.pdf>.

⁷⁷ For the full text cf. http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_1_1958_high_seas.pdf.

⁷⁸ For example, Denmark and Germany can prosecute pirates only if they have threatened national interests or citizens while under French law, a captain may apprehend and hold pirates, but only a judicial authority can arrest and detain them

⁷⁹ "Agreement with Kenya signed." Press Release of 6 Mar. 2009. European Union Press Office 30 Mar. 2010 http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/esdp/106547.pdf; European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 14-5.

⁸⁰ Cf. "Somalia Maps." UNOSAT 26 Apr. 2010 http://unosat.web.cern.ch/unosat/asp/prod_free.asp?id=28.

17 of the 21 countries of the region and resulted in the adoption of the so-called Djibouti Code of Conduct, through which subscribing States agreed to establish closer regional cooperation consistent with international law in order to arrest and prosecute alleged pirates. Together with the International Chamber of Commerce (ICC), in 1981 the IMO established the International Maritime Bureau (IMB). Increases in piracy incidents prompted the International Maritime Bureau to create the Piracy Reporting Centre (PRC) in October 1992 in Kuala Lumpur, Malaysia, which is the main piracy reporting institution.

NATO has been involved in the region through several operations including "Operation Allied Provider" (October to December 2008), which escorted UN World Food Programme (WFP) vessels, "Operation Allied Protector" (since March 2009) and "Operation Ocean Shield" (since August 2009). Additionally, NATO has developed a Maritime Situational Awareness (MSA) concept and is currently producing a comprehensive implementation plan focusing on doctrinal, legal, organisation, training, material & technology, facilities and interoperability aspects (to be

submitted to the NATO nations in summer 2010).⁸¹

Further missions in the region are the U.S.-led multinational Combined Task Force, CTF 150,⁸² a counter-terrorism mission which has taken part in counter-piracy operations on several occasions, the U.S.-led multinational Combined Task Force CTF 151 with a dedicated mission to combat piracy, and the land-based African Union Mission in Somalia (AMISOM)⁸³ which is mandated to support the TFG's institutions in their stabilisation process as well as to facilitate the delivery of humanitarian aid and to create the necessary pre-conditions for reconstruction, reconciliation and sustainable development. The European Union has supported AMISOM through the bilateral contributions of its Member States and, since its deployment, the allocation of € 35.5 million⁸⁴ from the Peace Facility.⁸⁵ Apart from financial contributions, the EU and its Member States support AMISOM in terms of planning and capacity building, with the particular objectives of increasing the efficiency of the Somali police force (Causative Factor 6: Corruption) and combatting any abuse and serious violation of human rights.⁸⁶

⁸¹ NATO Parliamentary Assembly. "Maritime Security: NATO and EU Roles and Coordination." Draft General Report of 29 April 2010; European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 14; Strickmann, Eva. "EU and NATO Efforts to Counter Piracy off Somalia: A Drop in the Ocean?" Brussels: ISIS Europe, 2009; For further information on NATO's maritime missions cf. "Maritime security: sink or swim." NATO 9 Jun. 2010 <http://www.nato.int/docu/review/2010/Maritime_Security/EN/index.htm>; NATO. "Maritime Information Services (MIS) – FFCI Pilot Case Proposals." <<https://transnet.act.nato.int/WISE/FFCI/Collaborat/CurrentCol/MaritimeIn/MISWorkshop/MISOvervie>>.

⁸² For further information on the U.S. led missions refer to Dutton, Peter A. op. cit.; Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. op. cit.;

⁸³ "AMISOM." European Commission 26 Apr. 2010. <http://ec.europa.eu/europeaid/where/acp/regional-cooperation/peace/peace-support-operations/amisom_en.htm>.

⁸⁴ A contribution of € 4.75 million coming from the Stability Instrument (IFS) supports the strategic planning and management unit (SPMU) of the operation, while other donors cover the other costs of the mission. Allowances, medical costs, housing, fuel and communication equipment are costs typically covered by the EU contribution.

⁸⁵ "AMISOM." op. cit.

⁸⁶ Further information on the involvement of other nations can be found in the following literature. U.S.: Tumin, Zachary. "Maritime Domain Awareness: A Case Study in Cross-Boundary Information Sharing Among the United States Navy, Coast Guard and Department of Transportation." 2007. Harvard University. 9 Jun. 2010 <<http://cio-nii.defense.gov/docs/MDA.pdf>>; China: Dutton, Peter A. op. cit.; Lai, David. "Chinese Military Going Global." China Security 5.1 (2009): 3-9; Weitz, Richard. "Operation Somalia: China's First Expeditionary Force?" China Security 5.1 (2009): 27-42.

Disgression: The European Convention on Human Rights (ECHR) and Piracy

Navies whose States are parties to the European Convention on Human Rights (ECHR) are obliged to comply with the requirements of that Convention. Given that it can take many days to get from the Gulf of Aden to Kenya navies cannot be expected to hand over pirates immediately to a judicial authority. This might be problematic in the light of Art. 5 (ECHR), saying that "Everyone has the right to liberty and security of person" and that "No one shall be deprived of his liberty".

Drawing on the *Medvedyev* case, if the pirates were held in order to hand them over to judicial authorities for arrest and detention and the pirates were in fact taken to the appropriate country to be handed over, holding them for the necessary period of time for the naval vessel to get to that country would not breach the ECHR; nor would the fact of their holding.

Member States of the European Convention on Human Rights are concerned that pirates might request asylum in the respective countries, claiming to risk torture or the death penalty if returned to Somalia. After having served a sentence and been granted asylum pirates might also ask for family reunion. No country would be eager having to import pirate clans.

Further information:

- for the full text of the ECHR cf. <<http://www.hri.org/docs/ECHR50.html#C.Art5>>.
- for the respective European Court of Human Right's rulings cf. European Court of Human Rights. Press Release by the Registrar of 10 Jul. 2008 <http://cmiskp.echr.coe.int/tkp197/view.asp?action=html&documentId=837812&portal=h_bkm&source=externalbydocnumber&tabl>; European Court of Human Rights. Press Release by the Registrar of 29 Mar. 2010 <<http://cmiskp.echr.coe.int/tkp197/viewhbkm.asp?sessionId=50145259&skin=hudoc-en&action=html&table=F69A27FD8FB86142BF01C1166DEA398649&key=80979&highlight=>>.
- for a discussion of the applicability of the ECHR refer to Middleton, Roger. "Pirates and How to Deal with Them." Chatham House Briefing Note AFP/IL BN 2009/01. London: Chatham House, 2009.

3. The Role of the EU in Countering Piracy

» The seas are Europe's lifeblood. Europe's maritime spaces and its coasts are central to its wellbeing and prosperity – they are Europe's trade routes, climate regulator, sources of food, energy and resources, and a favoured site for its citizens' residence and recreation. Our interactions with the sea are more intense, more varied, and create more value for Europe than ever before. Yet the strain is showing. We are at a crossroads in our relationship with the oceans.⁸⁷

Looking at the area of security, maritime security ranks high on the current agenda of the EU. The EU has been given an impetus by other actors such as the IMO, which recently issued the LRIT regulation. The International Maritime Organisation (IMO) took the window of opportunity created by 9/11 and established obligatory security standards for ships and ports, which were integrated by the Commission into a binding regulation in March 2004. Only then did the European Parliament and the Council agree to measures at Community level.⁸⁸ Based on the IMO standards each ship intending to enter a Member State's port must provide 24-hour advance information concerning ship and cargo safety.⁸⁹ Additionally, some other national coastal surveillance programmes that have recently emerged, such as the U.S. Deep Water programme, Qatar's National Border Shield and the Australian CoastWatch programme, might have triggered some EU policies.

Maritime security is a complex set of diverging but intertwined threats. Thus the EU has adopted a combination of cross-sectoral policies (transport, environment, energy, migration etc.) as a European approach to maritime security. In general an institutional drive towards an integrated maritime policy can be identified. The establishment of dedicated agencies has further added to this institutional drive.

The challenge is to establish a comprehensive framework of security measures covering all

phases of the piracy cycle, thereby establishing a "genuine 'security culture'"⁹⁰ that does not compromise the efficiency and speed of trade or the quality of life of seafarers and passengers.

3.1 Policies

Apart from the European Security Strategy⁹¹, which qualified piracy as a new dimension of organised crime needing further attention, and its subsequent implementation report of 2008⁹², which highlighted piracy as a single issue with respect to the stabilisation of the neighbourhood of the EU, few EU policies and documents of maritime security deal with the piracy threat alone. Rather, a strong emphasis on an integrated approach, including the integration of space applications, can be identified.

The EU has developed a comprehensive set of policies in the areas of four Causative Factors, i.e. policies improving maritime surveillance (CF 4), policies improving coastal and port-side security (CF 5) (e.g. combating illegal fishing, providing for the protection of ports as critical infrastructures), policies countering corruption and improving the degree of Statehood of adjacent States (CF 6 and Determinant 1) and policies countering illegal trade (i.e. the proliferation of SALW) (CF 7) (cf. Figure 10).⁹³

The different types of policies tackling different types of Causative Factors can also be analysed in terms of which phases of the attack-cycle they touch upon. The table below shows that most policies deal with preventing (phase 1) piracy. This is not a striking finding since it lies in the nature of policies to deal with prevention. Technologies or other instruments are instead used during a piracy attack.

⁸⁷ Ibid.

⁸⁸ The European Security Strategy of 12 Dec. 2003 <<http://www.consilium.europa.eu/uedocs/cmsUpload/78367.pdf>>.

⁸⁹ Council of the European Union. Report on the Implementation of the European Security Strategy – Providing Security in a Changing World. S407/08 of 11 Dec. 2008. Brussels: European Communities.

⁹⁰ A detailed description and analysis of the policies tackling the different Causative Factors can be found in the Annex.



Figure 10: Overview of the Policies in tackling the Causative Factors (CF) of and Determinants (D) for successful counter-piracy policy

	Phase 1: Prevention	Phase 2: Alert, Warning and Rescue	Phase 3: Post-Attack (Lessons learned)
Policies improving maritime surveillance (CF 4)	x	x	x
Policies improving coastal and port-side security (CF 5)	x	x	x
Policies countering corruption and improving the degree of Statehood (CF 6/ D 1)	x		
Policies countering illegal trade (CF 7)	x		

Figure 11: Overview of the four types of policies in terms of the disaster-phase they are tackling

3.2 Institutions involved

The EU Institutions, the European Commission (EC), its Directorates General (DGs), the European Parliament (EP), the Council, its Presidency, its EU Military Staff (EUMS), its EU Military Committee (EUMC), its Political and Security Committee (PSC/COPS) and the EU agencies (EMSA, EU LRIT DC, FRONTEX, EDA, and the Community Fisheries Control Agency (CFCA)) are all to various degrees involved in these efforts.

The European Commission is following two strands in this context, one aiming at the situation in Somalia and the other one related to maritime security in general. Both taken together address the Causative Factors mentioned and contribute to establishing determinants for an effective counter piracy policy.

The Council has placed emphasis on a strong commitment towards developing an Integrated Maritime Policy (IMP). Its Presidency highlighted the need for a well coordinated and integrated cross-sectoral and cross-border approach. The Swedish Presidency has been striving to establish a common political will as a solid foundation for the integration of maritime surveillance by making it a priority during its Presidency⁹⁴.

The European Parliament, as the only elected body within the EU's institutional setting, plays only a limited role in the CSDP but is often consulted by the Council in matters related to security and crisis management. It has issued several resolutions related to maritime policy, piracy and the situation in Somalia. The EP has been involved in the European Integrated Maritime Policy with six committees working together under an enhanced cooperation procedure to produce a joint opinion. Support for coverage of maritime policy has been very positive, yet maritime policy issues are being dealt with separately by a number of committees and structures.

EU agencies are directly involved in the fight against piracy rather than just touching upon it while dealing with the broader area of maritime security. The European Union Satellite Centre (EUSC) had been tasked by the

OHQ in support of the ATALANTA NAVFOR Operation. The European Maritime Safety Agency (EMSA) provides technical assistance to the Commission in order to improve ships' identification and traffic monitoring in EU waters⁹⁵ and in this position is responsible for the community vessel traffic monitoring and information systems (SafeSeaNet (SSN), SafeSeaNet Tracking Information Relay and Exchange System (STIRES), CleanSeaNet (CSN) and European Union Long Range Identification and Tracking of ships Data Centre (EU LRIT Data Centre)). The European Agency for the Management of Operational Cooperation at the External Borders (FRONTEX) cooperates with EMSA and the Joint Research Centre (JRC) in the maritime realm and is involved with some framework programme projects (e.g. LIMES). Most prominently, it is developing a permanent regional border security concept, the European Patrols Network (EPN), which has the objective of integrating the EPN into a European Surveillance System (EUROSUR). FRONTEX has set up a Central Record of Available Technical Equipment (CRATE) for border control and surveillance belonging to Member States, containing for the moment over a hundred vessels, around 20 aircraft and 25 helicopters, and several hundred items of border control equipment such as mobile radar units, vehicles, thermal cameras and mobile detectors.⁹⁶ It is important to highlight the complementarity among these technologies. The European Defence Agency (EDA) is conducting the EDA PT MARSUR project aimed at linking up different national military surveillance systems. Most recently, EDA's Wise Pen Team published its final report entitled "Maritime Surveillance in Support of CSDP", which highlights twelve areas for action (see Table in the Annex for a summary).⁹⁷ JRC liaises with PT MARSUR in this context. EDA has engaged in the so-called "Structured Dialogue on Space" with the European Commission, the Council General Secretariat, the European Space Agency and Member States, aiming at raising awareness about programmes and identifying opportunities for the complementary development of space based assets for respective user communities. In this context valuable interfaces have been created with other key players. The European Commission's activities within the FP 7 in areas such as Space and Security research are of high interest to EDA partici-

⁹⁴ This section is based on: Council of the European Union. Presidency Report on Integration of Maritime Surveillance. POLGEN 177 / POLMAR 17 / PESC 1479 / COSDP 1052 / AGRI 486 / TRANS 441 / JAI 791 / ENV 769 / PECH 321 of 17 Nov. 2010. Brussels: European Communities.
http://www.europarl.europa.eu/meetdocs/2009_2014/documents/sede/dv/sede101209maritimessurveillance/_sede101209maritimessurveillance_en.pdf.

⁹⁵ Commission of the European Communities. Commission Staff Working Document – An integrated Maritime Policy for the European Union. SEC(2007)1278. Brussels: European Union.

⁹⁶ "The FRONTEX Agency: Evaluation and future development." MEMO/08/84 of 13 Feb. 2008. Brussels: European Communities.

⁹⁷ <http://www.eda.europa.eu/newsitem.aspx?id=631>.

pating Member States. In this context the cooperative European Framework Initiative was formed in April/May 2009, creating joint programmes and committees, which might build the bridge between FP 7 and FP 8. Apart from EDA initiated projects (Ad Hoc Cat A projects), EDA is conducting projects initiated by Member States (Ad Hoc Cat B projects).⁹⁸ The Community Fisheries Control Agency (CFCA) was established in 2005 to organise operational coordination of fisheries control and inspection activities by the Member States and to assist them to cooperate so as to comply with the rules of the Common EU Fisheries Policy in order to ensure its effective and uniform application.⁹⁹ Given the variety of initiatives followed by different agencies, cooperation is often hindered by competition among the agencies.

In general under the European Space Policy, the European Space Agency (ESA) is responsible for implementing space capabilities that respond to EU policy needs. In this regard, the EU is cooperating strongly with ESA in the development of several security related service elements of its flagship programme Global Monitoring of Environment and Security (GMES). ESA has been actively involved in the maritime field for over the past twenty-five years. It is also working on the European Data Relay System (EDRS), which contributes to the improved provision of security through improved relays of Earth observation images and is currently in the process of developing a Global Integrated Network for iNnovative Utilisation of space for Security (formerly known as GIANUS), aimed at improving Europe's preparedness for a variety of threats through the development of an integrated space infrastructure as part of a European security and crisis management system in coordination with other current initiatives.¹⁰⁰

3.3 Member States' Initiatives

In the EU Member States, responsibilities are spread across a number of institutions such as the Ministries for Maritime Affairs, various Agencies, the Navy, the Police, the Gendarmerie, Customs, the Transport Ministries and the Coastguards etc. In most cases there is no coordinating authority.

⁹⁸ Starlinger FFG. Presentation. Space and Security – Aktueller Status und Entwicklungen. Österreichische Forschungsförderungsgesellschaft (FFG), Vienna, Austria. 15 May 2009.

⁹⁹ "Welcome to CFCA." CFCA 28 Apr. 2010 <<http://cfca.europa.eu/pages/home/home.htm>>.

¹⁰⁰ A detailed description and analysis of the institutions involved can be found in the Annex.

France is one of the countries most actively engaged in counter-piracy operations: for several decades now it has maintained a naval presence in the Indian Ocean (ALINDIEN) and is also part of the TF 150 multinational task force. Given the diverse nature of State action at sea, the French Government has set up a structure for the coordinated use of the assets of the different administrations (navy, customs, police, gendarmerie), which come under the responsibility of different ministries. In order to avoid duplication a government ship has the authority to conduct policing at sea in the areas of pollution, immigration, trafficking (drugs and goods) and fisheries. As early as in December 2001, in cooperation between the navy and ship-owners, France introduced a system of voluntary naval control of shipping protocols (protocole de contrôle naval volontaire, CNV). It has already been used to free captured ships. France adopted an all-encompassing approach and deals with all kinds of threats under the issue area of "maritime safety". Coordination responsibility is placed under the authority of one admiral for each "region" of the maritime zone.¹⁰¹

The Italian Navy has been hosting on a biannual basis a Regional Seapower Symposium for the Mediterranean and Black Sea Navies. It has proposed to the 25 countries and various international institutions participating in that Symposium to establish a Virtual Regional Maritime Traffic Centre (V-RMTC), a virtual network linking up the operations centres of all the navies concerned. It provides non-classified information on merchant ships of 300 tonnes or more. The data is converted into a specific format (MERSIT), which was developed by the Italian Navy, and collected at the CINCNAV (Italian Navy Command) headquarters, from where it can be made available to all participants. Based on the Internet and commercial platforms and networks, V-RMTC is inexpensive and easy to manage. It has been fully operational since 20 September 2006.¹⁰²

¹⁰¹ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit. 13; 18-9.

¹⁰² In parallel to those technological developments a so-called operational arrangement drawn up at the Sixth Regional Seapower Symposium on 12 October 2006 has been signed by the following States: Portugal, Spain, France, Slovenia, Croatia, Montenegro, Albania, Greece, Turkey, Cyprus, Malta, Jordan, Israel, Romania, the United Kingdom and the United States. It was at the Nice 5+5 Steering Committee on 13-15 November 2006 that the Italian delegation presented its final document on the creation of a V-RMTC 5+5 network. Germany and Bulgaria joined the V-RMTC in 2007, followed in 2008 by Belgium, Georgia, the Netherlands and Senegal. European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 9-12.

4. Space Applications as a Supporting Tool for Countering Piracy

Space applications have already been used to support ESDP missions such as the EUSEC RD Congo¹⁰³ and EUFOR Chad/RCA¹⁰⁴. The use of space applications in the fight against non-military threats such as counter-terrorism, or the fight against piracy or, more generally, in the provision of maritime security is only slowly gaining ground. In the past couple of years several steps have been taken to increase the role of space in countering organised crime such as piracy.

In this regard, in 2004 the Space and Security Panel of Experts (SPASEC) was given the mandate to inter alia review the role of space in fighting the sources of threats as identified in the ESS (i.e. terrorism, proliferation of WMD, regional conflicts, State failure and *organised crime*). The consequent SPASEC-Report¹⁰⁵ of March 2005 considered the support of space-based applications for maritime security.

The three year long "Preparatory Action on the Enhancement of the European industrial potential in the field of Security research" (2004-2007)¹⁰⁶ addressed "improving situational awareness" as one of five main areas.¹⁰⁷ There is no direct mention of maritime security. PASR's main objective was the development of a full-fledged European civil security research programme to be implemented as part of the 7th Framework Programme for Research and Technological Development (FP 7), the EU's main funding research programme over the period 2007-

¹⁰³ For an overview of the ESDP missions relying on EUSC's support cf. "The Centre's Users." EUSC 28 Apr. 2010 <http://www.eusc.europa.eu/index.php?option=com_content&task=view&id=7&Itemid=15>

¹⁰⁴ Öller, Gustav. "European External Operations and Reliance on Space: A Case Study." Presentation. EC-ESA-EDA Workshop on Space for Security and Defence. Brussels, Belgium. 16 Sept. 2009.

¹⁰⁵ Panel of Experts on Space and Security. Report of 1 Mar. 2005 <http://ec.europa.eu/enterprise/newsroom/cf/document.cfm?action=display&doc_id=2408&userservice_id=1>.

¹⁰⁶ Commission of the European Communities. Decision on the implementation of the Preparatory Action on the Enhancement of the European industrial potential in the field of security research. COM 2004/213/EC of 3 Feb. 2004. Brussels: European Union.

¹⁰⁷ PASR had been decided by the Commission in Communication COM (2004) 590 final of 7 Sep. 2004 entitled "Security Research: The Next Steps."

2013. FP 7 was the first EU research programme to include security.

The 6th Research Framework Programme had already included "aeronautics and space" as one of the thematic priority areas. All past Framework Programmes for Research and Technological Development (i.e. FP 5 – FP 7) and the Preparatory Action have included projects related to maritime surveillance under various thematic priority areas.

The preparation of both the PASR and the FP 7 Security theme was supported by high level strategy groups: the Group of Personalities (GoP) for Security Research and the European Security Research Advisory Board (ESRAB) whose strategic advice shaped the scope and implementation of these programmes. The Group of Personalities (GOP) in the field of security research recognised space as a "force enabler". GOP also concluded that security and civil applications increasingly form a continuum with challenges inside and outside of the EU often being similar. Across this continuum, applications in one area can often be transformed into applications in another area. Space is a prime example for such a development.¹⁰⁸

On the basis of the European Security Research Advisory Board (ESRAB) the European Security and Research Innovation Forum (ESRIF)¹⁰⁹ was established in 2007. Its mandate was to propose by the end of 2009 a European agenda for research and innovation in the field of security (ESRIA roadmap) capable of guiding European institutions, governments and the private sector in the coming two decades. Composed of eleven working groups, ESRIF considered inter alia security of infrastructures (including transport and space), borders (including sea borders) and situation awareness and the role of space as part of its missions and thematic areas. Piracy was mainly covered as part of external

¹⁰⁸ Group of Personalities in the field of Security Research. "Research for a Secure Europe: Report of the Group of Personalities in the field of Security Research." Luxembourg: Group of Personalities, 2004. 12.

¹⁰⁹ European Security Research and Innovation Forum (ESRIF). "European Security Research and Innovation in Support of European Security Policies. Intermediate Report." Luxembourg: Office for Official Publications of the European Communities, 2008. <http://www.esrif.eu/documents/intermediate_report.pdf>.



maritime borders by the working group on border security. ESRIF's final report, including the European Security Research and Innovation Agenda (ESRIA), provides a detailed analysis on the gaps and shortfalls in these areas, summarising the necessary steps according to priorities.¹¹⁰ ESRIF suggests inter alia security research to support research into the security element of maritime surveillance (piracy).

Moreover, the EU is developing its own operational capability through the GMES initiative in form of a series of research and development projects funded by the European Commission and ESA in the domains of maritime surveillance, humanitarian relief, early warning and prevention of conflict.

European level initiatives are complemented by national ones.

4.1 Advantages of Space Applications in Counter-Piracy

Satellite observation fits particularly well with the geographic and thematic diversity of maritime activities requiring monitoring and surveillance. The global characteristic of monitoring from space makes space systems particularly attractive for long-term monitoring of a very large geographic area. Satellite observation systems are multipurpose and non-intrusive. Satellite data is not limited to borders (legally valid over foreign territories) and is continuously available, allowing for continuous and frequent observation of large areas in order to guarantee early detection of potential threats.¹¹¹

4.2 Technical Capabilities

Providing for enhanced means of maritime surveillance space applications is a supportive tool for tackling Causative Factor 4: Difficulties with maritime surveillance as well as Causative Factor 5: Lax Coastal and Port-Side security. Additionally, space applications can

be used in the fight against illegal trade, which will counter the proliferation of SALW (Factor 7).

Satellites that can support counter piracy missions are already in place. There is no need to wait for new technology to develop; the challenge is to better use what is already there. The most famous example is that of Canada using Radarsat-2 and AIS information to cue its aircraft in order to identify fishing boats violating national boundaries. Cueing the aircraft shortened response times, made illegal fishery monitoring more effective and saved money. Apart from some technical limitations, problems were mainly reported in tasking. While tasking of satellites for counter piracy missions is technically possible, satellites have in most cases already been tasked for the time needed and re-tasking upon urgent requests in case of a pirate attack is hardly ever possible.

4.2.1 Space Applications and Maritime Surveillance (Causative Factor 4)

The role of space in a maritime surveillance mission can be threefold: imagery, collection of signals (cooperative and non-cooperative), and communications. In the chain of command of maritime surveillance functions, space mainly contributes to the function "observe" (regularly and continuously over a large zone) and "detect" (detect a potential threat). As such, space assets are complementary to ground, sea and air assets and are used to pinpoint potential threats and abnormal behaviour (indicate "where to look"). Users can then activate other systems to confirm and identify the threat.¹¹² Space applications complement existing coastal surveillance systems such as coastal RADAR, AIS, patrol vessels and aircraft. In doing so, they extend the surveillance range (to better anticipate threats), cover larger zones in one shot (optimisation of resources (money)) and offer a shared resource by fostering intra- and inter-national cooperation.¹¹³

Since access to space applications is already present onboard many vessels for communication, it allows for low cost data collection or positioning. In addition to being of direct use for navigation and communications, space has to be also considered as a significant component in the information chain as a raw data basis for information correlation, im-

¹¹⁰ European Security Research and Innovation Forum (ESRIF) "European Security Research and Innovation in Support of European Security Policies. Final Report." Luxembourg: Office for Official Publications of the European Communities, 2009.

<http://www.esrif.eu/documents/esrif_final_report.pdf>.

¹¹¹ Koppe, Rüdiger. "Industrial Approaches to Piracy – Securing Maritime Transportation from Piracy." Presentation. Space and Maritime Security – Strategies and Capabilities to Counter Piracy. Wirtschaftskammer Österreich, Vienna, Austria. 30 November 2009.

¹¹² Bressollette, Aurélie. "Space Current and Future Contributions to Maritime Security." Space and Internal Security Workshop. European Space Policy Institute, Vienna, Austria. 28 May 2009.

<<http://www.espi.or.at/images/stories/dokumente/Conference2009/bressollette.pdf>>.

¹¹³ Koppe, Rüdiger. op. cit.

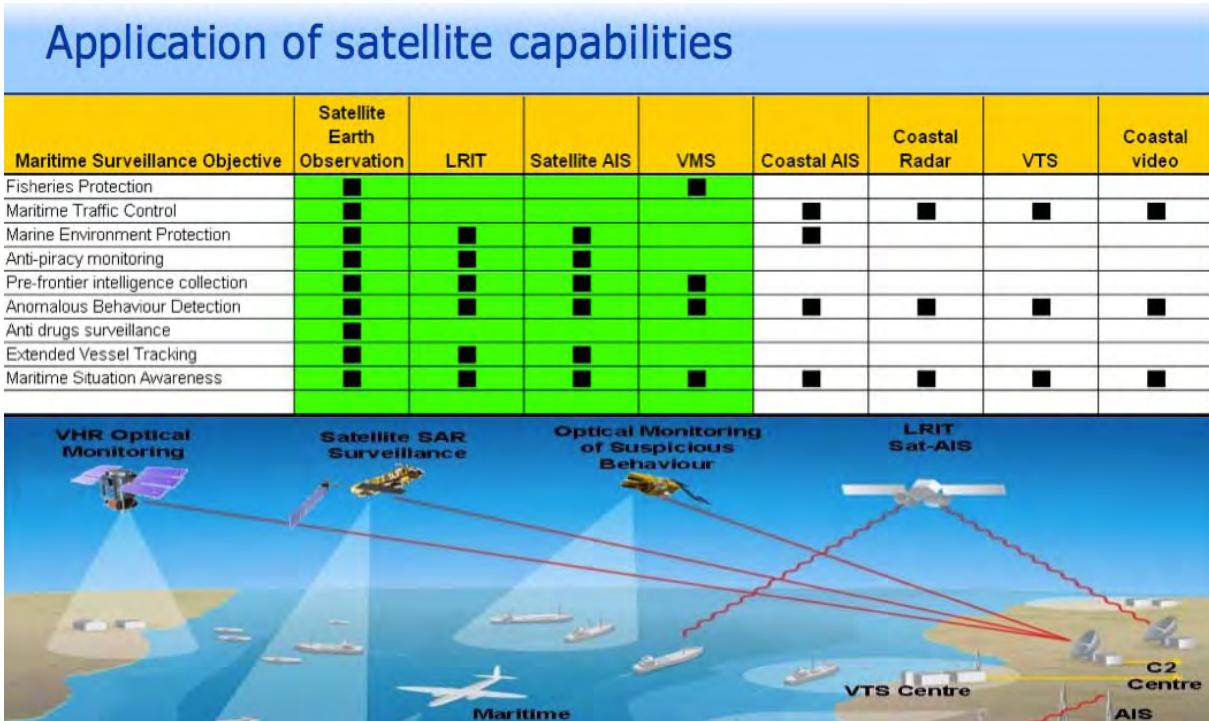


Figure 12: Application of Satellite Capabilities in the Maritime Domain¹¹⁵

agery intelligence and modelling (meteorology, ocean, mission/route planning).¹¹⁴

Space is already used as a valuable tool to monitor and control the marine environment for environmental purposes and is already deployed and efficiently used within fishing monitoring centres for illegal fishing controls.

The table in Figure 12 gives a brief overview of the fields of applicability of space applications in the maritime domain. This will be further elaborated upon in the course of the next sections.

It is further possible to distinguish between two broad areas where space applications can be supportive: (1) in finding pirate bases and (2) in tracking pirate skiffs and hijacked ships.¹¹⁶

Finding Pirate Bases: Intelligence Satellites and Imagery Processing

The first step in preventing a pirate attack is detecting pirate bases through intelligence. So-called "intelligence satellites" include all earth-observing sensors (EO, IMINT, SIGINT) as well as the electronic monitoring of telecommunications (COMINT and ELINT).¹¹⁷ Image intelligence (IMINT photo surveillance satellites)¹¹⁸ and signal intelligence (SIGINT or ferret satellites) are collectively referred to as surveillance satellites. They provide detailed high-resolution images (of a few centimetres resolution) and maps¹¹⁹¹²⁰.

¹¹⁵ European Space Agency. "The European Space Sector in a Global Context - ESA's Annual Analysis 2004." Paris: ESA Policy Department, Paris. 51. <www.esa.int/esa pub/br/br242/br242.pdf>.

¹¹⁶ IMINT satellites can be categorised according to their wavelength band of operation: (1) Electro-optical satellites and (2) Radar Imaging satellites

¹¹⁷ "The analysis of the imagery allows the extraction of the information in the form of vector layers including the description of the features represented. These layers are displayed together with the image in order to produce image – maps that can be taken to the field. The user can use this maps in a traditional way as paper maps or can interact with the information in digital format using a PC." "Map Generation." European Union Satellite Centre 9 Apr. 2010 <http://www.eusc.europa.eu/index.php?option=com_content&task=view&id=40&Itemid=60>.

¹¹⁸ The description on the workings of reconnaissance satellites is largely based on the related section in: Maini, Anil K. and Varsha Agrawal. "Satellite Technology: Principles and Applications." West Sussex: John Wiley & Sons, Ltd., 2007. 528 -541.

¹¹⁴ Jacq, Fabienne, Jean-Yves LeBras, Antoine Monsaingeon. op. cit..

¹¹⁵ Wilson, Andrew. op. cit.

¹¹⁶ This section is to a large degree based on the findings of the DECLIMS project as presented in: Greidanus, Harm & Naouma Kourt. "Findings of the DECLIMS Project: Detection and Classification of Marine Traffic from Space." Conference Paper. SESAR 2006: Advances in SAR oceanography from ENVISAT and ERS, ESA-ESRIN, Italy. 23-26 Jan 2006.

<http://earth.esa.int/workshops/seasar2006/participants/87/paper_SeasarDECLIMS12p3.pdf>; "Results of DECLIMS." Joint Research Centre 24 April 2009 <<https://declims.jrc.ec.europa.eu/web/declims/6>>.



Figure 14: EUSC Product showing a Pirate Base¹²¹

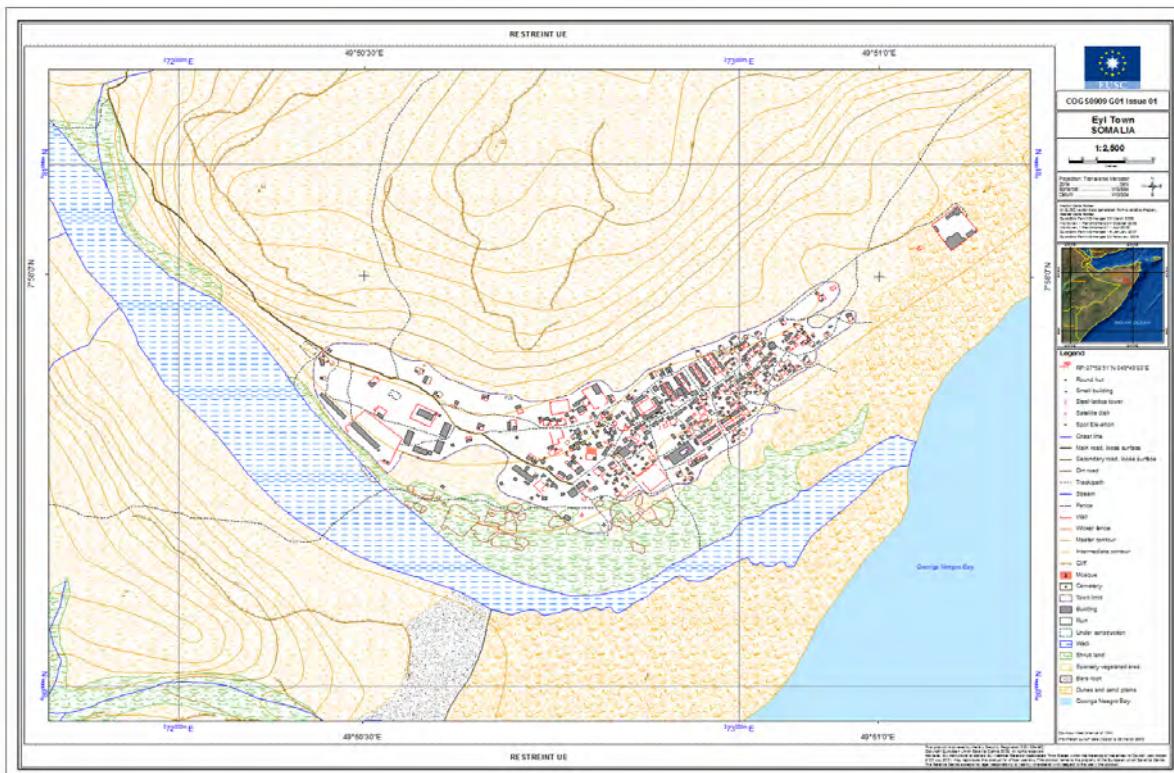


Figure 14: EUSC Product - Detailed Map of a Pirate Base¹²²

Electro-optical imaging satellites (also known as optical) provide full-spectrum photographic images in the visible and the IR bands and use a CCD camera. They are limited to non-cloudy conditions. Radar imaging satellites (also known

as synthetic aperture radar (SAR)) overcome this problem but suffer from poor resolutions compared to electro-optical satellites, have the problem of "backscatter noise", and are susceptible to active jamming. Radar satellites can contain Ground Moving Target Indication (GMTI) for detecting ground movement of vehicles.

¹²¹ Wilson, Andrew. "EUSC Support to Op Atalanta." Presentation. Space and Maritime Security – Strategies and Capabilities to Counter Piracy. Wirtschaftskammer Österreich, Vienna, Austria. 30 November 2009.

¹²² Wilson, Andrew. op. cit.

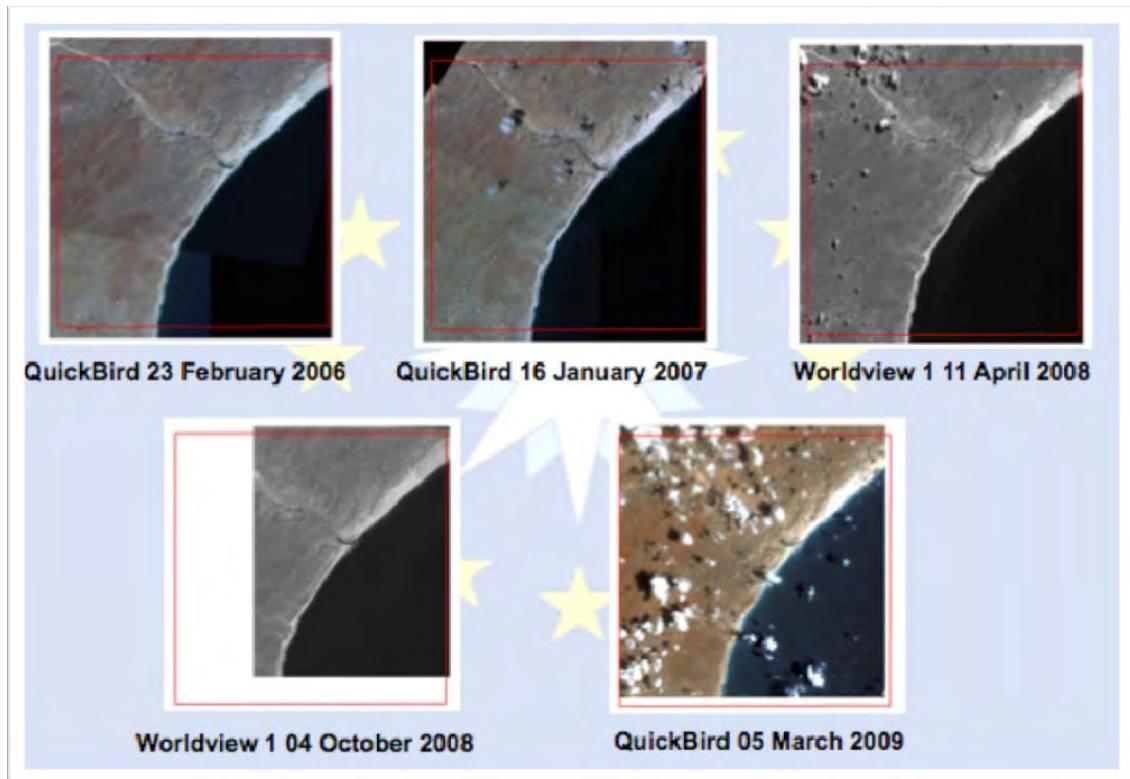


Figure 15: The Process of Change Detection¹²⁴

Pure imagery data is however of limited use and has to be used either for change detection or put in context through geographical intelligence.

- Change Detection

Both optical and radar imagery can be used for the detection of, for example, pirate bases through extraction of changes, which is normally done in three stages: (1) change detection; (2) change categorisation and (3) change classification. A database of satellite imagery (both optical and SAR) can serve as a basis for change detection.¹²³ Through fusion of SAR and optical changes, changes can be categorised into priorities:

- highest: coinciding changes (changes that occur in both SAR and optical at the same time)
- high: changes in SAR only
- medium: changes in optical only.

The last stage is change classification based on object size, spectral signature, GIS data

and what could possibly be detected using remote sensing images.

The Figure above gives an overview of the change detection process (cf. Figure 15).

The figure below shows in pink and green the changes identified to a pirate base (cf. Figure 17).

- GEOINT

Derived imagery has to be placed in the relevant context in order to be analysed and assessed. This is what is referred to as GEO-spatial INTelligence (GEOINT), which combines disciplines such as mapping, charting, imagery analysis and imagery intelligence. GEOINT organises and combines all available data around a particular geographical location and then exploits it in order to prepare products useable by decision makers, intelligence agencies and emergency responders.¹²⁵

Figure 16 is an example of such a geospatial intelligence analysis. In the search for pirate bases, the European Union Satellite Centre put the satellite imagery in context, combining it with real photography of the area and information on the main and secondary roads

¹²³ For the exact workflow in change detection refer to Dekker, R.J., I. Lingenfelder, B. Brozek, U. Benz and A.C. van den Broek. "Object-Based Detection of Hazards to the European Gas Pipeline Network Using SAR Images." 10 Feb. 2009 <http://www.presense.net/pdf/11_Object_based_detection.pdf>.

¹²⁴ Wilson, Andrew. op. cit.

¹²⁵ "Geospatial Intelligence." European Union Satellite Centre 9 Apr. 2010 <http://www.eusc.europa.eu/index.php?option=com_content&task=view&id=8&Itemid=16>.



Figure 17: Changes to Pirate Base¹²⁶

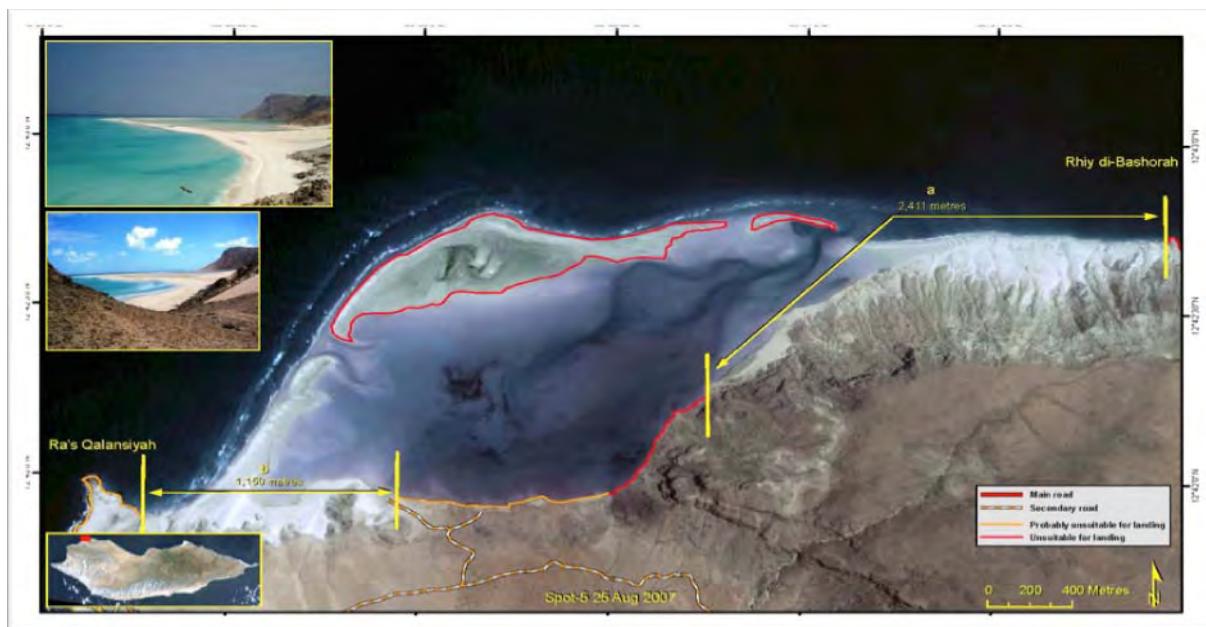


Figure 16: Example of an EUSC Geospatial Intelligence Analysis in the search for pirate bases¹²⁷

that are nearby. EUSC's analysis concludes that the area can provide accommodation and support to pirate activity as sandy beach areas provide shelter for pirate vessels and at the same time access to the Arabian Sea. The two real photos on the left have been taken from the Internet and show sandy shelving to the sea, which is uncovered at high tide and thus suitable for landing.

- Electronic Monitoring of Telecommunications

In addition to imagery intelligence, signal intelligence from SIGINT satellites can be used to detect transmissions from broadcast

communication and non-communication systems such as radar, radio and other electronic systems and are capable of intercepting and tracking pirate mobile phone conversations, radio signals and microwave transmissions. They are not capable of intercepting landline communication.¹²⁸

¹²⁶ Ibid.
¹²⁷ Wilson, Andrew. op. cit.

¹²⁸ SIGINT can be further divided into communication intelligence (COMINT) and electronic intelligence (ELINT). COMINT or communication intelligence satellites perform covert interception of foreign communications in order to determine the content of these messages. Given the encryption of these messages, various computer-processing techniques for decryption are needed. This way sensitive data about critical individuals can be obtained. ELINT, electronic intelligence satellites, are used for the analysis of non-communication electronic transmissions. Most common ELINT satellites are designed to receive radio

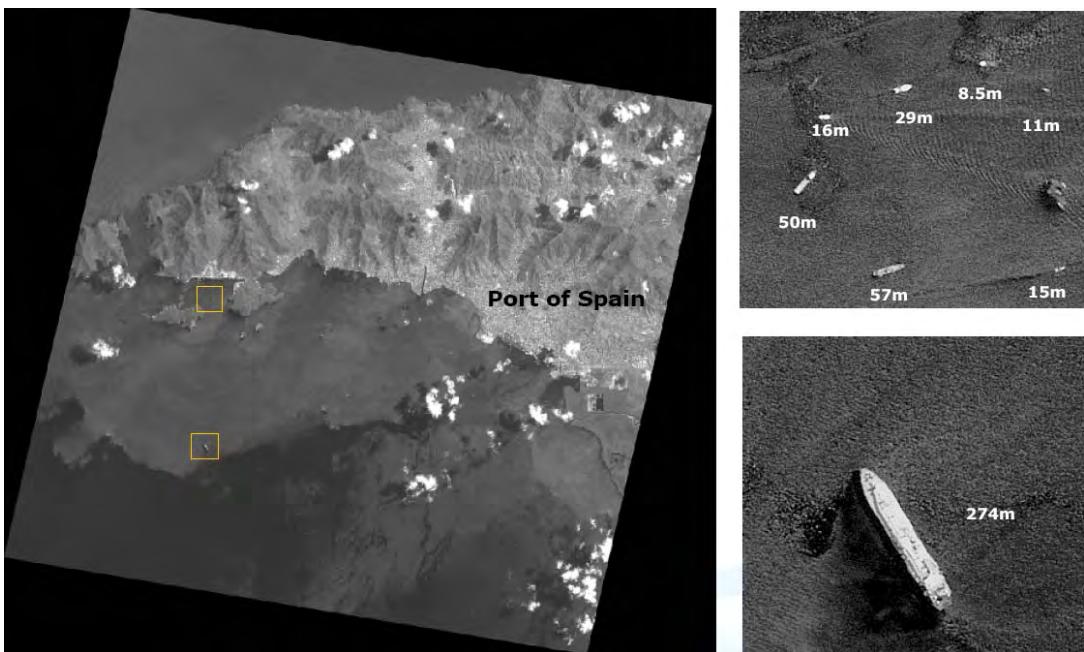


Figure 19: Example of optical imagery capability¹²⁹

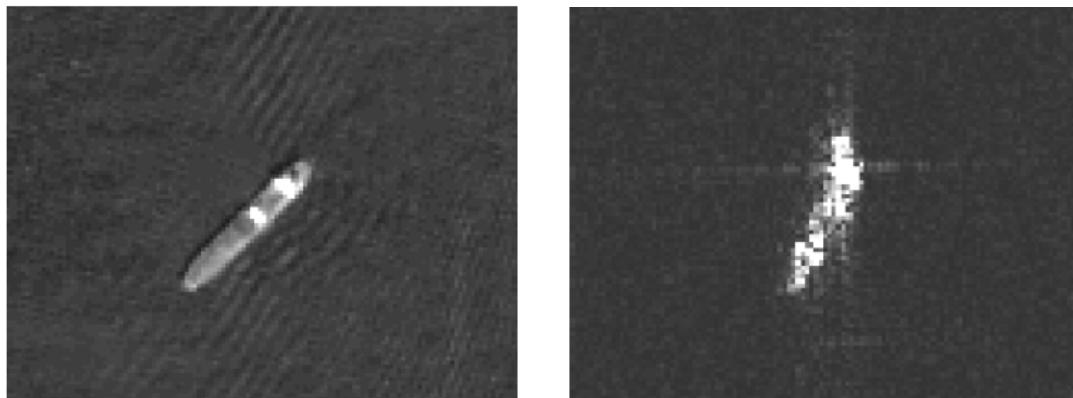


Figure 19: The same 220 m long ship imaged by SPOT-5 (2.5 m resolution, left) and RADARSAT Fine (8 m resolution, right)¹³⁰

Tracking, Identification of Pirate Skiffs and Tracking of Hijacked Ships

- Space-Based Imagery

Ships can be easily detected with the human eye on optical images of a minimum of 2.5 metre resolutions. Ship sizes can be estimated and larger vessel types such as container ships, oil tankers and bulk carriers can be recognised. Both intermediate vessels and

and radar emanations of ships at sea, mobile air defence radar, fixed strategic early warning radar and other components for the purpose of identification, location and signal analysis "Signals Intelligence Programs and Activities." 26 Nov. 1997. FAS 25 Aug. 2009 <<http://www.fas.org/irp/world/russia/program/sigint.htm>>.

¹²⁹ Ibid.
¹³⁰ The DECLIMS Partners. "Detection and Classification of Maritime Traffic from Space". The DECLIMS Partners, 2007. <http://ec.europa.eu/research/press/2007/maritime-briefing/pdf/31-jrc-declims-brochure_en.pdf>.

small ones (<10 metres) can be detected. Their identification is however more difficult or only possible through guessing based on context information., The nearness of a marina, for example, indicates that a small target is likely to be a pleasure boat. Guessing is risky when it comes to detecting pirates.

A number of service providers and suppliers offer automatic systems for ship detection in satellite SAR images based on images of RADARSAT, ENVISAT ASAR and ERS-2. For ship detection, resolutions range from 150 metres (ENVISAT ASAR Wide swath, only for large merchant ships) to 50 metres (RADARSAT ScanSAR), 25 metres (ENVISAT ASAR Image and Alternate polarisation modes, RADARSAT Standard) and 8 metres (RADARSAT Fine). JRC benchmarking tests on detectability of fishing vessels, analysing almost 900 known fishing ship positions in 100 images, indicate a detectability of 80 percent for larger fishing vessels (45 metres

on average) in RADARSAT ScanSAR Narrow B images (50 metres resolution) and over 90 percent for somewhat smaller fishing vessels (35 metres on average) in RADARSAT Standard images (25 m resolution).¹³¹ While most systems do provide a length estimate, and some provide a width and heading estimate, only a few provide a speed estimate or target RCS (Radar Cross Section). SAR imagery currently does not allow for vessel type identification. Length estimation has an accuracy of about 15 metres (standard error) under calm sea conditions for slow moving targets with high resolution.

Satellite imagery can thus be used to (1) identify pirate skiffs or to (2) track and find hijacked ships.

Moving ships show wakes in both radar and optical satellite imagery, which can provide

information about speed and direction of the ship. Wake detection in optical imagery proves difficult as the moving vessel and its wake can be difficult to separate given their similar brightness. Radar imagery too is underdeveloped in wake detection. This can be explained by the reliance on RADARSAT (HH) by most operational ship detection applications, where wakes are not prominent.¹³²

The challenge is to detect small boats that may be on the water for a very short time in a crowded area, and to recognise their hostile intent. Pirates use small boats that can suddenly appear from a nearby coast. As attacks can be expected further from shore in order to avoid any risk or reaction by local authorities or population, there is more pre-warning time. Thus, it would make sense to look for small boats leaving hot-spot coasts, heading to an intercept course with passing vessels.

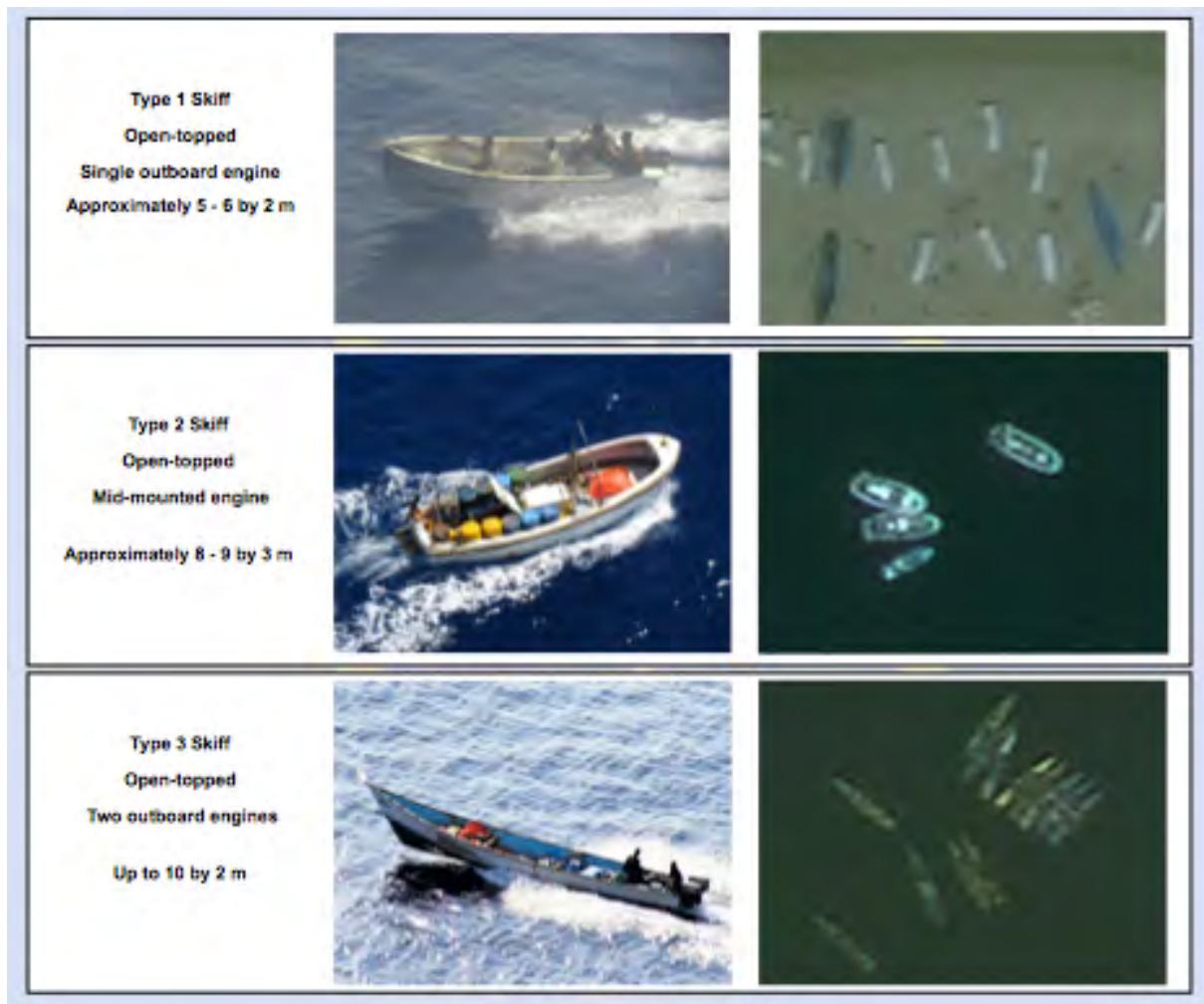


Figure 20: Small Pirate Vessels ("Skiffs")

¹³¹ Available experience however indicates comparable performance of ENVISAT ASAR's image mode to RADARSAT's standard mode. ENVISAT's wide swath mode is not suitable for detection of vessels (15 metres resolution).

¹³² Ship wakes are a rarity in these RADARSAT images, whereas in ERS images (VV, steep incidence) they are more the rule. It must be concluded that operational capability at present lags behind theoretical capability in this area.

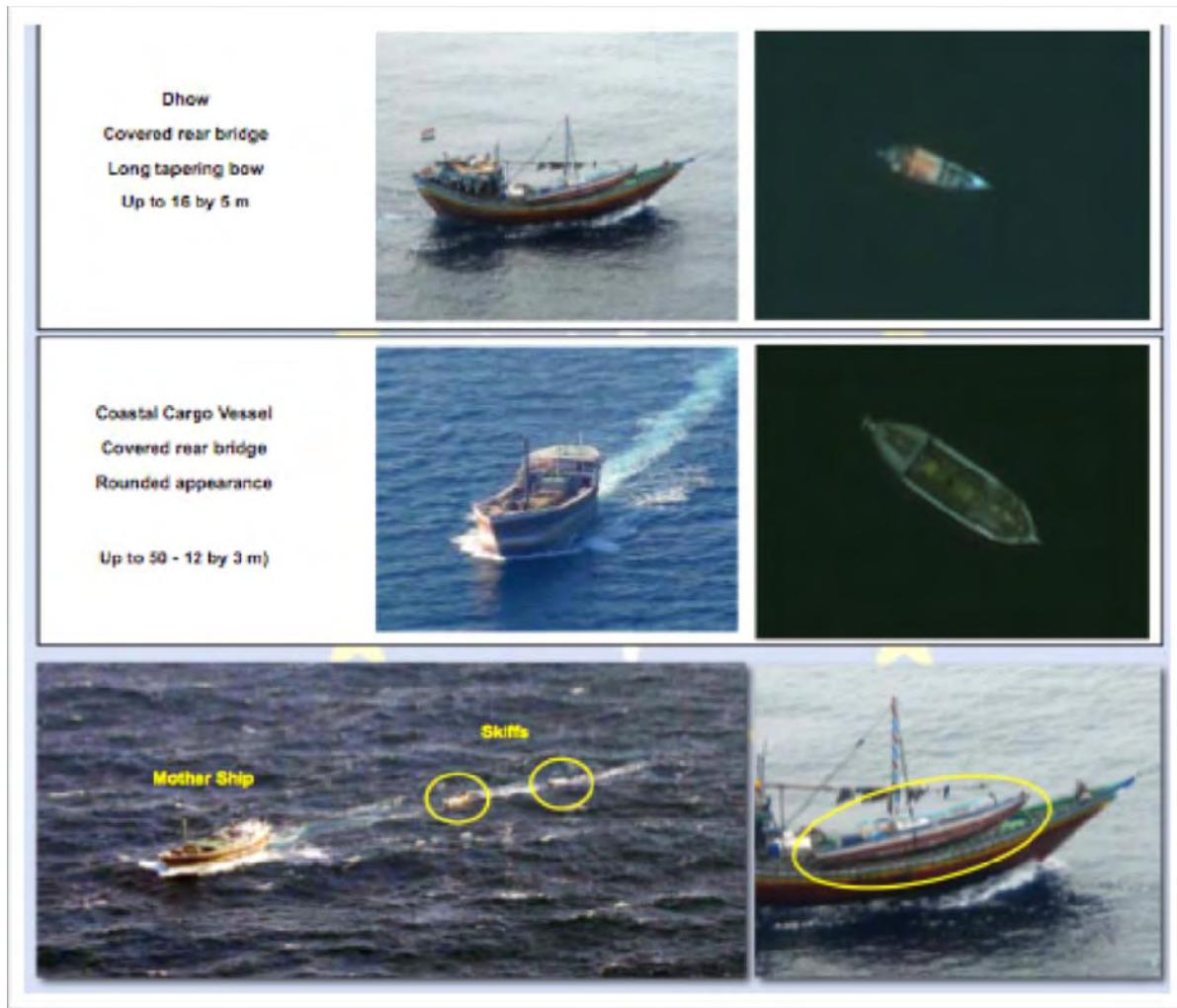


Figure 21: Larger Pirate Vessels in Satellite Imagery

In order to capture such an event, much higher revisit rates are needed.

Given these technical capabilities what are the space reconnaissance requirements along coastlines? In order to identify a pirate skiff as such, an intelligence warning is required. After such a warning, satellites can observe the area for twelve hours. Observation results are available within half an hour until maximum two hours after measurements. Vessels of interest size down to 3 metres at the coastline and 5 metres in harbours. Relocation for repeated space observation is dependent on assumed, ideally known, speed and heading of the vessel.¹³³

The space reconnaissance requirements in the open sea (> 200nm) are slightly different from those at the coastline. As at the coastline, a specific intelligence warning is required for the reconnaissance task to start. Vessels of interest are normally 12 metres minimum due to required open sea worthi-

ness. Abnormal behaviour is deducible from historic patterns compared against AIS, LRIT, VMS, VTS and other support data. Due to discontinuous observation, there is the need to know the speed and direction of the vessel.¹³⁴

Pirate mother ships have an average size of 50 – 70 meters and it should thus be possible to detect them in SAR imagery. Assuming that hijacked ships are medium to large vessels, the same holds true for them. As explained earlier, SAR imagery proves particularly valuable at open sea, far away from the coast. Vessel classification from SAR data, however, is still difficult: automatic algorithms do not yet always provide reliable size estimates, as earlier explained. In several areas implemented, operational capabilities lag behind available theoretical knowledge: e.g. in wake detection and analysis and for

¹³³ Koppe, Rüdiger. op. cit.

¹³⁴ Ibid.



Figure 22: Hijacked Vessels¹³⁶

automatic vessel detection and classification in optical images.¹³⁵

- Space-Based Collection of Signals

By picking up navigation signals, ship tracking and positioning becomes possible.

The International Maritime Organization's (IMO) International Convention for the Safety of Life at Sea (SOLAS) requires Automatic Identification Systems (AIS) to be fitted aboard internal ships of three-hundred or more tonnes as well as all passenger ships regardless of their size. An Automatic Identification System (AIS) provides the means for ships to electronically exchange ship data such as identification, position, course and speed with nearby ships and Vessel Traffic Services (VTS) and is used by ships and VTS for identification and location of vessels. By integrating a standardised VHF transceiver system with an electronic navigation system such as a GPS receiver, it enables tracking and monitoring of vessel movements. The AIS is capable of handling well over four

thousand five hundred reports per minute and updates every two seconds.¹³⁷

There are currently two types of shipboard AIS available. Class A AIS, using Self Organizing Time Division Multiple Access (SOTDMA) data communication technology (for larger ships in line with SOLAS), is mandatory for all ships of three-hundred gross tonnage, all ships engaging in international voyages, cargo ships of five-hundred gross tonnage and upwards not engaged in international voyages, and some search and rescue aircraft and passenger ships irrespective of size.¹³⁸ Class B AIS, using Carrier Sense Time Division Multiple Access (CSTDMA) technology, is a voluntary AIS service for pleasure vessels and small craft.¹³⁹ With the system becoming more popular, AIS receivers and display systems are becoming a common tool

¹³⁵ U.S. Department of Homeland Security. "What is the Automatic Identification System (AIS)?" 27 July 2009 <<http://www.navcen.uscg.gov/enav/ais/default.htm>>.

¹³⁶ Cain, J.S. and E. Meger. "Space-Based AIS: Contributing to Global Safety and Security." Presentation. ISU Annual Symposium. International Space University, Strasbourg, France. 18-20 Feb. 2008.

¹³⁷ For further information related to technology see U.S. Department of Homeland Security. "How AIS works." <http://www.navcen.uscg.gov/enav/ais/how_ais_works.htm>.

¹³⁵ For a more detailed analysis on technicalities related to false alarm rates and other common problems see: Gredanus, Harm & Naouma Kourti. op. cit.

¹³⁶ Wilsson, Andrew. op. cit.

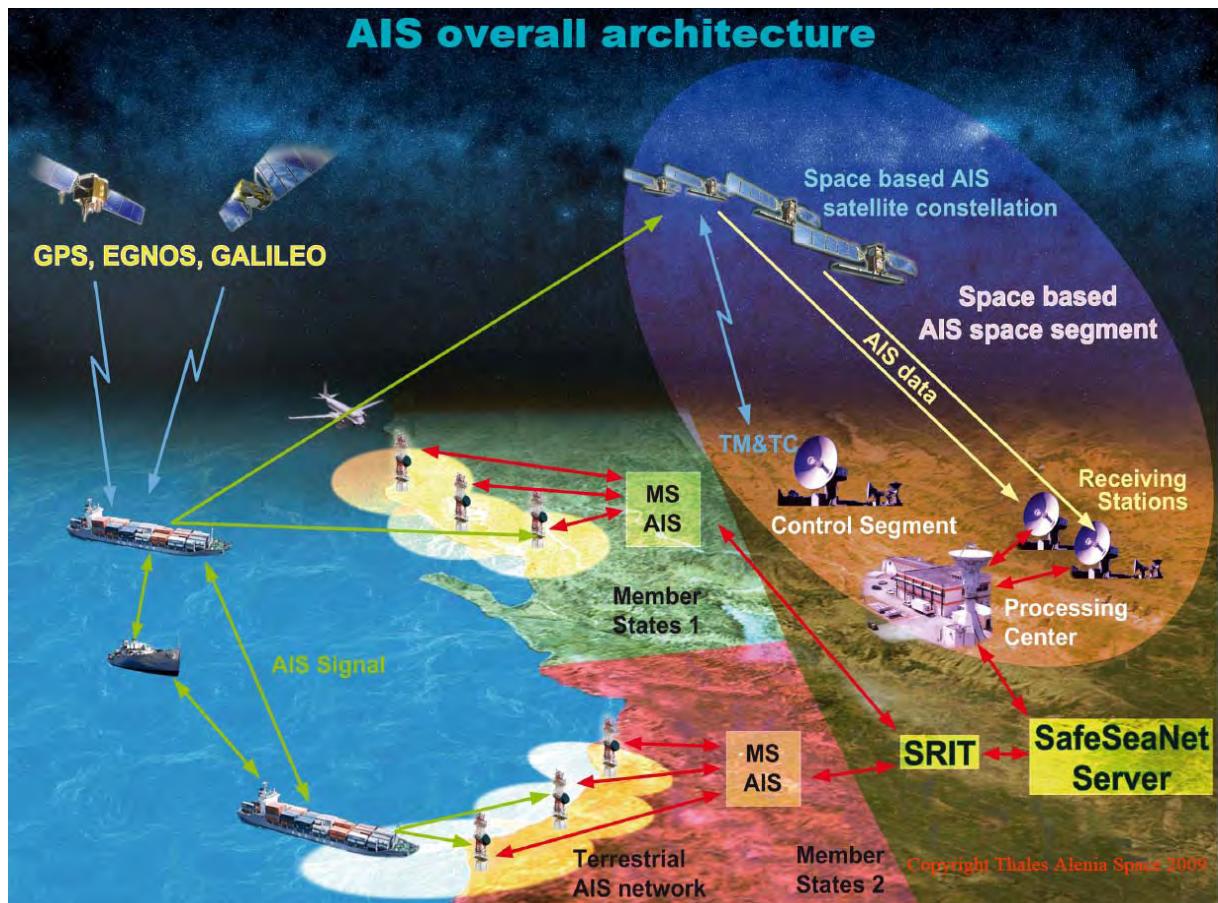


Figure 23: The AIS overall architecture¹⁴⁰

for local-area awareness on board ships. Current AIS reception is limited to coastal antennas' range of 50 to 100 kilometres.

While coastal receivers originally pick up the signal, the idea is to pick it up from space (AIS-S). This way the application range of AIS would be extended. Trials with the ESSAIM constellation have already proven this possibility. Exploiting AIS data collected from satellites can make worldwide maritime traffic surveillance a reality. For commercial operators it provides the advantage of making tracking of own ships easier, leading to potential for comparative advantage. The benefits of a space based AIS system are manifold, offering worldwide coverage (including the strategic maritime polar areas), high Quality of Service (rich information provided by AIS message) and reliable positioning information. It improves internal security mainly through its application to cooperative and semi-cooperative ships, allowing for more accurate vessel traffic management,

which is needed for transport security but would also support search and rescue operations.

While AIS is an existing anti-collision maritime system with 30 nautical metres terrestrial transponders, which is deployed on more than 70,000 ships, space-based AIS is still not a worldwide reality. It still faces problems in particularly crowded areas. Orbcomm (6 satellites) and COMDEV (1 test satellite) are the first two operators of AIS-equipped satellites. Trials are ongoing. Problems with the existing AIS system and its signals being picked up by space arise mainly due to the systems' optimisation for terrestrial use. Since space-based receivers are capable of receiving messages from multiple cells, the problem of message collisions arises. In areas with low ship density, the probability of message collisions is low and AIS provides reasonable performance. Long collection times can help improve the overall detection statistics and the chances of a clear message being received. Alternatively the antenna footprint can be reduced in order to increase the number of ship detections through reducing the cells in view at any point in time. This however increases the time to provide global coverage while reducing the amount of time

¹⁴⁰ Gagnou, Bruno. "Added Value of Space Solutions for Transportation Security." Presentation. Space and Internal Security Workshop. European Space Policy Institute, Vienna, Austria. 28 May 2009. <<http://www.espi.or.at/images/stories/dokumente/Conference2009/gagnou.pdf>>.

that any single cell is under observation. Both the Canadian COMDEV Ltd. and ThalesAenia Space (TAS) are currently working on a solution to this.

Both AIS-S and terrestrial systems are needed for complete maritime domain awareness for two reasons. First, terrestrial AIS systems have the benefit of continuous coverage and detection rates that approach one hundred percent close to shore but a very limited range and high cost per square mile covered. Secondly, AIS from space has the advantage of providing complete global coverage with comparable average detection performance as well as low costs per square mile covered but it faces the disadvantages of lower detection rates close to shore stations and only periodic vessel refresh.

COM DEV Ltd. is using an AIS radio to address the collision problem in order to achieve a much higher level of ship detection per spacecraft pass. The result is a large improvement in the number of detections versus the commercial receiver approach. TAS proposed instead to dedicate specific AIS channels to a space-based link and to optimise the transmission protocol (periodicity, message, synchronisation). Apart from the collision problem, AIS-S requires several other regulatory arrangements: once AIS-S data is captured by a satellite, cost-effective transport of the data down to the earth and then to a central repository must be guaranteed. The data must be processed, archived, routed, tagged, quality checked, filtered and then distributed to authorised users. A comprehensive approach to AIS-S has to be adopted.¹⁴¹

AIS is mainly used for collision avoidance but also provides traffic awareness for Vessel Traffic Services (VTS). VTS is a marine traffic monitoring system established by harbour or port authorities similar to air traffic control. Radar, closed-circuit television, and VHF radiotelephony complement AIS to monitor vessel movements and provide navigational safety in a limited geographical area. In addition to providing a comprehensive traffic image, VTS should have information about all participating vessels and their intentions in order to evaluate and respond to developing situations. The Vessel Monitoring Service (VMS) that is primarily used for fisheries monitoring is also able to detect cooperative sea traffic.

Additionally, AIS is used for coordination resources for marine search and rescue operations, which require exact position and

navigation status of ships in the vicinity of the ship or person in distress. The AIS standard envisions the possible use of SAR aircraft, including messages for aircraft to report positions. To aid SAR aircraft in locating people in distress, a standard for an AIS Search and Rescue Transmitter (AIS-SART) is currently being developed. Several demonstrations have proved its functions.

In addition to AIS, the IMO adopted a resolution in May 2006 requiring the establishment of an international system for the Long Range Identification and Tracking of ships (LRIT), amending Chapter V of SOLAS. The so-called LRIT regulation will apply to all passenger ships including high-speed craft, cargo ships of three-hundred gross tonnage and higher, and mobile offshore drilling units. These ships must automatically report their position to their flag administration at least four times a day. Contracting governments having a legitimate interest under the regulation may additionally request information about vessels. LRIT is a global standard for long range reporting accepted by nearly all governments. The EU's ambition for "LRIT" of ships heading towards Europe requires long-range detection over large maritime zones, which would not be feasible by means other than satellites.¹⁴² Providing additional information (e.g. course and speed), AIS-S is understood as supporting and complementing LRIT. LRIT is only sent to specific recipients for confidential treatment.¹⁴³ AIS-S is considered as providing an independent surveillance capability that operates regardless of the status of the LRIT deployment in a particular country. Thus both systems seem to be needed in providing mutually supporting value to the market.

Moreover several reporting regimes such as port notifications, hazardous material reporting (HAZMAT) and the West European Tanker Reporting System (WETREP) can be identified. A further distinction can be made between multinational (WETREP), single State (Italian ARES (Automated Search and Rescue System) and bilateral reporting systems that sometimes cover international straits (e.g. CALDOVREP for the Dover Strait, GOFREP for the Gulf of Finland). Different reporting systems can be mutually exclusive.¹⁴⁴

¹⁴¹ Chapman, John. "The Questionmarks over Europe's Maritime Security." op. cit.

¹⁴³ European Commission/ Joint Research Centre, Ispra. Integrated Maritime Policy for the EU: Working Document III - On Maritime Surveillance Systems. 14 June 2008. Ispra.

<http://ec.europa.eu/maritimeaffairs/pdf/maritime_policy_action/maritime-surveillance_en.pdf>.

¹⁴⁴ Ibid.

¹⁴¹ This section is mainly based on Cain, J.S. and E. Meger. op. cit.

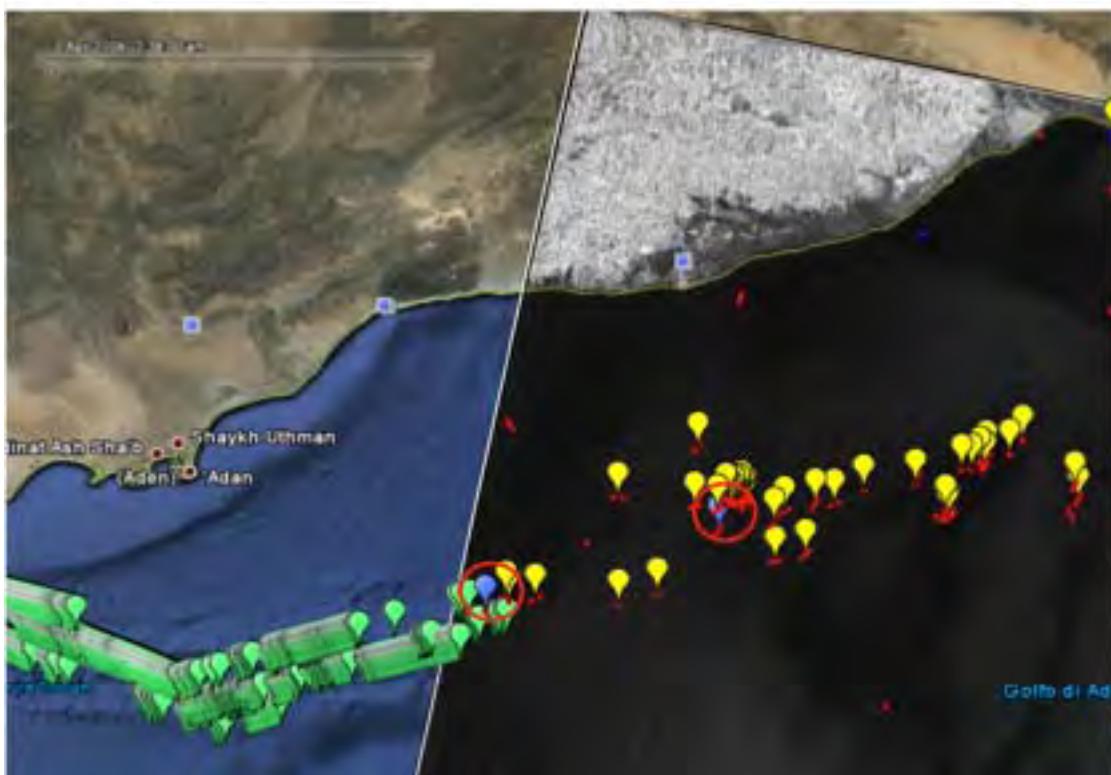


Figure 24: LIMES Demonstration satellite picture showing ships with AIS (green) and without AIS (yellow), which are potentially dangerous.¹⁴⁵

By picking up navigation signals, ship tracking and positioning becomes possible. AIS-S enables worldwide maritime traffic surveillance to become a reality. It improves maritime security through its application to cooperative and semi-cooperative ships, allowing for more accurate vessel traffic management needed for border protection. Non-cooperative signals are picked up by SIGINT satellites, shedding light on the “bad guys”.

During a two months demonstration of the FP 6 project LIMES, the container ship “Jolly Verde” that was supposedly transporting dangerous goods was monitored along its route from Mediterranean Sea toward the southern East Africa coast. Prior to this demonstration, users had expressed the need to be able to block attacks at the “mother ship” level prior to the actions of annexed small boats. In order to identify dangerous, i.e. non-cooperative ships, data from Envisat/Rsat2, CosmoSky-Med, AIS, VMS and AIS-S was fused.

Figure 24 shows the result. The yellow dots are potentially dangerous ships because their identity is unknown (i.e. GPS, VMS, LRIT, or AIS(-S) do not provide any indication on their identity).

4.2.2 Space Applications and the Monitoring of Ports (Causative Factor 5)

Coastal Security

There is growing interest in the use of satellite SAR imagery for maritime border control. Recently completed studies coordinated by FRONTEX have highlighted the potential role of satellite-based surveillance and airborne patrols for maritime areas outside the coverage of coastal surveillance systems (e.g. open waters and territorial waters of third party States). In particular, the Integrated Surveillance System for Europe’s southern maritime borders as requested by the European Council intends to integrate satellite-based surveillance with conventional vessel tracking systems.¹⁴⁶

¹⁴⁵ Brownsword, Christopher. “FP6 Project LIMES Demonstrating Space Applications in Maritime Surveillance and Countering Piracy.” Presentation. Space and Maritime Security – Strategies and Capabilities to Counter Piracy.

Wirtschaftskammer Österreich, Vienna, Austria. 30 November 2009.

¹⁴⁶ This section draws to a large degree on the insights provided by Gagnou, Bruno. op. cit.; Bressollette, Aurélie. op. cit.; Greidanus, Harm. op. cit.



Figure 26: Coastal Monitoring showing illegal migrants gathering for departure¹⁴⁸

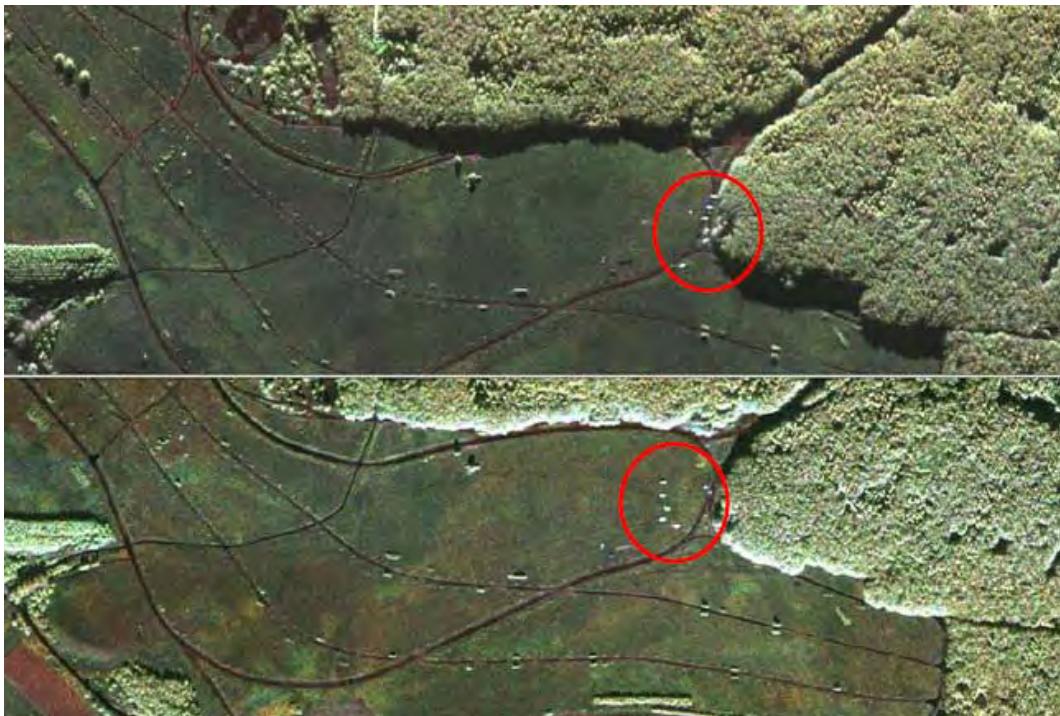


Figure 26: TerraSAR-X image showing vehicle movement¹⁴⁹

Optical images in combination with change detection can show groups of people accumulating at the coast (Figure 25), giving an indication of the possibility of a vessel with illegal migrants shortly leaving the coast (Figure 26) or pirates boarding their skiff. Satellite capabilities then depend on the destination (the distance) and the size of the vessel. Relatively large ships can be detected via SAR imagery based on previous suspicious indications. Without alert by, inter alia, intelligence, recognition that the vessel carries pirates would be impossible. Small vessels are far more difficult to track and to re-acquire in any subsequent satellite image. EO satellites

can help to detect and observe any abnormal concentration of ships.¹⁴⁷

Port-Side Security

The three stage process of change detection, change categorisation and change classification explained earlier can also be used for port monitoring,. Given the existing revisit

¹⁴⁷ Bressollette, Aurélie. op. cit.

¹⁴⁸ Ibid.

¹⁴⁹ Beer, Thomas. "The European Space Agency: A new Actor in Security and Defence." Presentation. NATO Space Workshop. Kalkar, Germany. 22 Apr. 2008.

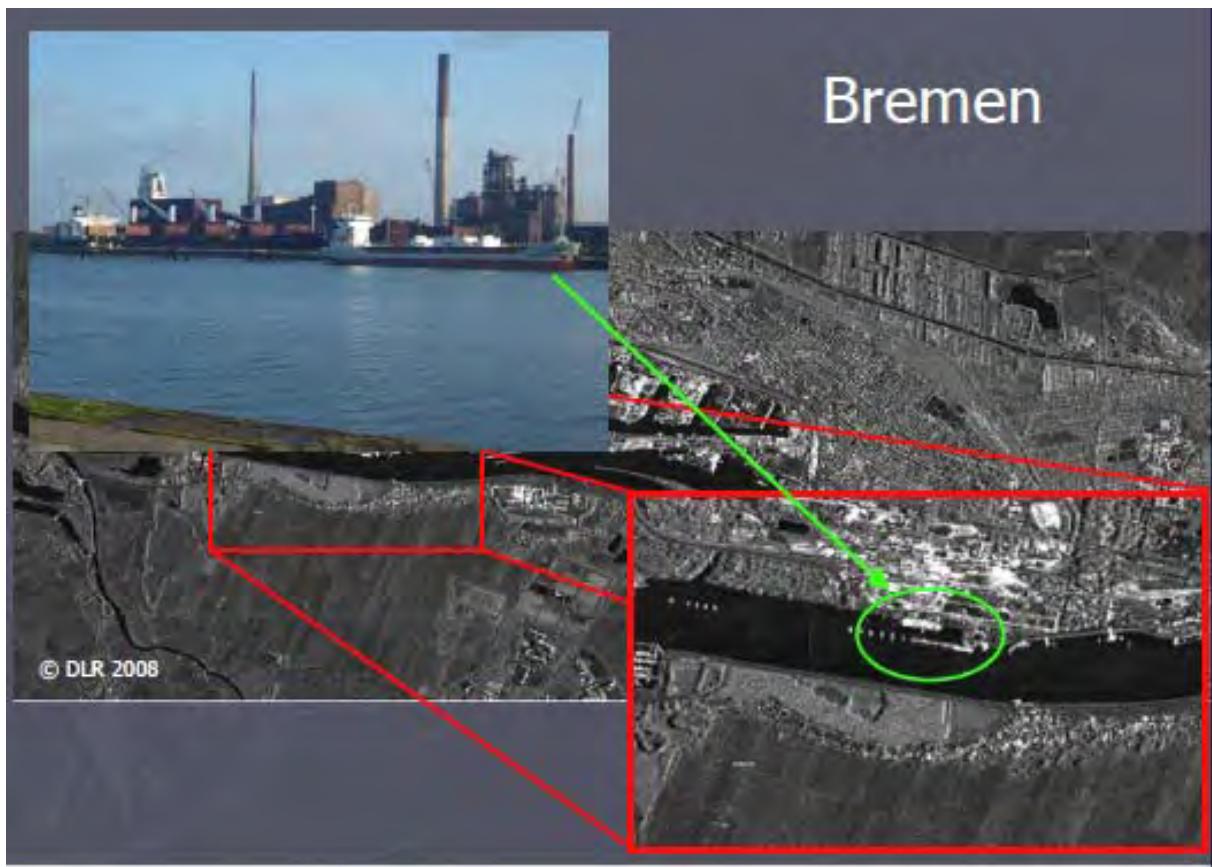


Figure 27: Example of the Use of Satellite Imagery for Port-Side Security¹⁵²

times, however, 24 hour monitoring is currently not possible.

A first step could be the mapping of the port including an assessment of the environment, the current situation and the potential risks.¹⁵⁰ High resolution EO satellites (e.g. Quickbird) can take detailed pictures, which provide the basis for more detailed maps. Feature level fusion techniques can be applied for extraction of man-made structures combining SAR and PolSAR data and combining SAR and hyper spectral data and are particularly useful for road detection. A classifier based on polarimetric decomposition methods is useful for detection of large roads in SAR and a specific detector for linear features is more effective for smaller roads.¹⁵¹ Tests and algorithms have recently been developed during the LIMES and GMOSAIC project, proving that the detection of even single con-

tainer boxes at port docks (in that case in the port of Valencia) is possible. Similarly, it is now possible to detect single houses as has been proven in rural Haiti and Colombia (Cucutá). Combined with local geospatial information, high resolution satellite imagery can provide updated infrastructure and terrain analysis. 2D modelling and risk mapping can be conducted on this basis, to determine vulnerabilities and predict potential hazards.

4.2.3 Space Applications and the Global Proliferation of SALW (Causative Factor 7)

About ninety percent of the world's cargo is transported in maritime containers, but customs authorities physically inspect only two percent, thus increasing the opportunities for illicit activities such as avoidance of customs duties, circumvention of quotas or smuggling of nuclear materials and weapons.¹⁵³ Border

¹⁵⁰ Institute for the Protection and Security of the Citizen & Sensors Radar Technologies and Cybersecurity Unit.

"Research Strategy Paper: Emerging Technologies in the Context of Security." Issued in the Framework of Science and Technology Foresight: Joint Research Centre, 2005. <http://serac.jrc.it/index.php?option=com_docman&task=download&Itemid=76&bid=22&limitstart=0&limit=5>.

¹⁵¹ "Man-made Object Classification Using Fused Polarimetric SAR and Hyperspectral Imagery Data (HYSAR)." 2006. Belgium Earth Observation Platform 30 Apr. 2009 <<http://eo.belspo.be/Directory/ProjectDetail.aspx?projId=789>>.

¹⁵² Hannemann, Ute. DeMarine. Presentation. Bremen: Gesellschaft für Angewandten Umweltschutz und Sicherheit im Seeverkehr. 30 Apr. 2010 <<http://www.dnnev.de/media/pdf/Vortrag%20Ute%20Hannemann.pdf>>.

¹⁵³ Joint Research Centre. "Maritime Surveillance ConTraffic: Monitoring Container Traffic." Joint Research Centre, 2008. <http://ipsc.jrc.ec.europa.eu/showdoc.php?doc=promotional_material/JRC42970_contraffic_leaflet.pdf&mime=application/pdf>.



agencies do not have the data to identify what is coming in; they do not possess the analytical capability to discern what to inspect and what to let pass through; they do not have the information systems to rapidly update databases and incorporate intelligence from other agencies; and they do not have the personnel to conduct meaningful inspections.

Often illegal goods such as drugs, small arms and light weapons (SALW) and weapons of mass destruction (WMD) or stolen cars are hidden behind innocent cargo, so that the ship seems to be a legitimate vessel. Smuggling can only be countered when ships are identified as suspect based on intelligence reports or upon detection. Large vessels can then be detected and tracked via SAR im-

agery, medium size vessels are difficult to re-acquire and small vessels are impossible to detect. Large vessels used for smuggling goods sometimes anchor off the coast to transfer the load to other vessels. Satellite imagery can detect such a vessel and identify it as suspect if it is found to stay at an off-shore location without reason and if smaller vessels are found moving between it and the coast (Figure 28). In order to detect the smaller vessels real-time availability is needed. High vessel speed, requiring fast reaction time, makes boats too difficult to detect by satellite imagery. Given the infrequent update rate, crossings are most likely missed.

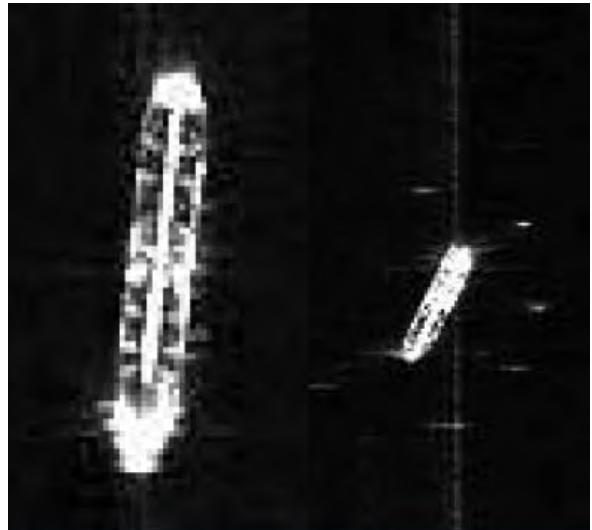
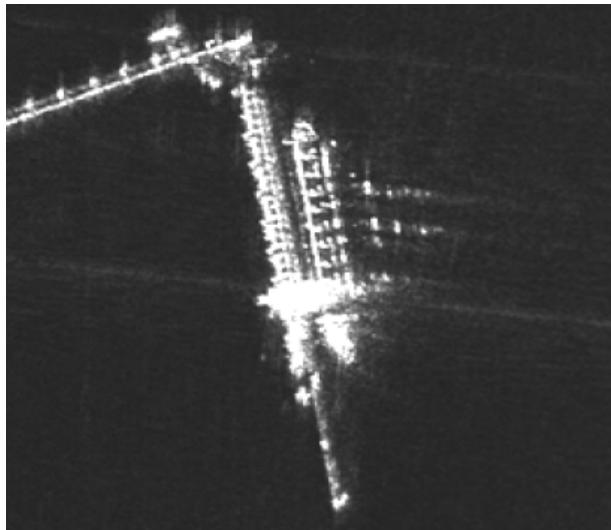


Figure 29 and Figure 29: X-Band SAR showing vessel structure and enabling identification, high resolution X-band enabling detection of small vessels close to larger vessel for monitoring of illegal transfer activities¹⁵⁴

¹⁵⁴ Ibid.

4.2.4 Comparative Matrix Showcasing Technical Capabilities and Limitations for each Causative Factor in the three different phases

Event Cycle	Causative Factor 4: Difficulties with Maritime Surveillance		Causative Factor 5: Lax Coastal and Port-Side Security		Causative Factor 7: Global Proliferation of SALW	
	Finding Pirate Intelligence Satellites and Imagery Processing	Bases: Tracking, Identification of Pirate Skiffs and Tracking of Hijacked Ships	Port-Side Security	Coastal Security	Global Proliferation of SALW	
<p>Pre-Attack</p> <p>Prevention</p>	<ul style="list-style-type: none"> continuous maritime surveillance (MarSur) SIGINT COMINT ELINT GEOINT IMINT (optical and radar) GEOspatial intelligence (GEOINT), geographic information system (GIS) tools, geographic management system (GMS) needed for context as a basis of analysis 	<ul style="list-style-type: none"> Vessel Traffic Service (VTS): provides comprehensive traffic imagery of all participating vessels and their intentions through monitoring of container traffic, identification of dangerous routes AIS-S can make worldwide maritime traffic surveillance a reality 	<ul style="list-style-type: none"> Risk mapping: mapping of critical sites including assessment of environment, current situation and potential risks EO imagery provides basis for maps of critical structures Risk mapping as a basis for database of critical sites 	<ul style="list-style-type: none"> satellite imagery and change detection techniques allow for detection of people accumulating at coast for departure; provides basis for where to look for boats 	<ul style="list-style-type: none"> tracking and tracing of ships (depending on vessel size, speed and length of travel route) 	
<p>Detection</p>	<ul style="list-style-type: none"> SIGINT COMINT ELINT GEOINT IMINT (optical and radar) for change detection Database of satellite imagery (from long-term monitoring) serves as basis for change detection Three step approach: (1) change detection; (2) change categorisation and (3) change classification GEOspatial intelligence (GEOINT), geographic information system (GIS) tools, geographic management system (GMS) needed for context as a basis of analysis 	<ul style="list-style-type: none"> SAR imagery allows for near-real time identification of a potentially dangerous unknown ship Detection and false alarm rates are sufficient only for some users and scenarios but need to be improved for others. Thus fusion with vessel traffic data from other sources (AIS, VMS, coastal radar, airborne patrol) needed AIS-S can make worldwide maritime traffic surveillance a reality; allows for application to cooperative and semi-cooperative ships for more accurate vessel traffic management (VTS): provides comprehensive traffic 	<ul style="list-style-type: none"> Monitoring provides for data on normal functioning which can be continuously compared to detect malicious interference Three step approach: (1) change detection; (2) change categorisation and (3) change classification 	<ul style="list-style-type: none"> satellite imagery and change detection techniques allow for detection of people accumulating at coast for departure; provides basis for where to look for boats transponders for tracking and tracing of the container ship detection and identification depending on size and intensity of ship traffic based on optical and radar imagery for detection of illicit events 		

Attack	Post-Attack	Lessons Learned	Rescue	Alert	Imagery on all participating vessels and their intentions	SatCom	SatCom	SatCom	Electronic systems inside the container monitoring movements and interference connected with an alarm and a monitoring centre
Identification of threat on the basis of intelligence sources	<ul style="list-style-type: none"> sea borders: SIGINT allows for identification of "bad guys" sea borders: satellite imagery and change detection techniques allow for detection of people accumulating at coast for departure; provides basis for where to look for boats with immigrants intelligence (GEOINT, GIS, GMS) needed as a context for the immediate response 	Lessons Learned	<ul style="list-style-type: none"> risk mapping can allow for detection of dangerous routes 	Alert	<ul style="list-style-type: none"> risk mapping can enable detection of dangerous routes 	SatCom	<ul style="list-style-type: none"> AIS Search and Rescue Transmitter (AIS-SART) to aid SAR aircraft in locating people in distress improved positioning through satellite navigation facilitates faster search and rescue missions 	SatCom	<ul style="list-style-type: none"> • electronic systems inside the container monitoring movements and interference connected with an alarm and a monitoring centre • AIS Search and Rescue Transmitter (AIS-SART) to aid SAR aircraft in locating people in distress • improved positioning through satellite navigation facilitates faster search and rescue missions
Limitations	pure imagery data is of limited use; need for placing in relevant context, analysis and assessment	Lessons Learned	GEOspatial intelligence (GEOINT), geographic information system (GIS) tools, geographic management system (GMS) needed for context as a basis of analysis	Alert	While tracking and detection of large and medium size vessels is possible, they currently cannot be identified as suspicious, threatening or as conducting an illicit mission; this needs to be done through intelligence challenge is to detect small boats which may be on the water for a very	SatCom	<ul style="list-style-type: none"> In situ data needed for threat identification and risk mapping Satellites can themselves be considered critical infrastructures and thus are vulnerable too sea borders: smugglers or illegal migrants at sea can only be identified upon prior identification by intelligence sources; need to know where to look for illicit behaviour Optical imagery is limited to cloud free conditions Swath of very-high resolution imagery is relatively small limiting its 	SatCom	<ul style="list-style-type: none"> • sea borders: smugglers or illegal migrants at sea can only be identified upon prior identification by intelligence sources; need to know where to look for illicit behaviour Optical imagery is limited to cloud free conditions Swath of very-high resolution imagery is relatively small limiting its

		<ul style="list-style-type: none"> suitability for ocean surveillance Optical imagery does not allow for identification of intermediate and small size vessels SAR imagery does not allow for vessel type identification Speed and direction based on wake detection is currently practically impossible While tracking and detection of large and medium size vessels is possible, they currently cannot be identified as suspicious, threatening or conducting an illicit mission; this needs to be done through intelligence Small vessels cannot be detected due to insufficient revisit time Challenge is to detect small boats which may be on the water for a very short time in a crowded area and to recognise hostile intent Data is available only at one instant, within a limited swath, with limited resolution and with limited detection probability and classification potential Detection and false alarm rates are sufficient only for some users and scenarios but need to be improved for others AIS-S is still not a world-wide reality Persistence of message collision problems in AIS-S
	<ul style="list-style-type: none"> Effective integration and assimilation of data and information from in situ and space-based observation necessary: need for common data standards and quality; EU currently has “islands of data” 	short time in a crowded area, and to recognise their hostile intent (spectral signal reflectance is insufficient)

Figure 30 Comparative Matrix Showcasing Technical Capabilities and Limitations for each Causative Factor in the three different phases



4.3 National Initiatives

Among national initiatives it is possible to distinguish between (1) satellites, i.e. imaging capabilities and (2) research and development projects. While their purpose or intention was originally different, they can be used in the fight against piracy for a variety of reasons.

National imaging capabilities can be used to counter Causative Factor 4: Difficulties with Maritime Surveillance as well as Causative Factor 5: Lax Coastal and Port-Side Security. They can also be used for maritime border surveillance (Causative Factor 7: Proliferation of SALW).

Radar imagery is provided by Germany's TerraSAR-X and Italy's Cosmo-SkyMed constellation. Both have already been used for maritime surveillance. Optical imagery is provided by SPOT IMAGE through Spot 2, 4 and 5, Formosat-2, Kompsat-2, Ikonos, EROS and Quickbird. With their medium to high resolution capability they offer small vessel detection (ca. 10 m) and large vessel classification. In addition SPOT IMAGE and SPOT Infoterra Group control a constellation of satellites, combining optical and radar capabilities. The Canadian RADARSAT-2 SAR-satellite, commercialised by SpotImage is also used for maritime surveillance in the context of border security. The future Sentinel satellites will be employed for a similar purpose as part of GMES.

4.3.1 National Capabilities improving Maritime Surveillance (Causative Factor 4)

Several European countries are pursuing R&D projects aimed at integrating satellite navigation with other technologies to obtain the most all-encompassing picture. Thus, Member States are again not primarily focussing on R&D projects related to piracy but rather take an all-encompassing approach towards improving maritime security as a whole.

Norway is working on a national maritime programme (SatHav) for using satellite Earth observation data in marine mapping, monitoring and warning. The French project GALILEOCEAN is aimed at optimising Galileo for maritime positioning. The final outcome will be a prototype receiver using a simulation platform. Italy is conducting the project Sicurezza nel Trasporto Marittimo (Safety in Sea Traffic), which develops and tests innovative advanced satellite navigation technologies supporting efficient implementation of Sea Roads. It also aims at reducing the

need for interventions at sea for rescuing pleasure boaters through preventive actions and targeting the search operations as far as possible.

As current AIS reception is limited to the range of coastal antennas, trials have been conducted with the ESSAIM constellation to pick up the signals from space so as to provide a space-based AIS. CNES and the French Ministry of Defence began a study on maritime security based on space means in early 2008 with the objective of improving tracking of ships through space-based AIS. Following some definition studies to be performed through bilateral cooperation, the programme could be proposed as a European service (possibly of GMES).¹⁵⁵ CNES is also working together with NASA on a radar ocean surveillance successor for TOPEX-Poseidon and Jason-1. Jason-2 is a four party Programme of EUMETSAT, NOAA, CNES and NASA.¹⁵⁶

Under the heading DeMarine, Germany is conducting research and development projects in the context of GMES. As part of this it is following ShipDetec and DEKO. Relying on TerraSar-X, Germany's project ShipDetec is currently investigating the correlation of satellite imagery with AIS for the purpose of detecting piracy, illegal immigration, illegal fishing and smuggling. Its project DEKO aims to improve maritime surveillance through combining optical data with TerraSAR-X data.

CNES is currently conducting a maritime surveillance project called S MAR.

National actors have also shown interest in the Land and Sea Integrated Monitoring for European Security. In the context of the FP 6 project LIMES, the French Navy was involved in a demonstration that took place in the Caribbean in June 2008 with the objective of fighting drug smuggling. Other navies (Spain, Italy) are together with FRONTEX involved in activities that will be demonstrated in the Atlantic, the North Sea and the Mediterranean Sea. The purpose of the French exercise was to provide satellite imagery (optical and radar) of vessel traffic in distant maritime areas. It focused on three main requirements specific to the job at hand:

- observe a large area on a regular basis and generate subsequent situation of vessels at sea

¹⁵⁵ Brudieu, P. "CNES and French MoD: A Common Approach for Security and Defence in Space." Presentation. ISU Annual Symposium. International Space University, Strasbourg, France. 18-20 Feb. 2008. <http://www.isunet.edu/index2.php?option=com_docman&task=doc_view&gid=737&Itemid=26>.

¹⁵⁶ European Space Agency/European Commission. op. cit. 19.

- observe hot spots on reduced timescales
- sort through a broad range of observation targets, and quickly process and deliver vessel detection information.

The French Navy was the end-user. As many as five satellites were used. Imagery was of two types – very high resolution for coastal and island zones, and high resolution for larger high sea areas.¹⁵⁷ The service providers produced intelligence and provided vessel traffic monitoring with the aim of delivering final products to support the monitoring, detecting and tracking of suspicious ships.¹⁵⁸ User-feedback showed that two hours after the satellite overpass, pre-processes imagery could already be provided. However, limitations were noted as to too low revisit time, optical imagery in cloudy conditions and that ships smaller than 30 meters were not visible. The French Navy also stressed that the 2-hour delay required for processing and transmission can be significant if you need to locate a ship in order to prepare an immediate intervention at sea. Demonstrations during the LIMES project showed that it is most effective to observe hot spots on reduced timescales. During demonstrations, movements in Spanish ports and borders close to Morocco were checked and illegal vessels were tracked leaving for the Canary Islands.

As many Member States are upgrading their surveillance infrastructure and deployment of AIS and coastal surveillance radar, there is growing interest in integrating additional surveillance capabilities at the EU level.¹⁵⁹

4.3.2 National Capabilities improving Coastal and Port-Side Security (Causative Factor 5)

Commission research has shown that VMS operational data sharing in general is relatively far advanced with respect to integration but at the same time quite restricted in any sharing outside the fisheries sector. National and regional sharing of AIS data is developing fast.¹⁶⁰

¹⁵⁷ "PORTRAITS OF GMES USERS - Intergovernmental Panel on Climate Change MEDSUN service French Navy in The Caribbean Polar swell alert." Window on GMES. Paris: Graham Deane, Infoterra Ltd, Coordinator of the BOSS4GMES project. 24. <<http://www.moon-oceanforecasting.eu/files/BOSS4GMS3-UK-BAT-final.pdf>>.

¹⁵⁸ Chapman, John. op. cit..

¹⁵⁹ Antonenko, Oksana, Bastian Giegerich Nigel Inkster, Raffaello Pantucci, Rahul Roy-Chaudhury. "FORESEC-Europe's Evolving Security: Drivers, Trends and Scenarios Deliverable D 2.2 Synthesis Report." FP 7 FORESEC, 2008.11.

¹⁶⁰ European Commission/ Joint Research Centre, Ispra. op. cit.

In December 2004 EADS was tasked by Portugal's Instituto dos Transportes e Portuário Marítimos (IPTM) to lead a Portuguese-German consortium in the introduction of a Vessel Traffic System (VTS) to monitor traffic off the coast of Portugal.¹⁶¹

The SMARTRegions (Space and Security Knowledge for Maritime Regional Development) project of the two Hanseatic cities Ventspils (Latvia) and Bremen (Germany) looks at potential mutual satellite-based technology application fields such as port/transport/ trade (port security, movement of goods, container security), maritime security / safety (detection of ship-source pollution, ship tracking/AIS, sensitivity mapping for coastal protection) and coastal and city environment.

Germany's project DEKO is also investigating the combination of optical data with TerraSAR-X data for port security.

Italy is undertaking a project on safe transport of dangerous goods, which tackles the intermodal connections with ports when dealing with transportation of dangerous goods (on inland waterways).

Germany's projects under the heading of DeMARINE focus on surveillance of the marine environment, coastal security, coastal zone management as well as port-side security.¹⁶² Specifically, its project ShipDetect aims at detecting illegal fishing.

4.3.3 National Capabilities Countering the Proliferation of SALW (Causative Factor 7)

France is conducting an R&D project called MODENA on a marine environment modelling platform for simulating maritime surveillance systems. It aims to integrate numerous methods and various technologies for ocean surveillance to counter, *inter alia*, illegal immigration and all types of trafficking. Additionally, France's GALILEOCEAN project is contributing to border security through ensuring the optimisation of the use of Galileo for coastal surveillance.

Germany's project ShipDetec is also aimed at countering smuggling.

¹⁶¹ Perrimond, Guy. "EADS: A World Leader in Maritime Surveillance." TTU International 232 (2009). 1.

¹⁶² More information on this project can be found on the project's website <www.demarine.de>.



Figure 30: Overview of National Initiatives tackling the three Causative Factors

4.3.4 Summarising National Initiatives tackling the three Causative Factors under Discussion

In addition to satellites, which can be used to counter all three Causative Factors, thirteen national projects directly dealing or touching upon the issue areas as covered by the three Causative Factors under discussion have been identified. It is particularly difficult to learn about the existence of national projects and initiatives.

Most projects aim at improving maritime surveillance as a whole, followed by those focussing on improving coastal and port-side

security. Fewer counter the proliferation of SALW. Thus, 13 out of 16 projects deal with phase 1, 2 and 3. It can be concluded that national projects cover the three phases of piracy almost equally. Considering the technical capabilities in these three phases, it can be concluded that most limitations relate to phase 2.

4.4 European Initiatives

Existing projects demonstrate a fragmented and uncoordinated European approach, even though EU stakeholders, EU Member States and industries participating in the debate are

	Total number of projects identified	Phase 1: Prevention	Phase 2: Alert, Warning and Rescue	Phase 3: Post-Attack (Lessons learned)
Projects improving maritime surveillance (CF 4)	8	x	x	x
Projects improving coastal and port-side security (CF 5)	5	x	x	x
Projects countering the proliferation of SALW (CF 7)	3	x		

Figure 31: Overview of National Projects in the three phases

convinced that "inter-pillar" and "inter-agency" cooperation should take place.¹⁶³ This situation should be considerably improved when GMES becomes operational. The goal is not to create an additional surveillance system but rather to set up an interface and integrate existing systems across sectors and borders.¹⁶⁴

GMES will contribute significantly to the surveillance of activities at sea mainly through its Marine Core Service (MCS).¹⁶⁵ In the long term, GMES requires a comprehensive and complementary set of operational space missions providing permanent and continuous observing capabilities at all levels (global, regional and local).¹⁶⁶ The purpose of the MCS is

- » to make available and deliver a set of basic, generic services based upon common-denominator ocean state variables that are required to help meet the needs for information of those responsible for environmental and civil security policy making, assessment and implementation.¹⁶⁷

The efficiency, safety and optimisation of marine transportation can benefit from satellite navigation. The GALILEO system will provide an advanced technological platform for the development of satellite-based surveillance applications. If surveillance and monitoring systems can be made more efficient and more compatible, ultimately allowing government agencies in the Member States

access to a fully integrated, single picture with complete information on ship movement and activities, all government activities concerned will benefit. This would also help Member States to carry out search and rescue activities more efficiently, thus preventing loss of life at sea.¹⁶⁸ Galileo will provide benefits for safety applications, safety improvements and automatic identification systems (AISs). It can also be used for port approaches.¹⁶⁹

It is possible to group projects according to the institutions conducting them, i.e. EU FP projects, ESA funded service elements or pure ESA projects, JRC projects and projects conducted by industrial consortia. Alternatively, one can group them according to the main objectives, i.e. (1) technology development or benchmarking of existing capabilities; (2) GMES or Galileo related projects and (3) projects related to coordination and the improvement of the entire EU approach.

The projects will be presented in the context of the Causative Factors of piracy. Most projects do not have a dedicated relevance for piracy but rather cover vessel tracking and maritime surveillance as a whole for various purposes and thus also have the potential to be used as an instrument in an EU counter-piracy operation. A further distinction will be made between operational satellite contributions and those in the research and development phase.

¹⁶³ Chapman, John. op. cit.

¹⁶⁴ Commission of the European Communities. SEC(2008)2337. op. cit.

¹⁶⁵ Chapman, John. op. cit.

¹⁶⁶ Detailed information on the Marine Core Service can be found in the documents listed on the GMES Website <<http://www.gmes.info/pages-principales/library/implementation-groups/marine-core-service-mcs>>.

¹⁶⁷ Ryder, Peter. "GMES Fast Track Marine Core Service – Strategic Implementation Plan." Of 24 Apr. 2007.

¹⁶⁸ Commission of the European Communities. SEC(2007)1278. op. cit.

¹⁶⁹ "Satellite Navigation Applications." op. cit.

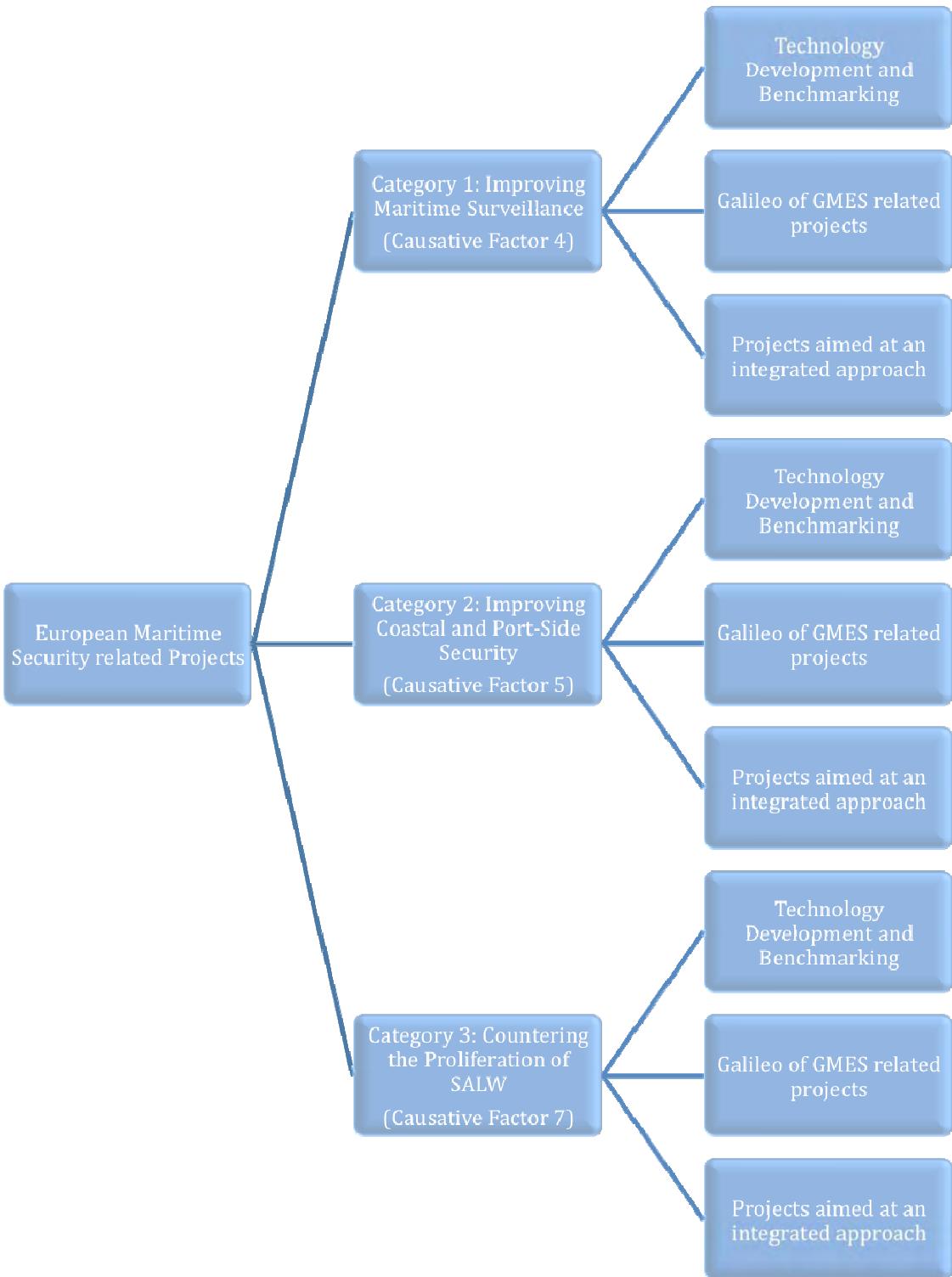


Figure 32: European Initiatives countering three Causative Factors

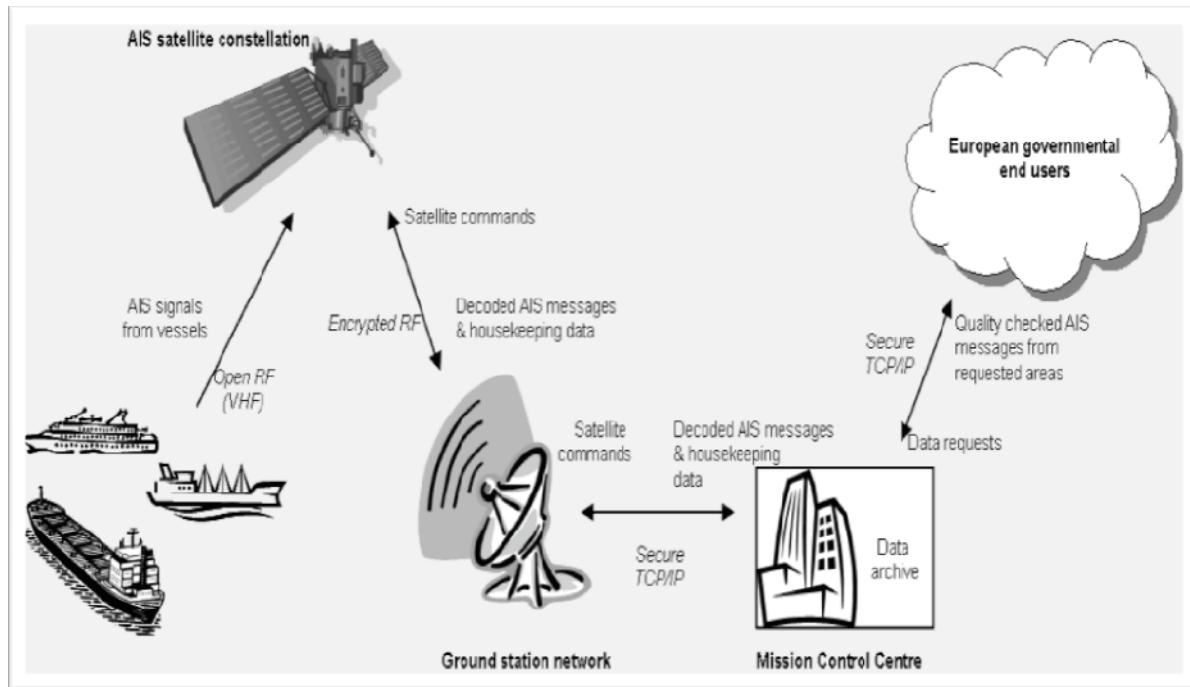


Figure 33: AIS Signal Detection from Space¹⁷²

4.4.1 European Projects Improving Maritime Surveillance (Causative Factor 4)

European R&D projects related to Technology Development and Benchmarking to Improve Maritime Surveillance

The FP 5 project DECLIMS conducted specific research with the aim of benchmarking both optical and radar sensors for vessel detection. While its results give a good overview of current capabilities and provide a basis for future missions,¹⁷⁰ the project's final report was published three years ago. EDA and NATO have undertaken their own research and development programmes on new EO sensors and system architecture. CNES and ESA are currently conducting a study on a possible European space-based maritime surveillance system.

It was concluded that satellites allow threat anticipation for vessel route forecasting. ESA is also exploring the feasibility of a system to pick up from space VHF signals emitted from ships' AIS. The European Commission,

through the JRC, in close collaboration with the European Space Agency (ESA), is working to establish whether and how such a system could become operational, in which case it would considerably increase the added value of AIS data.¹⁷¹ Several activities have been imitated by ESA and EC to validate AIS receivers, design first operational missions and develop complete space-based AIS constellations.

In 2008 ESA and the EC's DG MARE began cooperating on a European initiative for developing a capability for receiving AIS signals by satellites in support of EU maritime policy.

Two studies are funded by ESA's IAP and are running in parallel. One is led by OHB, which is responsible for the development of a full-fledged European space based AIS system (SPAIS).¹⁷³ In intermediate results, OHB concluded that in order to meet all requirements as defined a constellation of twelve satellites equipped with high performance receiver architecture, phased array antennas and intricate digital processing algorithms is needed. Most problems can be reduced by excluding vessels in coastal zones (including ports). "Considering all global water surfaces, the system is able to provide a detection

¹⁷⁰ See for example the Final Report of the DECLIMS Project on the JRC's website: Greidanus, Harm.

"DECLIMS: Detection, Classification and Identification of Marine Traffic from Space." DECLIMS FINAL REPORT. 27 Apr. 2007. JRC 19 Apr. 2010
https://maritimeaffairs.jrc.ec.europa.eu/web/declims/2?p_p_id=20&p_p_action=0&p_p_state=maximized&p_p_mode=view&p_p_col_id=column-1&p_p_col_count=1&_20_struts_action=%2Fdocument_library%2Fview_&_20_folderId=2482.

¹⁷¹ Commission of the European Communities. SEC(2008)2337. op. cit.

¹⁷² "EC-ESA SAT AIS JOINT INITIATIVE – Background & Status & Outlook." Presentation. EDA-ESA Meeting 25. Sept. 2009 Paris, France.

¹⁷³ Hennepe, F. te (et. Al.). "Space-Based Detection of AIS Signals – Results of a Feasibility Study into an Operational Space-Based AIS System." Bremen: Germany.

- **12 Satellites**
- **4 Orbit planes, 3 satellites per plane**
- Constellation: Streets of Coverage with
 - RAAN increment: 46°
 - True anomaly phasing: 60°
- Circular orbit:
 - 550km altitude
 - 88° inclination

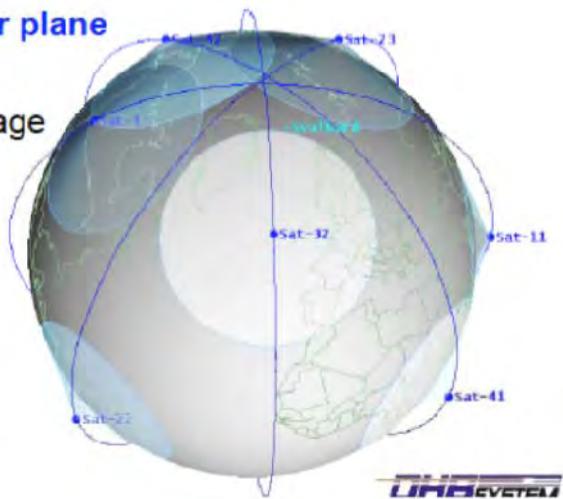


Figure 34: SPAIS Constellation Batch 1 by OHB (2014-2021)

probability of sixty-six percent within an update interval of one hour. With an update interval of three hours, this performance increased to 80 per cent".¹⁷⁴ As a first step, a so-called First Space Node (FSN) will be deployed, which is foreseen to supplement EMSA's coastal AIS network. The FSN comprises one to two spacecrafts to be optionally complemented by an optical IR payload for detection of non-cooperating vessels.

The other study is led by Telespazio. Furthermore LuxSpace is conducting a project for the assessment of space-born AIS receivers funded by DG MARE.

Additionally CNES aims to develop a constellation of Maritime Security and Safety (MSS) with AIS being only one of the sensors. Similarly, OHB is leading a study under an ESA contract on a Space-based Maritime Reconnaissance and Surveillance System (SMRS) including an AIS payload. It is analysing the feasibility of integrating potential payloads for maritime surveillance onto a low-cost platform and aims at providing data products for maritime surveillance on an operational basis with the intention of generating data fusion of these products.

In parallel, TAS is following several comparatively small contracts funded by CNES in order to study further the problem of data collision for really dense areas, or to support the French position towards regulatory bodies.

AIS-S for Europe will provide a promising system for improving maritime surveillance for cooperative and semi-cooperative ships

and thus improve border protection and piracy prevention as well as supporting search and rescue operations.¹⁷⁵ The AIS-S system will be capable of detecting an average of more than ninety percent of ships worldwide¹⁷⁶ (including dense maritime areas) in less than two hours.¹⁷⁷

EADS Astrium and SPOT Image SA are explicitly covering piracy in their provision of imagery intelligence.¹⁷⁸ Imagery acquisition, image production, intelligence extraction and its transmission (use of secure VPN-type connection) takes two hours, so that the use of satellites for operational needs provides a near real-time pre-tactical surface situation. Targeted information acquisition in specific areas is carried out and may be merged with other data from automatic identification systems (AIS, VMS, LRIT) in order to complete maritime situation awareness.

Operational since 30 June 2009, the EU LRIT DC provides Member States, on request, with the LRIT information of any third country vessel bound to, or sailing within, EU waters. Drawing on LRIT messages picked up by satellites (e.g. Inmarsat and Iridium) it is possible to track any ship within a 1,000 nautical mile zone of a participating State's coastline independent of the flag of the ship. The EU

¹⁷⁵ Gagnou, Bruno. op. cit.

¹⁷⁶ Performances provided with a fleet distribution estimated for the next 15 years.

¹⁷⁷ Gagnou, Bruno. op. cit.

¹⁷⁸ Perrimond, Guy. "Maritime Surveillance by Satellites."

TTU International Bimonthly Newsletter on Defence and Strategy (May 2009).

<<http://www.ttu.fr/english/endocpdf/EADSpiracy2009.pdf>>.

¹⁷⁴ Ibid.

LRIT DC tracking data can be used for security related positioning requests.¹⁷⁹

ESA's ERS satellites have been used for testing and demonstrating the feasibility of using EO satellite data in different maritime policy areas. Among other results, the ERS mission advanced vessel detection. Processing near-real time products from ENVISAT's Advanced Synthetic Aperture Radar (ASAR), ESA is able to create maps revealing European shipping routes.¹⁸⁰

In the context of improving maritime surveillance, in 2002 the Commission initiated a project named SafeSeaNet (SSN), which is limited to incident and accident management and does not involve satellites at present. SSN is capable of tracking and following ships and obtaining information on their cargoes. Operational responsibilities were transferred from the Commission to EMSA in 2004. EMSA will examine the possibility of integrating other applications and functionalities into SafeSeaNet (e.g. waste notification messages). There are also indications that SSN might become part of a larger system in support of the development of a comprehensive EU vessel traffic monitoring and information system¹⁸¹.

The Commission (DG Maritime Affairs and Fishery) has indicated¹⁸² that, in the long term, it will develop a system for Maritime Situational Awareness for Coast Guard Operations, which will support anti-piracy missions and allow for extended tracking of contacts of interest as was needed, for example, as part of the Active Endeavour mission. It will also look into the development of an improved traffic management system allowing for anomalous behaviour detection in the context of improved maritime traffic surveillance and tracking.

European R&D projects related to GMES or Galileo Improving Maritime Surveillance

The FP5 project Nauplius aims to improve Galileo services in the area of maritime surveillance. Particularly, it has demonstrated the added value of Galileo's positioning and SAR services for maritime transport surveillance and related services with regard to sea traffic management, the transportation of

¹⁷⁹ European Maritime Safety Agency. "The EU LRIT Data Centre is in Production." op. cit.

¹⁸⁰ "ESA map reveals European shipping routes like never before." News 22 May 2009. European Space Agency 29 May 2009
www.esa.int/esaEO/SEMBDI0OWUF_index_2.html.

¹⁸¹ Detailed information on EMSA's SSN can be found here: European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 5-8.

¹⁸² See Mattila, Isto. op. cit.

dangerous goods, search and rescue, and piracy and terrorist incidents. Nauplius among other things has integrated satellite links with AIS.¹⁸³

As AIS depends on satellite navigation, Galileo will improve AIS reliability thereby contributing to increased safety and vessel traceability. The high accuracy and signal availability of a combined Galileo/GPS receiver are ideal for navigation in the open sea. The integrity information contained in the Galileo signal adds confidence in the calculated position of a vessel. Galileo will be an additional means of implementing the regulations on Automatic Identification Systems (AIS) and vessel traffic management systems to increase navigation safety and collision prevention in line with IMO requirements.¹⁸⁴

In the context of GMES, LIMES and MARISS are probably the most prominent projects focussing on the use of technology for detection and deterrence of illegal activities. Their primary objective is to show the added value of earth observation (both optical and radar) from space combined with other technologies for monitoring vessels.¹⁸⁵

Within its maritime surveillance cluster, the FP 6 project LIMES aims to supplement current surveillance measures such as coastal radar and airborne and ship-based surveillance with satellite sensors. Its main objective is to monitor both vessels and cargo movements for reasons of maritime safety, policing and border security.

ESA is funding MARISS (MARitime Security Service project), a GMES service element for vessel detection, a Vessel Tracking System and an Automatic Identification System with Earth Observation satellite data.¹⁸⁶ It focuses on (1) near real time tactical monitoring of vessel movements and (2) strategic monitoring for anomaly detection and threat characterisation. By researching

- » the combination of non-cooperative wide area detection (based on EO imagery) with more limited area cooperative identification systems, ensuring that any tampering (whether accidental or delib-

¹⁸³ An outline on the NAUTILOS project can be found at <http://nauplius.cnes.fr/Pres.htm>.

¹⁸⁴ Galileo Joint Undertaking. "Galileo Application Maritime." October 2002. 30 July 2009
http://ec.europa.eu/transport/galileo/doc/galileo_application_maritime.pdf; Feuerbacher, Berndt and Heinz, Stower. op. cit. 260.

¹⁸⁵ Commission of the European Communities. SEC(2008)2337. op. cit.

¹⁸⁶ Mastracci, Federica. "European Maritime Security Services." MARISS NEWSLETTER # 1. 19 July 2006; "European Maritime Security Services (MARISS)." 30 July 2009 <http://www.gmes-mariiss.com/sections/theproject/objectives.html>.



erate) with identification systems does not result in a particular vessel being invisible to maritime surveillance authorities¹⁸⁷

it will also have an impact on the detection of pirate vessels. MARISS also researches

- » the combined coverage of as wide an area as possible using satellite and airborne surveillance systems with coastal systems, meaning that limited temporal coverage of open waters by satellite and aircraft can be combined with regular temporal coverage of limited area coastal waters by AIS and coastal radar resulting in a significant improvement to the overall recognised maritime picture.¹⁸⁸

While MARISS explicitly mentions collaboration with other FP projects in maritime security, the difference between MARISS and LIMES is not that obvious. Both seem to conduct vessel tracking. LIMES is focussed on improving the performance characterisation of the different satellite radar systems and their various operating modes with respect to the detection and identification of types of vessel and the impact of different environmental and viewing conditions. Thus newly-derived algorithms can provide an improved basis for integrating the different data streams within any future follow-on activity to MARISS.

The FP 6 project MERSEA (Marine Environment and Security for the European Area) was aimed at developing an ocean monitoring system envisioned as an operational networking acquiring data from EO satellites, in-situ ocean observing networks and weather prediction agencies.

OHB is leading a preliminary industrial study investigating space infrastructure and the concept of operation in the context of the security dimension of GMES.

European R&D Projects Related to Establishing an Integrated Approach to Maritime Security Improving Maritime Surveillance

The JRC institutional action on maritime surveillance (MASURE) aims at developing and providing scientific expertise that is essential for policy makers, particularly with regard to the desirability and feasibility of an integrated plan for EU-wide maritime surveillance (in line with the Green Paper), that fits with the GMES objectives but is not primarily aimed at technology development for GMES. MASURE started in 2007 and aims to develop tools for data fusion and integration of the difference

¹⁸⁷ "European Maritime Security Services (MARISS). op. cit.

¹⁸⁸ Ibid.

sources of vessel traffic information. Technology transfer to other agencies is planned.

FP 6 project MarNIS, involving port authorities, ship owners, harbour masters, pilots and search and rescue authorities, focuses on improving exchange of information and aims to develop Maritime Navigation and Information Services on a pan-European basis.¹⁸⁹ MarNIS is directly linked with the Commission Initiative to develop a future maritime policy as put forward in the Green Paper.¹⁹⁰

The FP 7 project MyOcean, a joint EC and ESA initiative, is a first step towards the implementation of the Marine Core Service. Aiming at providing the best possible information available on oceans, it is working on the combination of space and in situ observation and their assimilation in numerical models. Its main objective is to set-up an integrated pan-European capacity for ocean monitoring and forecasting. It particularly aims at integrating Member States' capacities and procedures so as to avoid resource duplications and define European procedures, organisations as well as a European architecture.

The FP 7 project OPERAMAR (An InterOPERABLE Approach to European Union MARitime Security) is intended to provide the foundations for a pan-European Maritime Security Awareness by addressing the insufficient interoperability of European and national assets with a view to fusing data into a common comprehensive picture, thereby overcoming the division into national and EU initiatives.

Similar to OPERAMAR, the Commission in 2007 called for the establishment of a European Marine Observation and Data Network¹⁹¹ (EMODNET) integrating existing but fragmented initiatives in marine data collection.¹⁹² EMODNET will contribute to INSPIRE with respect to data sharing and marine standards and will facilitate the GMES's marine core service.¹⁹³ Likewise, the FP 6 project SeaDataNet is constructing a standardised system for managing the large and diverse data sets collected by oceanographic fleets and new automatic observation sys-

¹⁸⁹ Commission of the European Communities. SEC(2008)2337. op. cit.

¹⁹⁰ "MarNIS - Maritime Navigation and Information Services." Maritime Navigation Information Service 30 July 2009 <<http://www.marnis.org/home.asp>>.

¹⁹¹ Commission of the European Communities. SEC(2007)1278. op. cit.

¹⁹² cf. Commission of the European Communities. Commission Staff Working Document - Building a European marine knowledge infrastructure: Roadmap for a European Marine Observation and Data Network. SEC(2009) 499 final of 7 April 2009. Brussels: European Communities.

¹⁹³ Ibid.

tems, thereby networking and enhancing currently existing infrastructures. It mainly covers multidisciplinary datasets relevant to the monitoring of ocean State and health (e.g. distribution of heat and salt concentrations, sea level and currents, but also data related to living marine resources and ecosystems such as nutrients and oxygen), which are of limited use for counter-piracy purposes.¹⁹⁴ Synergies between marine data collection and maritime security data should be built in right from the start.

The SEABILLA project (2010-2014) aims to integrate the results of the preceding research and development projects (i.e. OPERAMAR, LIMES, WIMAAS etc.) in the area of improving detection and identification of non-collaborative ships.

PERSEUS (2011-2015) is a demonstrative project that aims at experimenting with the establishment of an all encompassing European maritime surveillance system which would integrate existing national platforms in an innovative way.¹⁹⁵

The Commission's call for pilot proposals (MARE/2009/04) for a pilot project for the integration of surveillance in the North Sea Basin resulted in the MARSUNO project. MARSUNO aims at

- testing the capacity of project partners to exchange surveillance and monitoring information
- testing joint maritime surveillance operational procedures between law enforcement authorities
- determining the extent to which project partners are able to set up an exchange of information mechanism at a cross sectoral and cross border level
- identifying the legal, administrative and technical obstacle hindering the exchange of information on a long-term basis
- identifying the acquired experience in exchanging the information, best practices and/or legal adjustments needed to overcome the obstacles identified
- determining the extent to which this co-operation between project partners has

resulted in added value, both in qualitative and quantitative terms.¹⁹⁶

The BLUEMASSMED project aims to define the architecture of the future Europe-wide Maritime Surveillance Network, allowing interoperability among all Maritime Surveillance Systems. It develops methodologies and procedures common to all European nations and aims to mobilise partners around a concrete and practical process starting by requirement analysis, defining a coherent frame and leading to a field demonstration of a shared basic common maritime picture (SBCMP).¹⁹⁷

EMSA is currently working on an Integrated EU Maritime Surveillance Network. Taking SSN as a basis and adding all other services, EMSA aims at making a comprehensive network available to all interested users who can then add their specific information. While already technically feasible, this project is currently hindered by the need to clarify access rights and ownership of data as well as the confidentiality of data.

EDA started the Project Team MARSUR in 2006 in order to develop a European Maritime Surveillance System (EMS) based on maritime information exchange through a "Maritime Exchange System" (MEXS). With a minimum of modification, existing surveillance systems shall be combined. It is currently in the demonstration phase and should be operable by 2012. Additionally EDA is working on the project GlobMarSit, which intends to develop "contributing Research and Technology elements to a European recognised maritime surveillance picture" with an eye to improving the global efficiency of exchanging relevant information in the best possible way, building on national systems and capabilities.¹⁹⁸

Most of these projects have been summarised in Figure 36.

¹⁹⁴ Pan-European infrastructure for Ocean& Marine Data Management. "SeaDataNet." 30 July 2009
<http://www.seadatanet.org/>.

¹⁹⁵ Le Bail, Yves. "Les Project en cours de la Surveillance Maritime Européenne." Presentation. WEU Seminar on European Maritime Surveillance. King George Palace, Athens, Greece. 10-11 May 2010.

¹⁹⁶ DG for Maritime Affairs and Fisheries. Call for Proposal. MARE/2009/04. Brussels: European Communities

¹⁹⁷ For more information consult the projects website
www.bluemassmed.net.

¹⁹⁸ "KSPT signs contract with European Defence Agency on GlobMarSit." Kongsberg. 28 May 2010
http://www.spacetec.no/news_store/kspt-signs-contract-with-european-defence-agency-on-globmarsit.

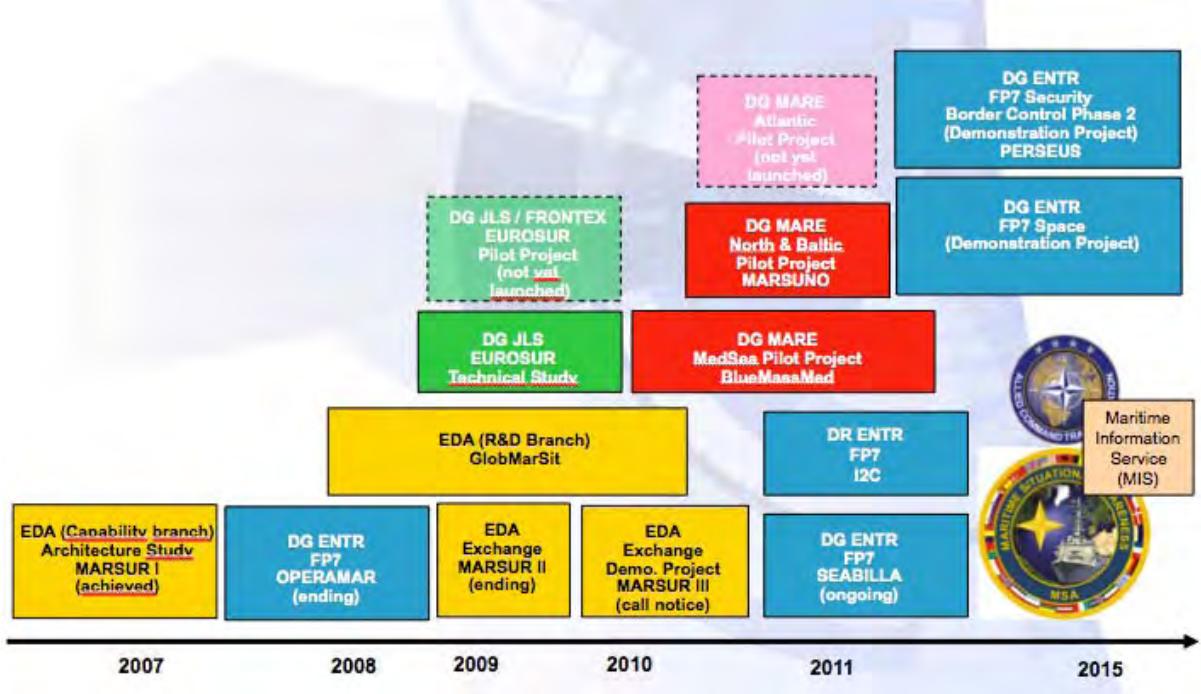


Figure 35: Building of the European Maritime Surveillance System¹⁹⁹

4.4.2 European Projects Improving Coastal and Port-Side Security (Causative Factor 5)

European R&D projects related to Technology Development and Benchmarking Improving Coastal and Port-Side Security

- Coastal Security

Community services look to fisheries control and environmental protection for coastal security.

The JRC is working on a Vessel Detection System (VDS) correlating VDS with AIS and VMS in real-time for fisheries policy control only. Limited to fisheries control, such a system would initially mainly improve coastal security, depriving Somalia's pirates of their "Robin Hood" argument. Secondly, an extension of this system to other applications would improve vessel detection in general thereby improving the general area of maritime surveillance (Causative Factor 4). EMSA's Vessel Monitoring System is a quite similar service based on satellite services, which also solely covers fishery while EMSA's CleanSeaNet (CSN) is limited to oil spill detection (Satellite SAR based pollution detection) and aims at combating maritime pollution.²⁰⁰ CSN has been operational since 2007.

These different systems are the prime example of the Commission's fragmented approach to maritime surveillance. The Commission however now seems to be working on the integration of these three surveillance systems (SSN, CSN and LRIT) (the objective is 2010) into the SSN Tracking Information Relay and Exchange System (STIRES). A new Maritime Support Services Centre has already been set up in Lisbon for the overall management of the SSN, CSN and LRIT systems.²⁰¹

The JRC has also developed an Eclipse RCP-based tool for Search Unidentified Marine Object (SUMO) which is used in collaboration with national agencies to police fisheries. By law, fishing vessels are required to retrieve their location from GPS and report it to authorities every two hours. SUMO takes that data and compares it to high-resolution satellite imagery. This way it is possible to determine whether the activities on the ocean match with the positions reported. While it is primarily used for policing of fisheries, it could in the future be used against any tampering thus preventing fake VMS positions reporting.²⁰²

¹⁹⁹ Le Bail, Yves. op. cit.

²⁰⁰ For further information on CSN see for example the related analysis in: European Security and Defence As-

sembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 5-8.

²⁰¹ For further information on CSN see for example the related analysis in: European Security and Defence As-sembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 5-8.

²⁰² Joint Research Centre. "European Commission Helps National Agencies Monitor Fishing Activity using RCP."

- Port-Side Security

European R&D projects cover ports mainly in the context of improved transport security (ports as the intersection between land and sea transportation and the point of handling of most cargos) or in the context of critical infrastructures (disrupting the functioning of a large seaport will result in disruption of huge amounts of transport goods).

The FP 7 project SECTRONIC (Security System for maritime infrastructures, ports and coastal zones) addresses observation and protection of critical maritime infrastructures, i.e. passenger and goods transport, energy supply and port infrastructures. It aims at preventing them from being damaged, destroyed or disrupted by, among other things, criminal activity and malicious behaviour. Specifically it offers a small area surveillance system, which accurately observes, characterises and tracks any object of significance, 360 degrees around an infrastructure, 24 hours a day in all weather conditions.

The JRC is currently involved in the FP 7 project VESPO (VEssel Surveillance and POrt security),²⁰³ aimed at improving vessel detection through the development of algorithms in satellite radar images for improved port security. Additionally, it supported the former DG TREN (now: DG MOVE) to provide guidelines for the most efficient application of the new port security regime, thereby focusing on the technologies necessary to fulfil the functional security requirements in the technical domain.

The FP 7 project SOBCAH will provide an efficient, real-time, user-friendly, highly automated surveillance system to be deployed in the larger European Ports to counter organised crime.

EADS Defence & Security is developing an intelligent system (Integrated MARitime SECurity System) for border security, which integrates cameras, radar, UAVs and satellites for border surveillance and security and also aims at improving the protection of seaports.²⁰⁴

European R&D projects related to GMES or Galileo Improving Coastal and Port-Side Security

In a second project cycle, LIMES also focuses on the monitoring of ports as critical infrastructures building the interface between oceans and cities, often handling critical substances and being industrial in character. LIMES has conducted different demonstrations in order to gain data on port monitoring. Among other things a simulation of attacking vessels at the port of Valencia and the port of Cork was conducted. Even a terrorist attack targeting the energy storage tanks and docks as well as the overall port and harbour infrastructures was simulated. A simulation of exploding tanks was carried out using proven dispersion models, such as weather data from weather satellites used to determine the impact in adjacent urban and industrial areas. During the demonstration in the port of Cork, the exercise was complemented with an evacuation simulation (i.e. road transit and ambulance access times to un-affected hospitals) and the inclusion of a GIS based decision making tool in the local safety plans.

R&D Projects related to Establishing an Integrated Approach to Maritime Security Improving Coastal and Port-Side Security (Causative Factor 5)

EADS is offering the IMARSEC sub-systems suite. It is an integrated system developed for the global security and safety of seaports, coastlines, territorial waters and exclusive economic zones (EEZs). It has already been used to monitor traffic off the coast of Portugal, for surveillance of the maritime border, coastal and land protection of Qatar, and in a specific project called "Tanger Med" securing the new seaport of Tangier in Morocco.²⁰⁵

4.4.3 European Projects Countering the Proliferation of SALW (Causative Factor 7)

European R&D projects related to Technology Development and Benchmarking Countering the Proliferation of SALW (Causative Factor 7)

European projects seem to cover mainly illegal immigration and drug trafficking rather than the transport of illegal goods as a whole. None of the projects directly deals with the transport of weapons but they rather focus on securing the content of containers.

²⁰⁵ Perrimond, Guy. "EADS Positioning – EADS: A World Leader in Maritime Surveillance." TTU International Bi-monthly Newsletter on Defence and Strategy (May 2009). <<http://www.ttu.fr/english/endocpdf/EADSpiracy2009.pdf>>.

2007. 30 July 2009
<<http://www.eclipse.org/community/casestudies/jrcfinal.pdf>>.

203 "Institutional Action -Vessel Surveillance and Port Security (VESPO)." Institute for the Protection and Security of the Citizen. 30 July 2009
<<http://ipsc.jrc.ec.europa.eu/showaction.php?id=28>>.

204 EADS. "The Step Beyond – Sicherheit in einer veränderten Welt." Issue 1.2009. 50-1.

JRC in collaboration with the European Anti-Fraud Office (OLAF) is developing the project ConTraffic, monitoring container traffic. The ConTraffic System has become one pillar of the JRC's institutional action MASURE. Through ConTraffic, systematic gathering and analysis of data on global maritime container movements and subsequent identification of potentially suspicious consignments may become possible. The project is being carried out in the framework of mutual assistance between EU customs. ConTraffic directly tackles the issue of supply chain security by giving custom authorities information on the whole transport route rather than just the start and end points. In addition to the ConTraffic project, several industrial consortia are conducting research and development projects for container and supply chain security.

In this regard Bosch is working on a transport supply chain security initiative. Like ConTraffic it covers the whole transport chain but additionally also monitors interference with the container through a plug and play container security box (CSB) which is connected to a 24/7 – 365 days alarm management coordination centre. Thus it not only tracks the container through its entire route but also secures its content and sends an alarm if the container content is tampered with.

The industrial consortium project SeCureSystem (EADS astrium, EUROGAT, Hellmann worldwide logistics, MSCGATE) also aims to develop smart and secure logistics services. In addition to offering ground-independent and worldwide position determination of containers through GPS, SeCureSystem offers permanent real-time data transfer via communications satellites enabling world-wide availability of all data and documents, electronic creation and signing of loading and customs documents by authorised persons, and goods-condition monitoring and coding of all data.

The Commission has further indicated²⁰⁶ that the following community services including satellite applications are in a pre-operational development phase: (1) maritime border control for detection and tracking of vessels, (2) anti-drugs traffic surveillance and (3) pre-frontier intelligence collection (monitoring of ports and coasts for border security).

European R&D projects related to GMES or Galileo Countering the Proliferation of SALW (Causative Factor 7)

In the context of the FP 6 project LIMES, the JRC together with EADS Astrium, EUSC, SPOT

²⁰⁶ See for example Mattila, Isto. op. cit.

Image, Nev@antropic and the French Navy conducted a thirty-day long demonstration in Caribbean waters on data provision in an ongoing anti-drug and counter-piracy operation of the French Navy.²⁰⁷ In this demonstration Astrium conducted pre-operational information gathering from different sources for improved intelligence. Astrium deployed an operational satellite information platform for combating drug trafficking over Caribbean waters with the objective of anticipating a next-generation integrated system. It provided a high value added service from satellite tasking down to ship detection reports. Similar technologies could surely also be used for the illegal trafficking of SALW.

The FP 7 project G-MOSAIC primarily provides the EU with intelligence data to be applied in treaty and border monitoring for non-proliferation of illegal activities. In this context it offers monitoring of border crossing and related infrastructure along the border as part of its service chain.

R&D Projects related to Establishing an Integrated Approach to Maritime Security Countering the Proliferation of SALW (Causative Factor 7)

FRONTEX is developing a permanent regional border security concept, the European Patrols Network (EPN). It is based on the preceding studies MEDSEA and BORTEC, which explored the feasibility of the establishment of a Mediterranean Coastal Patrol Network (MEDSEA) and the technical feasibility of establishing a surveillance system covering the whole southern maritime border of the EU and the Mediterranean Sea. MEDSEA had already called for the implementation of a global approach to migration through the development of a permanent Coastal Patrol Network. It also has the advantage of offering Member States the possibility of coordinating their patrol schedules, pooling their civilian and military assets and exchanging strategic and tactical information in real time.²⁰⁸ EPN is limited to the Mediterranean region but might be a model for other similar networks until a global structure can be agreed upon.

The integration of the EPN into the European Surveillance System (EUROSUR) is also foreseen. Both GMES and Galileo will contribute

²⁰⁷ Greidanus, Harm. "JRC R&D activities related to border surveillance." FP 7 Demo Program Workshop, Brussels, 12 March 2009.

²⁰⁸ Commission of the European Communities. Communication from the Commission to the Council Reinforcing the management of the European Union's Southern Maritime Borders. COM (2006) 733 final of 30 Nov. 2006. Brussels: European Union.

to EUROSUR.²⁰⁹ The Commission recommended a three-phase approach: (1) interconnection and rationalisation of border surveillance systems at national level; (2) improving the performance of surveillance tools at EU level; and (3) creation of a common monitoring and information-sharing environment for the EU maritime domain.²¹⁰ Currently, EUROSUR seems to be focussed on illegal immigration. EUROSUR would constitute a decisive step in the further gradual establishment of a common European integrated border management system.²¹¹

4.5 The EU ATALANTA NAVFOR Mission

During the summer of 2008 the EU set up a coordination cell (EU NAVCO) in Brussels with the objective of coordinating the resources made available by the Member States for escorting ships off the coast of Somalia. In November 2008 the Council decided to launch the EU ATALANTA NAVFOR ESDP operation into which the activities of the EU NACVO were incorporated. ATALANTA NAVFOR supports the UN Security Council resolutions 1814, 1816, 1838 and 1846 adopted in 2008.

4.5.1 Mandate, Objectives and Member States' Contributions

The mission's objectives are:

- the protection of vessels of the World Food Programme (WFP) delivering food aid to displaced persons in Somalia;
- the protection of vulnerable vessels sailing in the Gulf of Aden and off the Somali coast and the deterrence, prevention and repression of acts of piracy and armed robbery off the Somali coast
- employ the necessary measures, including the use of force, to deter, prevent and intervene in order
- to bring to an end acts of piracy and armed robbery which may be committed in the areas where they are present.²¹²

²⁰⁹ Chapman, John. op. cit.; Commission of the European Communities. SEC(2007)1278. op. cit.

²¹⁰ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 5-8.

²¹¹ Commission of the European Communities. COM(2008) 68 final. op. cit.

²¹² This section is largely based on the EU's information on the mission found in: EU Council Secretariat. "EU Naval Operation Against Piracy (EUNAVFOR Somalia – Operation ATALANTA)." Press Release of Nov. 2009.

With the EU and its Member States providing financial support in terms of planning and capacity building to the AMISOM mission, ATALANTA NavFor has also been tasked to protect ships helping to sustain AMISOM or deploying AMISOM reinforcements.

In practice EU ATALANTA NAVFOR conducts three types of mission:

- escorts of WFP ships, in particular from Mombasa to Mogadishu;
- escorts in connection with the Transit Group concept, whereby several ships are grouped into convoys in order to cross the Gulf of Aden. An International Recommended Transit Corridor (IRTC) has been established for that purpose, in agreement with the IMO and the U.S. authorities;
- routine patrols in the Gulf of Aden with a view to detecting pirate ships and deterring acts of piracy (coastal security).

These objectives have not been prioritised. The mission was first set-up for twelve months and has recently been extended until the end of 2010. The Council has recently requested the High Representative

- » to prepare work for the potential further extension of Operation Atalanta beyond December 2010, for consideration by the Council in due time, taking into account operational requirements.²¹³

The Area of Operation (AOO) consists of 1.4 million square nautical miles and is composed of several zones: the south of the Red Sea, the Gulf of Aden and southern coasts of Somalia up to 500 miles, and the area surrounding the Seychelles islands, representing an area comparable to that of the Mediterranean.

The military personnel involved in the operation can arrest, detain and transfer persons who are suspected of having committed or who have committed acts of piracy or armed robbery in the areas where they are present. They can seize the vessels of pirates or the vessels captured following an act of piracy or an armed robbery and which are in the hands of the pirates, as well as the goods on board. The suspects can be prosecuted, as appropriate, by an EU Member State or by Kenya under the agreement signed with the EU on 6

<http://www.consilium.europa.eu/uedocs/cmsUpload/090325FactsheetEUNAVFOR%20Somalia-version4_EN.pdf>; and the analysis in Fuhrmann, Christian, and Dieter Berg. op. cit.

²¹³ Council of the European Union. Council Conclusions on CDSP of 26 Apr. 2010. Luxembourg: European Communities. 5.



Figure 36: AOO of ATALANTA NAVFOR²¹⁴

March 2009 giving the Kenyan authorities the right to prosecute.

Operation ATALANTA NAVFOR is commanded from the Operational Headquarters (OHQ) at Northwood, UK, where the mission was planned and conducted. Additionally the naval force is commanded from the Force headquarters (FHQ) on board of HNLMS EVERSEN, a Dutch frigate present in the theatre.

As explained, several naval forces are already present in this zone and provide permanent or temporary backup to the action conducted by the European naval force. The EU NAVFOR operation is in permanent liaison with the forces already present in that zone (CTF-151, NATO Maritime Group, Russian, Indian, Japanese and Chinese vessels). NATO agreed in 2009 to join the mission.

Alongside the EU ATALANTA NAVFOR operation at sea, Operation Atalanta headquarters (OHQ) has set up two international data transmission networks that are used by all international players engaged in counter-piracy action off the coast of Somalia. First,

²¹⁴ EU Council Secretariat. "EU Naval Operation Against Piracy (EUNAVFOR Somalia – Operation ATALANTA)." op. cit.

TEXWEB links up all the shore and sea-based authorities and all the ships engaged in counter-piracy operations and thus enables quasi real-time exchanges of information concerning merchant shipping in the area and real-time coordination of the action of the different players through a chat-room. Secondly, MSCHOA (Maritime Security Centre – Horn of Africa), installed at the Northwood headquarters, disseminates all relevant information on piracy in the zone via a website that can be consulted by all players involved in merchant shipping traffic. MSCHOA issues recommendations to ships' captains, instructions for the formation of convoys, warnings in the case of pirate attacks and news bulletins.²¹⁵

4.5.2 Space Applications and EU ATALANTA NAVFOR

The OHQ in support of the ATALANTA NAVFOR Operation²¹⁶ has tasked the European Union Satellite Centre to analyse imagery and report on key ports and specific coastal areas with the objective of gaining understanding of the current infrastructure and service ability and to give an outline of possible access/regress routes important to the operation. EUSC was thus tasked to conduct²¹⁷:

- continued monitoring of pirate operating bases (skiff activity)
- continued monitoring of the Somalian border (Ethiopian military activity)
- continued monitoring of possible terrorist training camps
- identification of potential pirate camps on the Somali coastline and offshore islands

²¹⁵ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 5-8. Through the Centre, merchant ships can apply for protection: 98% of the ships that did so were able to cross the Gulf of Aden without incident.

²¹⁶ "EU NAVFOR Somalia. European Security and Defence Policy." op. cit.

²¹⁷ Details on EUSC's support are drawn from Wilson, Andrew. op. cit.



Figure 37: An example of EUSC's analysis of known pirate bases²¹⁸

— battle damage assessments of Somali towns.

Findings are then issued in the form of Imagery Intelligence (IMINT) Reports or Digital Geographic Information (DGI). EUSC is also analysing known pirate operations bases in Somalia with an eye to:

- the infrastructure of the base (LOC)
- significant buildings and structures
- government or military installations
- maritime facilities, and
- the classification of fishing vessels (skiffs).

The main analysis is of the extent to which these structures support pirate operations. The analysis is made available in form of text reports (that are supported with imagery) or DGIs. An example can be found in Figure 38.

EUSC is also looking for potential pirate bases. In order to identify these, it analyses island and coastal locations, potential landing

areas, maritime facilities, infrastructures and maritime activity. In its analysis it mainly assesses the suitability of these structures to support pirate activity. An example of such an analysis can be found in Figure 39.

One of EUSC's imagery analysts (IA) is sent to the ATALANTA NAVFOR OHO on a monthly turn-around basis for the whole duration of the operation. This IA coordinates tasking to the EUSC and is responsible for the production of IARs using maritime patrol and reconnaissance aircraft as well as the production of geoproducts to support the OHQ.

Sending an IA on board one of the EU's naval forces is also under discussion.

In the future EUSC could be tasked to identify pirate forward operating bases and to observe pirate activity within the Southern Red Sea Area.

²¹⁸ Wilson, Andrew. op. cit.

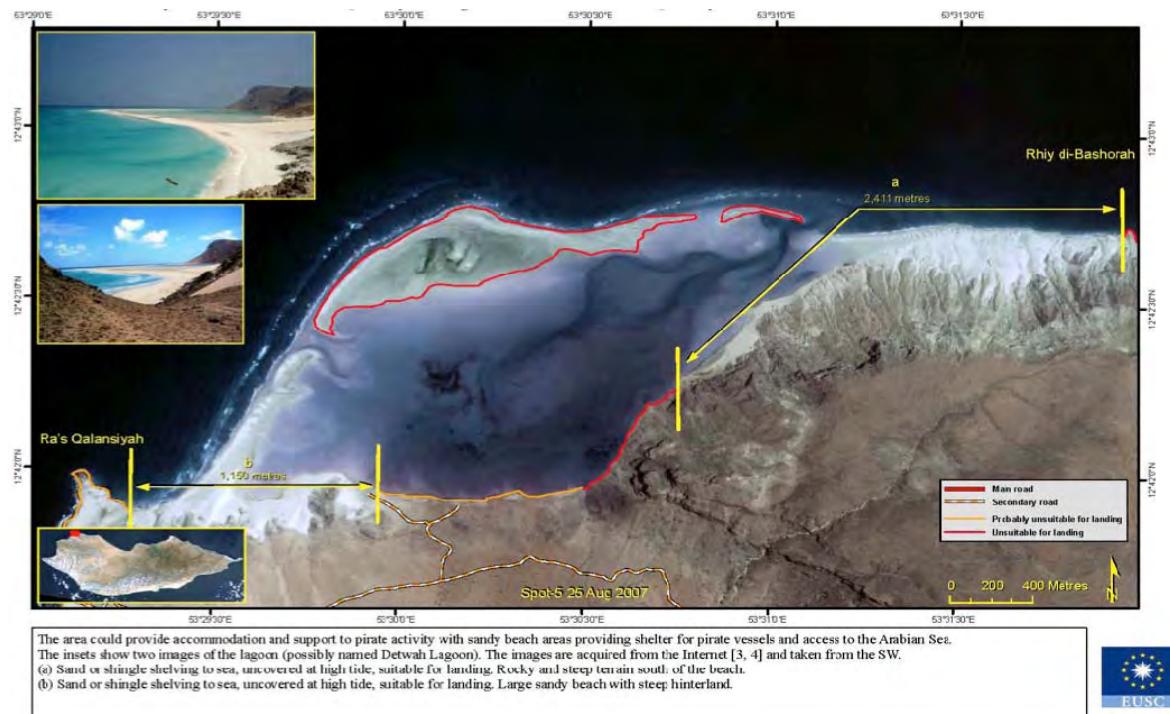


Figure 38: Analysis of areas for potential pirate bases²¹⁹

²¹⁹ Ibid.

5. Findings and Recommendations

In the general area of security, maritime security ranks high on the current agenda of the EU. The maritime sector is particularly complex with many issues at stake ranging from piracy, to environmental protection, accident management and fisheries. Current EU attempts are of a sectoral nature dealing with environmental issues separate from security-related aspects. The EU seems to already have all the necessary instruments at hand but needs to put them together and develop a comprehensive maritime security policy in order to create a so-called enhanced maritime picture (as also discussed in the "Blue Book").

The specific findings and recommendations have been grouped into the following categories.



Figure 39: Three Areas of Findings and Recommendations

5.1 Regional Capacity-Building

Having shed light on the Causative Factors of piracy and the determinants for effective counter-piracy policy, it has become clear that not all of these can be tackled by space applications. However, the study has shown that Causative Factors such as problems with maritime surveillance, lax coastal and port-side security and the global proliferation of SALW can at least partly be improved through space applications.

The case of Somalia has proven that space applications are a major, but not the only,

element for dealing with piracy. They provide a complementary tool in the EU's toolbox to fight piracy and improve maritime security. Technologies need to be seen as instruments that support an overall strategy or a political concept - in this case the AMISOM mission and the EU's attempts to improve the situation in Somalia's land areas.

In the long-term only a political approach to the underlying Causative Factors such as poverty, illegal fishery and organised crime can provide an effective counter-piracy policy²²⁰.

Several measures can be taken to improve the situation while efforts continue towards a political settlement.²²¹ These could be the organisation of shipping into a safe lane²²², providing Somalia with a coast guard service, or maintaining a large naval presence in the region.²²³ The international community needs to make sure that its initiatives complement existing regional initiatives.

5.1.1 Establishing a Regional Coast Guard Service

Governments of the region should work to promote cooperation among the navies of the coastal States as to establish a regional maritime patrol. This force could engage in intelligence sharing, the dissemination of early-warning information, and joint protection and enforcement operations. In addition to countering piracy, a regional maritime patrol would address other transnational maritime problems, including managing fishing and monitoring environmental threats. Establishing an official coast guard force that included Somali participation would deprive pirates of their Robin Hood argument as well as provid-

²²⁰ Galaski, Julia. op. cit.

²²¹ Middleton, Roger. "Piracy in Somalia – Threatening Global Trade, Feeding Local Wars." Chatham House Briefing Paper. London: Chatham House, 2008..

²²² The establishment of a Maritime Security Patrol Area (MSPA) was announced by the coalition naval forces in the Gulf of Aden in August 2008. Following a standard route should make it easier for international forces in the area to monitor shipping and respond to distress calls. Problems arise if the international presence is too light as shipping organised in a lane would potentially offer an easier target for pirates.

²²³ Middleton, Roger. op. cit.

ing an alternative source of livelihood and income to potential sea pirates.²²⁴

The international community could provide funding, training and advanced surveillance technologies thereby supporting regional efforts. In the long-term international naval forces could reduce their operations, transfer missions to the regional security forces and concentrate their efforts on distant off-shore missions with local navies focussing on coastal security.²²⁵

The action taken by the Commission in the framework of its Instrument for Stability (IfS) includes "supporting regional cooperation and building capacity of selected coastal States; as well as reinforced capacity of coastal States' coast guards and administrations, starting with Yemen and Djibouti.

5.1.2 Stabilising Efforts in Somalia and Building up the Judiciary and Strengthening the Rule of Law

In the case of Somalia, peace has to be established in the country. The international community should support stabilising efforts in Somalia.²²⁶ The police as well as a judiciary system have to be established (Causative Factor 6: corruption/ safe havens) through capacity-building measures.²²⁷ In the meantime governments in the region, such as Kenya, who are willing to prosecute pirates should be supported. This would not only bring regional legal systems up to international standards but would also have a stabilising effect in the region.²²⁸ On-going trials in Kenya should be monitored and assessed to determine the need for capacity building and to evaluate the long-term viability of this option. Model laws and best practices for domestic protection of pirates should be identified with the objective of passing them to regional States willing to conduct prosecutions in the future.²²⁹

At the same time prosecutions in Europe and the U.S. need to be encouraged.²³⁰ The fact that some States are not using existing treaties to prosecute pirates and that many States have not revised their domestic anti-

piracy laws to reflect the norms embodied in SUA and UNCLOS, shows a general lack of political will to find a purely domestic solution to the problem of prosecuting pirates.²³¹ This is in line with the general conclusion of the joint AIES-ESPI workshop, which showed that while a lot was already technically feasible industry did not engage in these actions as there was no political will calling for them.

Bringing pirates to justice in national courts is also said to be difficult as a result of legal and practical challenges, such as

- » concerns regarding the security and impartiality of local judges; a lack of clarity with respect to the steps that capturing ships must take in order not to run afoul of their human rights obligations; difficulties in the process of preserving and transporting evidence; inadequate national laws relating to the crime; and reluctance on the part of countries to prosecute pirates for fear that they will be forced to grant them (and their families) asylum once their sentence has been served.²³²

Thus, there is a need to establish an international mechanism for the prosecution and punishment of suspected pirates.²³³

- » What should not happen, in any case, is that pirates go free due to the lack of proper legislation or political will. No matter how intimidating the presence of an international naval force may be and how efficient that force is, pirates will not be deterred if they know that there is no law to judge them.²³⁴

The rule of law must be strengthened.

5.1.3 Building-Up Long-Term Regional Partnership

Building on the successes of the Regional Cooperation Agreement on Combating Piracy and Armed Robbery Against Ships in Asia, the IMO held a high-level meeting in Djibouti where a similar regional code of conduct for 21 countries in the Western Indian Ocean, the Gulf of Aden, and Red Sea regions (the so-called Djibouti Code of Conduct) was agreed upon.

This Code aims at supporting networks for sharing and reporting relevant information through a system of national points of con-

²²⁴ Türk, Helmut. op. cit..

²²⁵ Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. op. cit.19.

²²⁶ Reveron, Derek S. "Beyond Piracy: Maritime Security and Safety Challenges." 20 Oct. 2009. Atlantic Council 26 Feb. 2010 <http://www.acus.org/new_atlanticist/beyond-piracy-maritime-security-and-safety-challenges>.

²²⁷ Middleton, Roger. op. cit.; Fuhrmann, Christian, and Dieter Berg. op. cit.

²²⁸ Türk, Helmut. op. cit..

²²⁹ Andersen, Elisabeth, Benjamin Brockman-Hawe, and Patricia Golf. op. cit.

²³⁰ Reveron, Derek S. op. cit.

²³¹ Andersen, Elisabeth, Benjamin Brockman-Hawe, and Patricia Golf. op. cit..

²³² Andersen, Elisabeth, Benjamin Brockman-Hawe, and Patricia Golf. op. cit.

²³³ Türk, Helmut. op. cit.

²³⁴ Ibid.



Figure 40: Four areas needing further coordination

tact and information centres.²³⁵ Such long-term regional partnerships need to be fostered.

5.1.4 Expanding Bilateral Cooperation

The lack of interoperability, specialisation, and orientation around key missions leaves most of the naval forces in the region with only limited ability to address threats such as those posed by piracy. Naval forces need more modern ships, aviation assets, intelligence systems, and logistics. Common data links for shared and improved situational awareness should be created.

International forces have been working with the major States of the region. Such bilateral cooperation should be fostered, increased and institutionalised.²³⁶

5.2 Coordination Issues

According to ESRIF's final report the main challenges to ensuring interoperability and information sharing in the maritime domain are (1) the coordination and integration of different national authorities involved in maritime surveillance at national and EU level and (2) cooperation with neighbouring third countries.²³⁷

This analysis of current EU efforts in the maritime sector has also shown a great need for further coordination. It has however identified two more areas needing further coordination. Thus three coordination issue areas have been grouped into four thematic areas: (1) Governance in Security Research and Innovation, (2) Coordination at Member State level, (3) Interoperability of surveillance systems and (4) Cooperation with other international actors.

5.2.1 Governance in Security Research

EU-wide governance in security research and innovation must be "user" and "capability" driven. ESRIF has concluded that "[t]he search for governance in this area must proceed in parallel with the development of a "European security culture". In those fields where the EU has adopted policies (i.e., border management or the protection of critical infrastructures) there is the opportunity and need to first develop complementary and interoperable capabilities, then shared ones and, ultimately, common ones.

The table below summarises European initiatives within the three categories, sorted according to their applicability to the three Causative Factors. A total of 42 European initiatives, services and satellites have been identified. The table shows that most projects are related to technology development and

²³⁵ Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. op. cit.20.

²³⁶ Ibid.

²³⁷ European Security Research and Innovation Forum (ESRIF) "European Security Research and Innovation in

Support of European Security Policies. Final Report." Luxembourg: Office for Official Publications of the European Communities, 2009. 93
http://www.esrif.eu/documents/esrif_final_report.pdf.

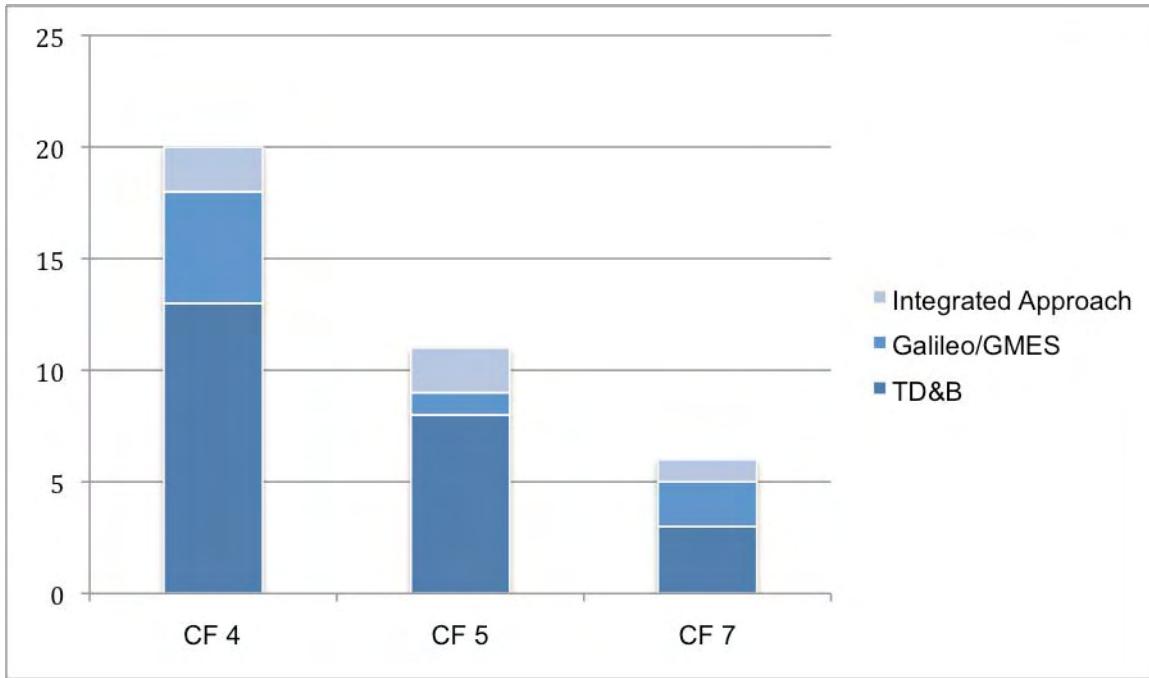


Figure 41: Number of Projects identified within a CF and differentiated between three categories (TD&B, Galileo/GMES, Integrated Approach)

benchmarking (23 for all three Causative Factors compared to 6 projects related to Galileo and GMES and 15 covering an integrated approach²³⁸). European initiatives mainly cover CF 4 (29 initiatives compared to 10 related to CF 5 and 6 to CF 7).

Given that the largest number of projects deals with improving maritime surveillance as a whole and given that the improvement of maritime surveillance covers all three phases of a piracy incident, it can be concluded that the three phases are covered equally.

Systems to counter illegal fishing activity seem to be well developed per se but are not integrated with other systems as to enhance the overall maritime surveillance picture. Very few projects tackle the proliferation of SALW (6 in total). Those mentioned focus on container security and/ or illegal immigration

and drug trafficking. Coastal security is looked at in terms of fishery control, detection of pollution and/or border security rather than explicitly focussing on the problem of piracy. There are also few attempts to combine existing projects aimed at improving coastal security. Ports are looked at in the context of transportation policy (how to make handling faster) and in the context of critical infrastructure protection. Progress is being made in terms of combining existing maritime surveillance systems with a sectoral focus (e.g. fisheries, oil spills etc.). Current projects and efforts are scattered and non-transparent. There is thus a risk of duplication of efforts due to the lack of an overview of existing projects and actors involved. Other European attempts have a regional focus (e.g. the EPN) on European waters for European bodies.

²³⁸ Some projects cover more than one CF and are thus listed more than once.

CF 4: Maritime Surveillance	CF 5: Coastal and Port-Side Security	CF 7: Proliferation of SALW
<ul style="list-style-type: none"> • Technology Development & Benchmarking: <ul style="list-style-type: none"> - DECLIMS - EDA & NATO research - CNES & ESA study on a possible European space-based maritime surveillance system - AIS-S (EC (JRC/ DG MARE) & ESA, ESA&CNES, OHB's SPAIS, Telespazio, LuxSpace, TAS) - CNES' R&D project developing a Maritime Security and Safety (MSS) constellation OHB's Space-Based Maritime Reconnaissance and Surveillance System (SMRS) <ul style="list-style-type: none"> - EADS Astrum and SPOT Image SA imagery intelligence - EU LRIT DC: LRIT info on 3rd country vessels bound to or sailing within EU waters - ERS satellite - ENVISAT satellite - Inmarsat satellite and Inmarsat standards - EMSA examining integration of more services into SSN with the objective of developing an Integrated EU Maritime Surveillance Network - EC to develop a system for Maritime Situational Awareness for Coast Guard Operations • Services for Galileo or GMES <ul style="list-style-type: none"> - Nauplios - LIMES - MARISS - MERSEA - OHB industry study on space infrastructure and the concept of operation • Integrated Approach <ul style="list-style-type: none"> - JRC's institutional action MASURE - MarNIS - MyOcean - OPERAMAR - EMODNET - SEABILLA - PERSEUS - MARSUNO - BLUEMASSMED - EMSA examining integration of more services into SSN with the objective of developing an Integrated EU Maritime Surveillance Network - EDA's Project team MARSUR is working on the development of a European Maritime Surveillance System (EMS) - GlobMarSit 	<ul style="list-style-type: none"> • Technology Development & Benchmarking: <ul style="list-style-type: none"> - JRC is working on a VDS - EMSA's VMS - SUMO - SECTRONIC - VESPO - SOB-CAH - EADS's IMARSEC - Inmarsat satellite and Inmarsat standards • Services for Galileo or GMES <ul style="list-style-type: none"> - LIMES (- G-MOSAIC) • Integrated Approach: <ul style="list-style-type: none"> - EADS's IMARSEC - EC working on integrating SSN, CSN and LRIT into STIRES 	<ul style="list-style-type: none"> • Technology Development & Benchmarking <ul style="list-style-type: none"> - ConTraffic - Bosch's transport supply chain security initiative - EADS's SeCureSystem • Services for Galileo or GMES <ul style="list-style-type: none"> - LIMES • Integrated Approach: <ul style="list-style-type: none"> - EUROSUR

Figure 42: European Initiatives tackling the three identified Causative Factors

The results of the projects are hard to access and are not disseminated enough. After the end of projects, project websites cease to exist and thus all results can no longer be found. Instead all the results should be brought together into one document, summarising the technological capabilities, the gaps and the future needs. This should be the basis for a technology roadmap for maritime surveillance.

The same idea has also been put forward by the blue book, as earlier discussed. It is of utmost importance to integrate the isolated programmes and projects in progress in order to avoid unnecessary duplication. By doing so, the EU would be in a position to create a 24/7 maritime surveillance system by combining existing surveillance measures. Sensors such as coastal radars, Vessel Tracking Systems (VTS) and Automatic Identification Systems (AIS) and other satellite technology under the responsibility of the police, the intelligence services, coast guards and navies need to be pooled so as to contribute to comprehensive maritime situation awareness.²³⁹

Building upon the Blue Paper and the accompanying Action Plan as first steps, a holistic EU Maritime Security Policy can be created. IMO has and will continue to serve as a market place for ideas. Some observers²⁴⁰ have also suggested the establishment of a European coordinating body. While the European Maritime Safety Agency (EMSA) constantly monitors the level of maritime safety in order to maintain a high level, there is no such body for the maritime security sector as a whole. Given the recent progress in integrating SSN, CSN and LRIT in STIRES, EMSA could be the right institution to act as a coordinating body. While this would require a change in the mandate of the agency, it would mean that a new institutional body does not need to be founded.

In the area of maritime security one single actor (possibly EMSA) should pool resources and projects and provide oversight. Industry should also be involved in this coordination process. Commercial actors need to be taken into account too. Cooperation between defence (ESDP) and other (civil or internal security) users has to be fostered for all users to learn from the experience of others in the use of space applications as supportive tools. Many of the projects mentioned above remain at the research level or, at maximum, have ended in a demonstration. There is a

need to move beyond the mere demonstration phase into actual services.

5.2.2 Reinforcing Coordination at Member State Level

In the EU Member States responsibilities are spread across a number of institutions such as the Ministry for Maritime Affairs, Agencies, the Navy, the Police, the Gendarmerie, Customs, the Transport Ministry and the Coastguards etc. In most cases there is no coordinating authority.²⁴¹ Member States need to consider reinforcing internal coordination with a view to increased coordination at the EU level.

Currently, national authorities such as coast guards are much more eager to share information with coast guards of another Member State than with another institution within their own borders. The need to share is often not felt by the users as they do not know what other sources are available and thus do not see the added value of sharing.

International efforts have partly been hampered by the fact that naval forces have to answer to individual national authorities with varied rules of engagement as well as incompatible communications.²⁴²

The FORESEC study, a European-wide foresight project on Europe's evolving security landscape conducted by a consortium of research organisations, concluded that while it is possible to observe an increasing overlap of threat assessments in different EU Member States, with most governments stressing the diffuse and complex nature of the threats, the blurring of internal and external security driven by interlinked, asymmetric and de-territorialised challenges involving a multitude of actors including non-State entities, a common picture and a shared European concept of security has yet to emerge.²⁴³

The pursuit of EU-wide governance in security research and innovation is a complex task: there remain significant differences between Members States' national policies concerning risk perception and approaches. Such differences are noticeable too in their security concepts and national governance

²³⁹ Chapman, John. op. cit.

²⁴⁰ Cf. for example. Voort, van de Maarten, Kevin A. O'Brien, Adnan Rahman and Lorenzo Valeri. op. cit. 186.

²⁴¹ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 2.

²⁴² Türk, Helmut. op. cit..

²⁴³ FORESEC. "Cooperation in the Context of Complexity: European Security in Light of Evolving Trends, Drivers, and Threats." FORESEC Final Report, 2009. <www.foresec.eu>.

models.²⁴⁴ Member States need to agree on rules for dealing with pirates.²⁴⁵

ESRIF further stressed that maritime interoperability and information-sharing is hampered by the limited interoperability inside and between countries, not because of the lack of communication channels, but mainly because (1) no data exchange practices are performed between actors and (2) concerns about information ownership exist. ESRIF proposes the introduction of "National Coordination Centres for Border Control or Surveillance".²⁴⁶

While stressing that "the development of a strategic and integrated approach at national level is at the roots of integrated maritime policy-making", the Commission's iCommunication focuses on the Mediterranean.²⁴⁷

In October 2009 the Commission issued a Communication entitled "Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain" (COM(2009)538)²⁴⁸, which puts forward several guiding principles for the development of a common information sharing environment for the EU maritime domain in the context of taking "steps towards a more interoperable surveillance system, bringing together existing monitoring and tracking systems used for maritime safety and security, protection of the marine environment, fisheries control, control of external borders and other law enforcement activities."²⁴⁹

The main goals of this Communication are to establish greater cooperation amongst national authorities, improve maritime situation awareness of Member States' authorities by providing comprehensive information for better decision-making and to maximise the use of existing sectoral systems by ensuring they are interoperable. In achieving these goals the EU mainly faces the following challenges:

²⁴⁴ European Security Research and Innovation Forum. Final Report. December 2009. Brussels: ESRIF. 33.

²⁴⁵ kammel

²⁴⁶ European Security Research and Innovation Forum (ESRIF) "European Security Research and Innovation in Support of European Security Policies. Final Report." Luxembourg: Office for Official Publications of the European Communities, 2009. 93

<http://www.esrif.eu/documents/esrif_final_report.pdf>.

²⁴⁷ Commission of the European Communities. COM (2009) 466 final. op. cit.

²⁴⁸ Commission of the European Communities. Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain. COM (2009) 538 final of 15 Oct. 2009. Brussels: European Union.

²⁴⁹ COM (2007) 575 final of 10.10.2007 in Commission of the European Communities. Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain. COM (2009) 538 final of 15 Oct. 2009. Brussels: European Union.

(1) to respect the principle of subsidiarity, (2) to respect different legal frameworks and (3) technical challenges.²⁵⁰

5.2.3 Improving the interoperability of Surveillance Systems

At the EU level different surveillance systems are currently operated by different agencies under the lead of different DGs (see Figure 44 below).

Currently the EU has "islands of data" of different standards and quality. The current data situation in Europe often results in the absence of necessary information due to lack of coordination across borders and between levels of government, and a lack of common standards and their use resulting in incompatible information and information systems, fragmentation of information and redundancy. This situation is worsened by current data policy restrictions such as pricing, copyright, access rights and licensing policy. With this in mind, in 2001 the European Commission launched an initiative to develop an Infrastructure for Spatial Information in Europe. The INSPIRE initiative aims mainly at developing a legal framework to underpin the creation of a European SDI thereby starting from priorities in the environmental field. While the INSPIRE initiative, which is currently in its transposition phase, aims at solving the standardisation issues, other obstacles to satellite data exchange still persist. In this regard, architecture constraints remain.

ESRIF has further stressed that operational situational pictures fusing all available and relevant information are not produced in real-time and rely to only a limited degree on multi-sensor fusion and multi-information fusion.²⁵¹

Moreover there is compartmentalisation and lack of interoperability of different information systems for monitoring the position of ships at sea, requiring a comprehensive approach to the sharing of maritime surveillance data.²⁵² This process of integrating surveillance needs to encompass all user communities at national and Community level so that their needs and the policy options necessary to meet such needs, are clearly identified. The Commission's Member States Expert

²⁵⁰ Mattila, Isto. op. cit.

²⁵¹ European Security Research and Innovation Forum (ESRIF) "European Security Research and Innovation in Support of European Security Policies. Final Report." Luxembourg: Office for Official Publications of the European Communities, 2009. 93.

<http://www.esrif.eu/documents/esrif_final_report.pdf>.

²⁵² European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 2.

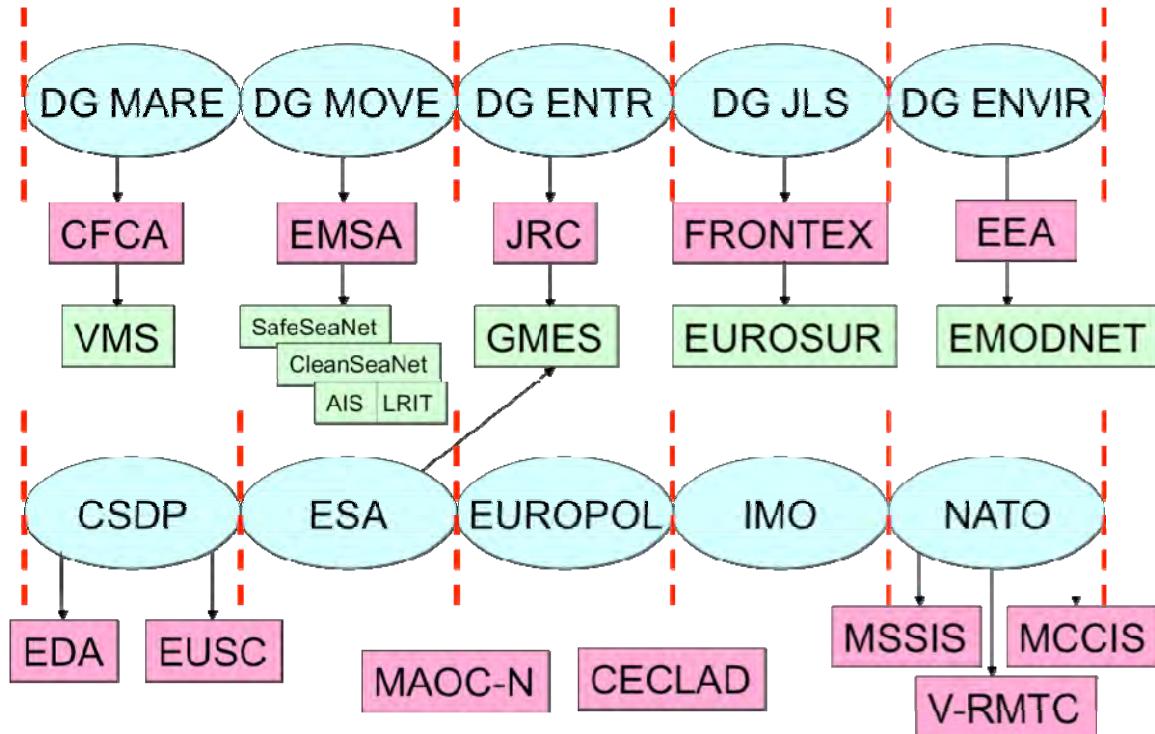


Figure 43: Stovepipes in the European Maritime Surveillance Landscape (N.B. DG JLS has recently been split up in two DGs cf. footnote 210)

Group on Maritime Surveillance could serve as an exchange platform.²⁵³ The EU is in a position to create a 24/7 maritime surveillance system by combining existing surveillance measures.

The Commission proposes moving towards a more interoperable surveillance system by bringing together existing systems for the control and monitoring of maritime safety and security operations, the protection of the marine environment, fisheries surveillance, the monitoring of external borders and all other activities pertaining to the implementation of the laws of the nation at sea.²⁵⁴

ESRIF has identified the following shortfalls in maritime surveillance for security:²⁵⁵

- Open sea: partial coverage, no continuous and persistent surveillance
- Coastal waters: gaps in small targets detection

- Member State coastal surveillance systems: adjacent, non integrated, limited coordination and information sharing
- Legal frameworks: limitation on interventions
- Fragmentation of involved organisations
- Limited interoperability between sectoral stakeholders and systems
- No common situational picture
- Lack of early warning and documented alarms
- Lack of cooperation with neighbouring third countries
- Delays in search and rescue operations.

At present, satellite data varies depending on sectors (purpose), region and organisation. The figure below shows the use of data provided by space applications for different maritime sectors.

²⁵³ Mattila, Isto. op. cit.

²⁵⁴ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 5-8.

²⁵⁵ European Security Research and Innovation Forum (ESRIF) "European Security Research and Innovation in Support of European Security Policies. Final Report." Luxembourg: Office for Official Publications of the European Communities, 2009. 93. <http://www.esrif.eu/documents/esrif_final_report.pdf>.

²⁵⁶ Le Bail, Yves. op. cit.

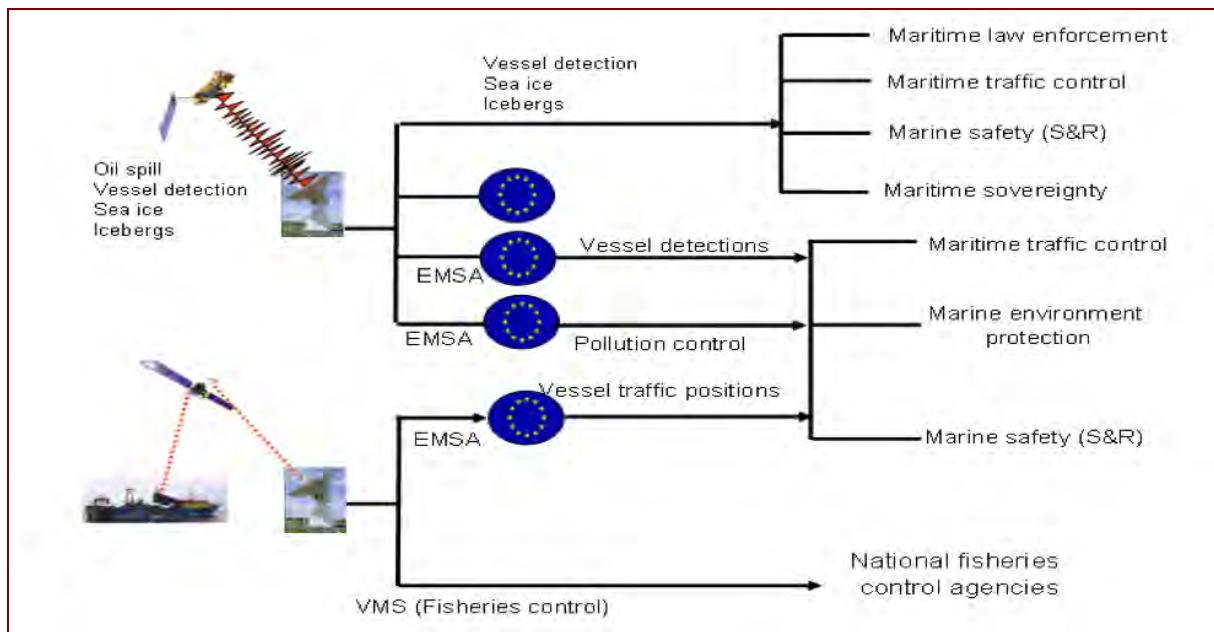


Figure 44: Data Flow of Different Sectors²⁵⁷

Different regions face different threats and thus require different data, meaning that not the same data is accumulated for all regions. As a result, challenges arise in the data flow of different regions (s. figure below).

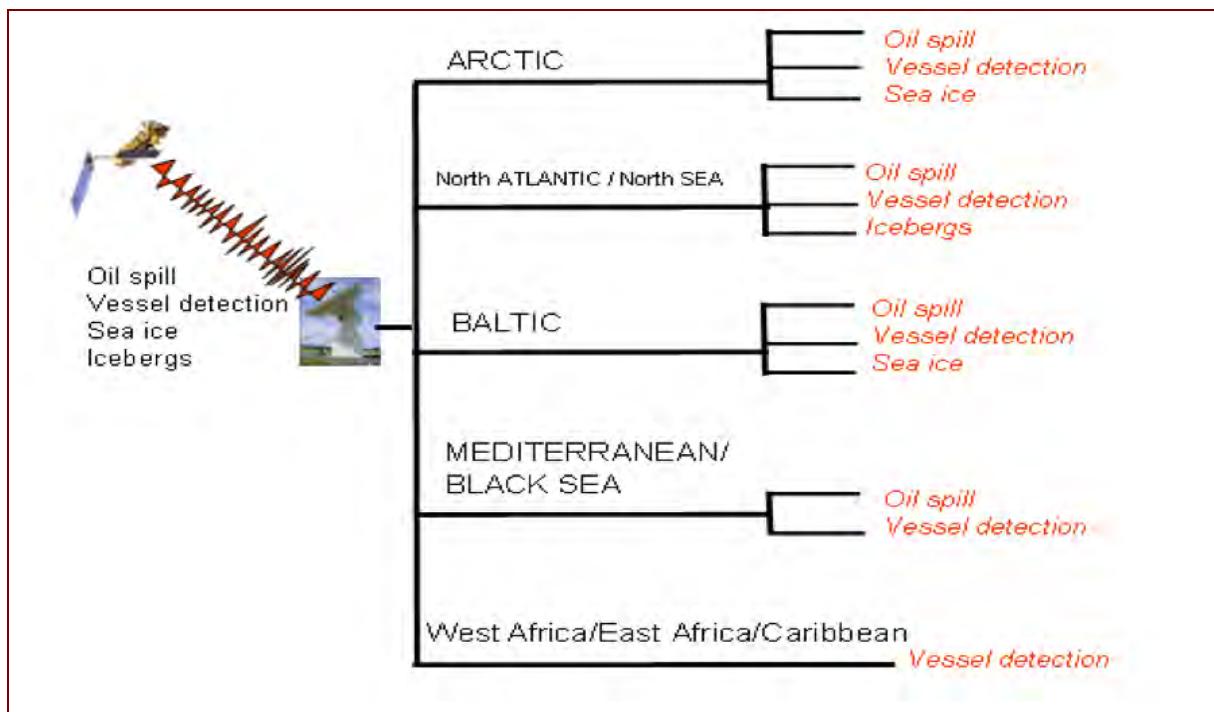


Figure 45: Data Flow of different Regions²⁵⁸

Moreover, satellite vessel detection data needs to be directly fed to both EU institutions and national institutions. The resulting organisational challenges of data flow are depicted below.

²⁵⁷ Mattila, Isto. op. cit.

²⁵⁸ Ibid.

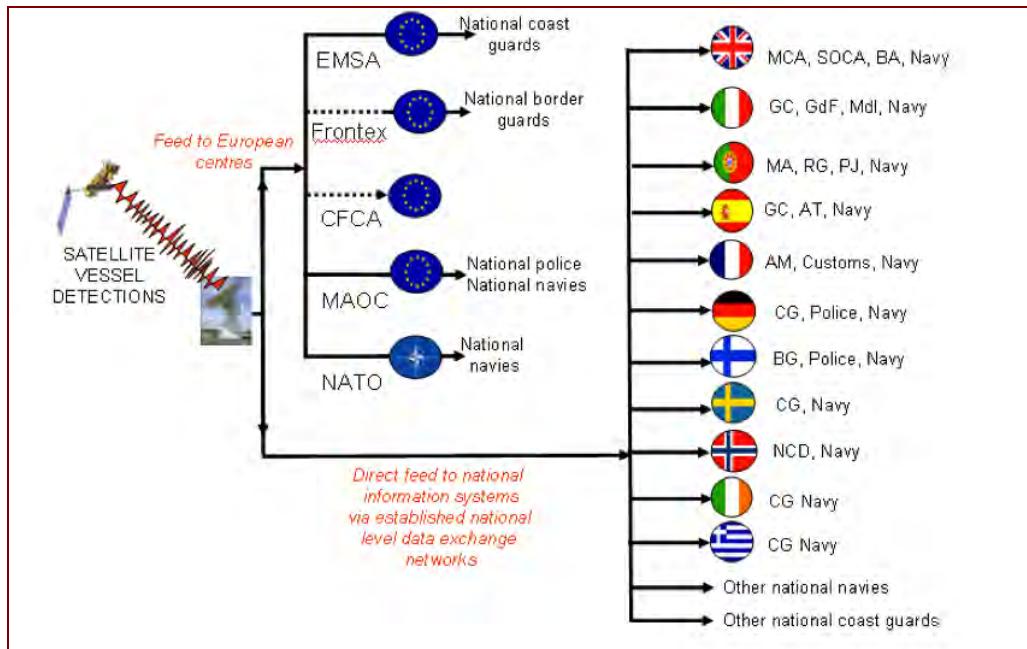


Figure 46: Organisational Data Flow Challenges²⁵⁹

This data flow also works the other way around. Sensors such as coastal radars, Vessel Tracking Systems (VTS), Automatic Identification Systems (AIS) and other satellite technology under the responsibility of different actors (e.g. policy, intelligence services, coast guards) need to be pooled so as to contribute to comprehensive maritime situ-

ation awareness, which is then made available to all actors involved.

The different organisations or players involved in the various maritime areas are of both a civil and a military nature. As a consequence data flow challenges between civil and military actors arise.

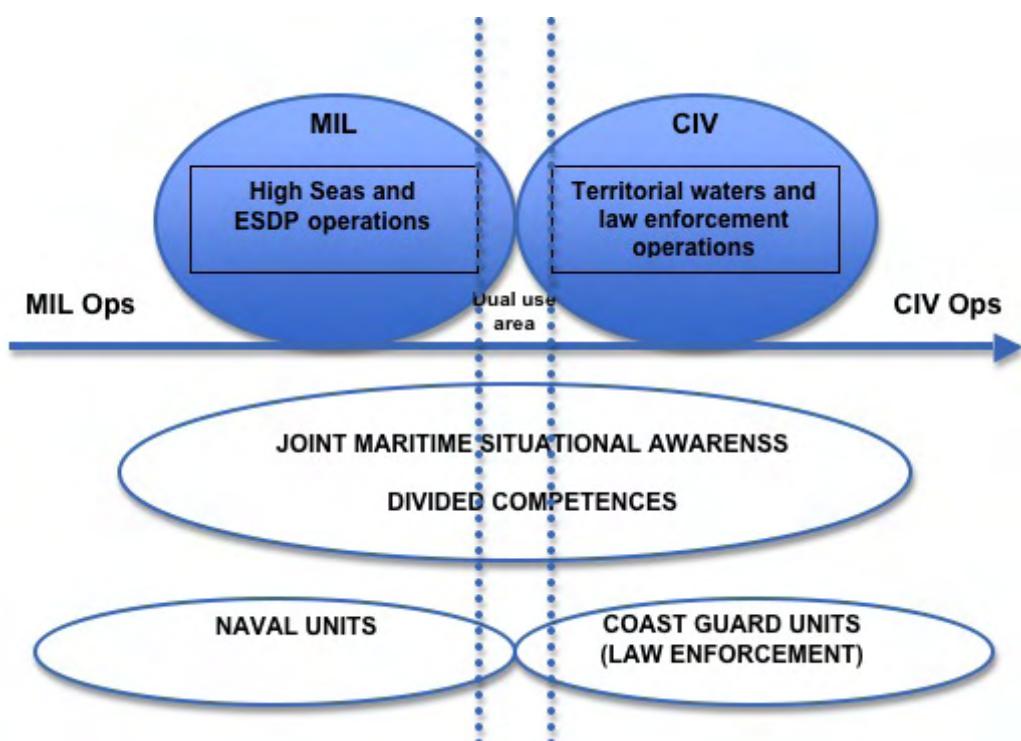


Figure 47: Civil Military Cooperation Challenges²⁶⁰

²⁵⁹ Ibid.

²⁶⁰ Mattila, Isto. op. cit.

Monitoring and surveillance activities carried out at national level as well as at European level, regardless of their particular focus within the range of threats to maritime security, can be understood as nodes within an overall system. All these nodes need to be pooled without losing original data ownership and control. In order to do so a common information-sharing environment is needed. A push from the Commission to establish such an environment can be acknowledged.²⁶¹ The figure below visualises this common information-sharing environment, with the different information layers from national authorities and EU systems such as SSN, VMS and EUROSUR.

A similar system has to be found for the European Space Situational Awareness (SSA) system. Any progress in either of these projects might reinforce progress in the other.

In October 2009 the Commission issued a Communication entitled “Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain” (COM(2009)538)²⁶², which puts forward several guiding principles for the development of a common information sharing environment for the EU maritime domain in the context of taking “steps towards a more interoperable surveillance system, bringing together existing monitoring and tracking systems used for maritime safety and security, protection of the marine environment, fisheries control, control of external borders and other law enforcement activities.”²⁶³

Principle 1 aims at establishing an approach interlinking all user communities. In order to do so

- » Common rules and standards should be developed at Community level to optimise the exchange of information between the different user communities. Each of these communities should be given the possibility to provide and/or receive information at national level from international (e.g. AIS, LRIT.), regional (e.g. BSRBCC, BSBC), Community (e.g. SafeSeaNet, EU LRIT Data Centre, CleanSeaNet, VMS, EUROSUR.), military (e.g. MSSIS, VR-MTC, SUCBAS), and internal security systems and mechanisms

²⁶¹ Ibid.

²⁶² Commission of the European Communities. Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain. COM (2009) 538 final of 15 Oct. 2009. Brussels: European Union.

²⁶³ COM (2007) 575 final of 10.10.2007 in Commission of the European Communities. Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain. COM (2009) 538 final of 15 Oct. 2009. Brussels: European Union.

(e.g. MAOC-N, CeCLAD, FRONTEX Information System) on a need-to-know basis, in line with conditions of use and defined user access rights, in order to build up its individual user-defined situational picture.

In this context the Commission stressed the interoperability of data and the abolition of duplicated data transfers.

Principle 2 aims at building a technical framework for interoperability and future integration, which is described as best achieved through

- » a non-hierarchical technical framework of maritime monitoring and surveillance systems. Such architecture should be designed as a cost effective interaction of different information layers to enable the improvement of user defined pictures. The system architecture must allow data to be *inter alia* collected, merged, analysed, disseminated and managed at the appropriate level of decentralisation, depending on security concerns (e.g. intelligence) and in compliance with data protection regulations, international rules and functional requirements. Best use should be made of existing systems.

While such an architecture needs to guarantee the interoperability and interconnection, “for certain categories of information such as classified, security-sensitive data (e.g. intelligence related to internal security and defence), a sectoral approach needs to be pursued to safeguard the security interests of the concerned user communities or recipients”. In all other cases “it is easier and more cost-efficient to collect and disseminate the data in a centralised manner”. The Commission envisages the community system SafeSeaNet to “be used by all relevant user communities and be developed further to function as the main platform for information exchange in the EU maritime domain with regard to port arrival and departure notifications, notifications on dangerous goods, maritime security notifications, incident and accident information, AIS, LRIT and pollution monitoring.” Relevant EU Agencies play an important supportive and coordination role within their user community. They could also serve as hubs for the information exchange as appropriate.

Principle 3 foresees the sharing of information between civilian military authorities with the objective of avoiding duplications and guaranteeing cost-effectiveness, notwithstanding their distinct purposes and underlying mandates. This requires common standards and procedures for access to and use of the relevant information.

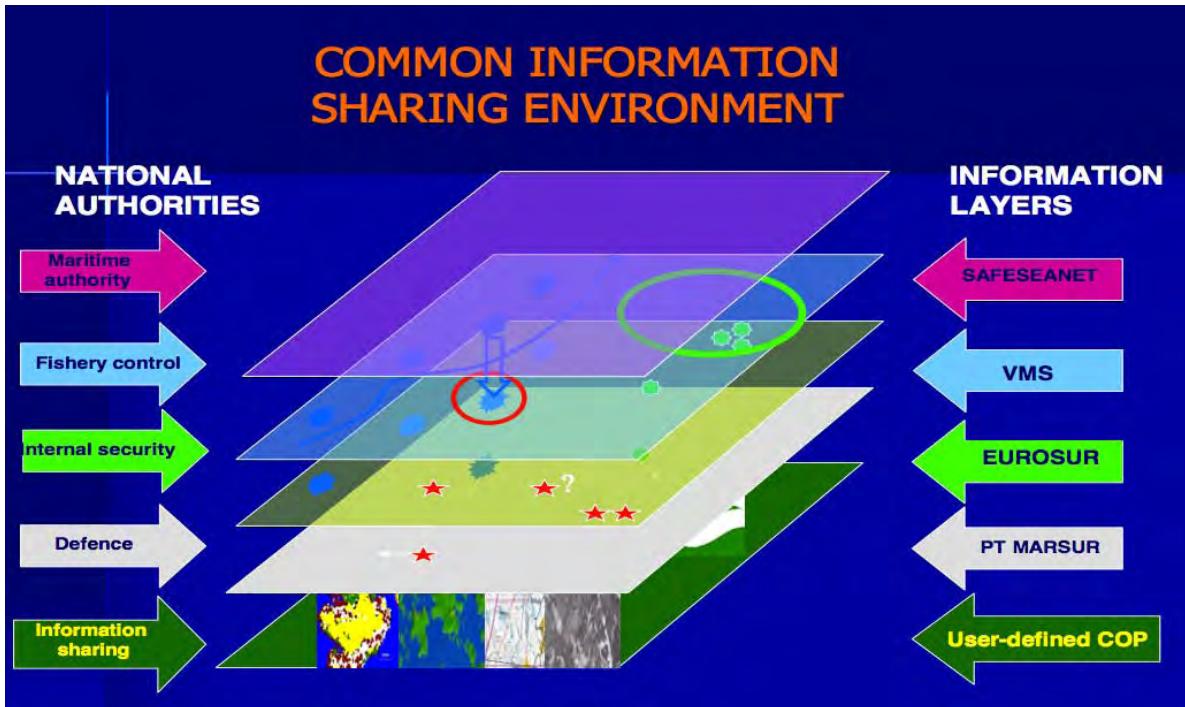


Figure 48: Visualisation of a Common Information Sharing Environment

Principle 4 stresses that EU and national legislation must give due consideration inter alia to the respect of data confidentiality, intellectual property rights issues and the protection of personal data as well as ownership of data in accordance with national and international law, in the removal of obstacles to the exchange of monitoring and surveillance data for the purpose of setting up a common information sharing environment .

Such a common information sharing environment will enable the most effective make use of systems that are already in place in order to gain the most comprehensive maritime situation picture for all threats to maritime security. While it will encompass different policies (such as agriculture, fisheries, external and internal security), and the actors involved in these policy areas (navies, border and coast guards etc.) it will also draw upon a variety of existing services (e.g. EUROSUR), flagship programmes (e.g. Galileo and GMES) and institutional actors such as EUSC.

This Commission Communication can be understood as a first milestone towards the integration of existing maritime surveillance networks. It is important is to lay down a set of access rights and obligations.

"Common" refers to the fact that since information is to be shared between different user communities, data used for this information should be collected only once. "Information" must enable user-defined situational awareness. Coming from diverse user communities,

information should be identifiable, accessible, understandable and usable. "Sharing" means that each community receives but also provides information on the basis of previously defined standards and procedures. "Environment" refers to interconnected sectoral information systems, allowing users to build up their specific situational awareness picture, which enables them to identify trends and detect anomalies and threats.

This common information sharing environment shall also counter the current existing data flow challenges.

In a presentation in December 2009 the Commission (DG MARE) announced a step-by-step approach to integrating maritime surveillance data. This is said to take into account the results from relevant sectoral and cross-border projects, research and development projects, and the lessons learned from ESDP operations.²⁶⁴

ESRIF has called for an Integrated Surveillance Management that is seamless, gives unimpeded access to surveillance and intelligence data of different tiers, requires interoperability and/or interfaces, and has procedural as well as legal frameworks. Accordingly, border security will require the flowing use of numerous surveillance methods (COMINT, ELINT, fixed and mobile terrestrial

²⁶⁴ Mattila, Isto. op. cit.

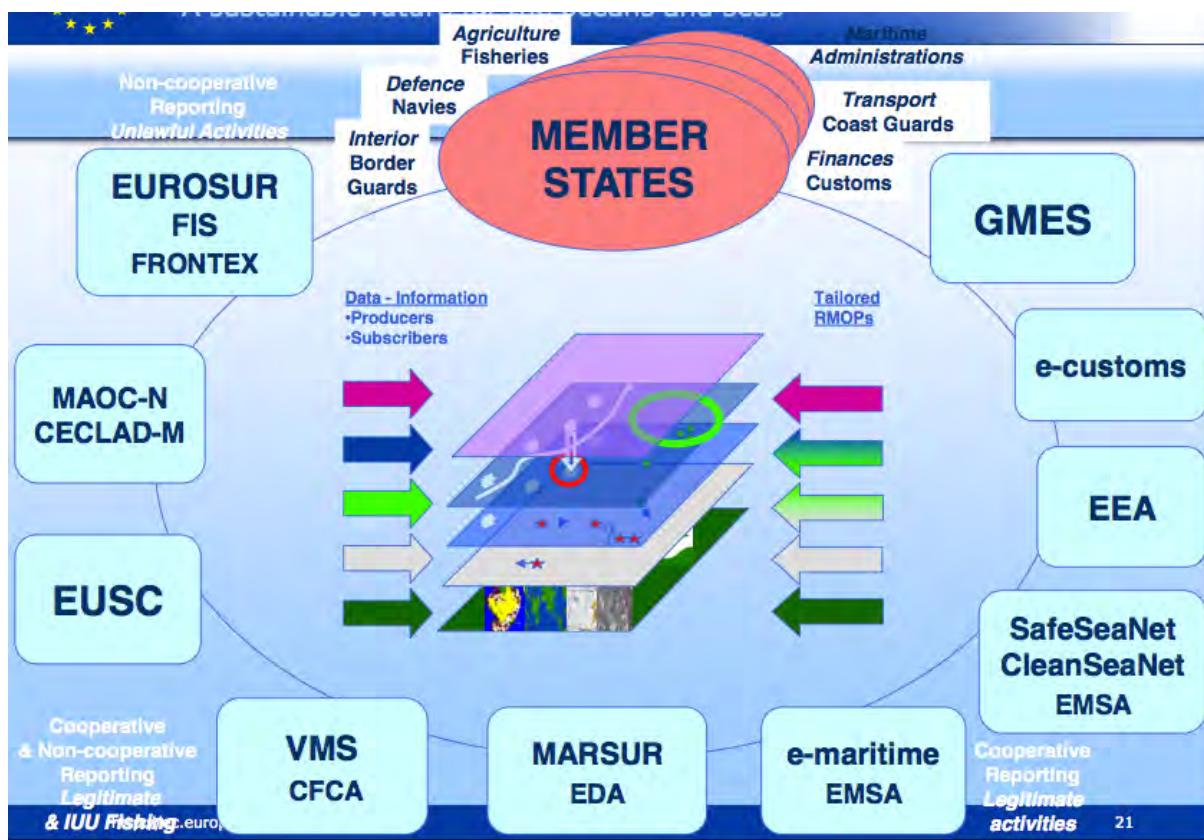


Figure 49: Overview of the existing community systems and services to be integrated into a common information sharing environment

sensors, maritime vessels, patrol aircraft and space surveillance assets).²⁶⁵

Additionally, in order to achieve a common operational picture and to guarantee its dissemination, further research into data mining software, dissemination protocols, generation of enhanced intelligent COP from different sources as well as into technical and operational interoperability is needed.²⁶⁶

Such an improved interoperability of surveillance systems requires a service-oriented approach. Once all technology related obstacles to sharing have been overcome, all actors involved have to be convinced that a need to share requires a "dare to share" attitude. Frequently cited examples of a similar nature are Facebook and Google. On the one hand a system needs to be developed where users can decide to either "push" or "pull" information from their partners, just like in any social network (e.g. Facebook) where users decide which information they share with whom. On the other hand, a Google attitude is needed. Given that users might not be aware of a certain service, a tool like the Google search engine needs to be developed to help them find the right service provider. These two examples show that there is

a difference between system-enabled and culture-enabled information sharing.

A proposal for a strategy for interagency co-operation for maritime security operations was already put forward in 2006 by the Chiefs of the European Navies (CHENS).²⁶⁷

5.2.4 Improving Cooperation with Other International Actors

Additionally, there is a lack of coordination among those called on to intervene at sea, as well as among the various agencies and military authorities of the EU MS.²⁶⁸ Various formations have different mandates, tactics, and rules of engagement, they have also been preoccupied with responding to immediate challenges rather than engaging in long-term local capacity building and ensuring that regional authorities have the means to protect their territorial waters and make meaningful contributions to ensuring freedom of the seas.²⁶⁹

²⁶⁵ <http://www.statewatch.org/news/2007/jul/eu-mso-chens-strategy.pdf>

²⁶⁶ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit. 2.

²⁶⁷ Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. op. cit.17.

²⁶⁵ ESRIF, 259.
²⁶⁶ Ibid. 260.



The immediate priority of maritime powers operating in the Gulf of Aden should be to harmonise the activities of the current naval operations being conducted by the EU, NATO, and the independent maritime commands of China, Russia, and other countries. There must be a suitable division of labour that reflects the distinct concerns and capabilities of each nation.²⁷⁰

The EU should actively seek cooperation with other countries and relevant international organisations in the provision of maritime security.

5.3 Improving Technical Capabilities

Current capabilities in maritime surveillance are based on Earth Observation satellites that have already been operating for some time and whose primary mission is not maritime surveillance. For this reason, they often cannot achieve "best delivery times" as revisiting is not sufficient. In a wide area, ship detection remains limited (< 8-10 metres (optical), < 30 metres (SAR)). As indicated earlier, satellite applications for maritime surveillance cannot be used on their own but should rather be understood as complementary to other data sources. This is a result of the rather limited information on vessel traffic provided by satellite images: data is not available continuously but only at one instant; within a limited swath; with limited resolution; and with limited detection probability and classification potential. In order to be able to identify a potentially dangerous unknown ship from satellite SAR imagery, in near-real time, with detection and false alarm rates that are sufficient for some users and scenarios but need to be improved for others, detections have to be fused with vessel traffic data from other sources (e.g. AIS, VMS, coastal radar, airborne patrol etc.). This is increasingly being done.

There is a need for a dedicated maritime surveillance mission composed of a combination of both radar and optical satellites. Given that radar (at medium resolution) is most suitable for ship detection but does not allow for ship classification, which in turn has to be derived from (very) high resolution optical imagery, a combination of radar (for day and night all-weather imagery) and optical (for large swath and high resolution) is needed for maritime surveillance. Specific sensor requirements depend on the application. A full constellation is not necessarily needed - a

group of radar and optical satellites would be enough.²⁷¹ In a wide area, ship detection remains limited (< 8-10m (optical), < 30m (SAR)).²⁷² Their surveillance range should be extended and their re-visit time improved. It is important to take precautions to guarantee that they are non-intrusive.

Based on the preliminary requirements and demonstrations of services (e.g. ESA GSE, EC FP 6 projects), the current priorities for development appear to be:

- A radar satellite providing high resolution imagery for continuity with ERS and ENVISAT class radars, with a medium resolution mode with the widest possible coverage for marine surveillance. Co-ordination will be sought with the Canadian Radarsat mission to increase observation frequency and geographical coverage.
- Multi-spectral optical imaging satellites at two spatial resolutions: High resolution for local and regional operational monitoring applications (continuity of SPOT and Landsat classes); Medium resolution for global applications (continuity of ENVISAT-global imaging and SPOT-Vegetation -classes), with multi-spectral capabilities and optimised for vegetation, cloud & aerosol and ocean colour.²⁷³

The FP 5 project DECLIMS conducted specific research for the purpose of benchmarking both optical and radar sensors for vessel detection. While its results give a good overview of current capabilities and provide a basis for future missions,²⁷⁴ the project's final report was published three years ago and a follow-up should be conducted. ESRIF concluded that there is a need to continue research on new imaging and sensing capabilities from various platforms such as microsatellites, sensors (optical, hyper spectral), and to develop standard satellite platforms with autonomous capabilities to increase responsiveness. It acknowledged that

- » future European and multilateral telecommunication projects will increase the capability in space of secure broadband

²⁷¹ Bressollette, Aurélie. op. cit.

²⁷² Ibid.

²⁷³ European Space Agency/European Commission. op. cit. 19-20.

²⁷⁴ See for example the Final Report of the DECLIMS Project on the JRC website: Greidanus, Harm. "DECLIMS: Detection, Classification and Identification of Marine Traffic from Space." DECLIMS FINAL REPORT. 27 Apr. 2007. JRC 19 Apr. 2010

https://maritimeaffairs.jrc.ec.europa.eu/web/declims/2?p_p_id=20&p_p_action=0&p_p_state=maximized&p_p_mode=view&p_p_col_id=column-1&p_p_col_count=1&_20_struts_action=%2Fdocument_library%2Fview&_20_folderId=2482.

²⁷⁰ Ibid. 19.

communication systems to be deployed in a very short time to back up/substitute terrestrial communications infrastructure.²⁷⁵

The availability of space systems and their capacity to be replaced or augmented for operational purposes remains weak and barely reactive. Space systems have to become more responsive²⁷⁶. While some user needs might not be technically feasible, there is still room for action.

Additionally, wake detection has to be improved: moving ships show wakes in both radar and optical satellite imagery, which can provide information about the speed and direction of the ship. This can be helpful when (1) identifying a ship as a pirate skiff and (2) predicting the target of the pirates. Wakes can also give indications of the landing bases. Their detection is still underdeveloped.

Galileo will further improve Europe's surveillance capabilities. It will provide a wide range of added value services in support of security. Positioning and timing capabilities together with continuous and low-cost monitoring will provide users with accurate information on ship positions.

Thus, there is a need for a dedicated maritime surveillance system that is better adapted to maritime surveillance in terms of surveillance, detection, classification and tracking.

Future maritime security capacities should be composed of a combination of space and non-space missions, designed to ensure:

- continuous tracking of activities along international routes from port to port activities to support vessel protection,
- surveillance will be able to be operated anywhere, at any time to detect (even small) potentially dangerous suspect activities along routes, and
- The maritime environment can be mastered in terms of the presence of objects and ocean behaviour to support detection and operations.²⁷⁷

²⁷⁵ European Security Research and Innovation Forum. Final Report. December 2009. Brussels: ESRIF. 33.

²⁷⁶ For more information on how to make European space assets more reactive refer to Remuss, Nina-Louisa. "Responsive Space for Europe – Elements for a Roadmap for Europe based on a comparative analysis with the U.S. Operational Responsive Space Concept.". ESPI Report 22. Vienna: European Space Policy Institute, 2010. <http://www.espi.or.at/index.php?option=com_content&task=view&id=469&Itemid=1>.

²⁷⁷ Jacq, Fabienne, Jean-Yves LeBras, Antoine Monsaingeon. op. cit.

In order to fulfil these requirements space applications face the following challenges:²⁷⁸

- improve performance in terms of technology to meet operational requirements and scenarios: ensure the continuity of information at all time, increase real time availability and reactivity in case of unplanned events and emergencies, ensure integrity and security of the information
- Space based capacities will not improve without strong support from international actors pushing for the use of space applications and promoting the added value of maritime services integrating all types of technologies into powerful integrated systems for institutions and States
- At the same time light, flexible and cost effective applications for all actors concerned (developing countries, private sector, and industry) are needed.²⁷⁹

ESA's initiative on space for crisis response (formerly known as GIANUS) is a first step in the direction of improving crisis response through the development and provision of cost-effective and sustainable crisis services²⁸⁰. In this context, Europe also needs to continue its work on a European AIS-S system to contribute to the global aim of providing an AIS-S system with global coverage.

This analysis described the technological capabilities of Europe. Yet, one of the determining factors was lax coastal and port-side security in the piracy-prone region itself. There is an obvious disparity between the high-technology force operating in the area from distant water States and the nearly complete lack of maritime security capacity among the States of East Africa.²⁸¹ The international community can support the region in building up its own surveillance capacity.

Thus funds and support should be directed to boosting the coastal monitoring and maritime surveillance capabilities of States in areas of strategic maritime importance.²⁸²

5.3.1 The Private-Sector

The primary and most important responsibility to make the sea safer rests with the carriers themselves and their responsibility to fully implement best practices for thwarting

²⁷⁸ Ibid.

²⁷⁹ Ibid.

²⁸⁰ N.B. ESA does not aim to develop or provide these services but rather to pool existing ones.

²⁸¹ Türk, Helmut. op. cit..

²⁸² Chalk, Peter. op. cit. XV.



piracy efforts²⁸³ and to avoid other maritime threats (accidents, oil spill etc.). In the case of piracy the ISPS codes require a ship security plan (SSP), appointment of a ship security officer, and the conduct of drills. Before entering an area at high risk for piracy, plans should be fully prepared and crews well trained in implementing them. Flag-carrying nations working in concert with the International Maritime Organization (IMO) should insist that carriers increase their compliance with the ISPS code. Best practices²⁸⁴ should be adopted for all maritime threats.²⁸⁵

Situational awareness in the immediate area of the ship is also key to protecting a vessel against a pirate attack whether at sea or in a port. Most vessels have navigation radars as their primary target detection system. These radars do not have the ability to detect smaller fast-moving vessels, which are used by pirates. Vessel owners and shipping companies thus need to consider alternative detection technologies that have proven successful in other areas such as long-range high-definition camera systems that have the ability to track smaller fast-moving targets.²⁸⁶

Carriers can also employ certified security consultants to serve on board vessels transiting high-risk areas. These consultants can provide guidance on security measures, as well as additional on-board training. Calls for arming merchant crews or routinely placing armed security teams on ships should be considered with caution.²⁸⁷ The same holds for the use of military force. Not only do pirates also augment the weapons they use but there is also the risk of a general escalation of the problem. This might lead to more violence by pirates against crews on hijacked vessels.²⁸⁸

The satellite industry should conduct further research into cost effective, easy to deploy industrial solutions. Difficulties persist in

²⁸³ cf. "Piraterie auf See: Kommission fordert die Mitgliedsstaaten auf, für die Durchführung von Präventivmaßnahmen zu sorgen." IP/10/267 of 11 Mar. 2010. Brussels: European Communities.

²⁸⁴ With regard to piracy those include: The International Chamber of Shipping guidance notes on Piracy and Armed Robbery, the Baltic and International Maritime Council Ship Security Guidelines, the 1999 IMO's "Recommendations to Governments for Preventing and Suppressing Piracy and Armed Robbery against Ships" and the 2002 "Guidance to Ship Owners and Ship Operators, Shipmasters and Crews for Preventing and Suppressing Acts of Piracy and Armed Robbery Against Ships." With regard to oil spill disasters there is the Oil Companies International Maritime Forum (OCIMF) Handbook.

²⁸⁵ Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. op. cit.13.

²⁸⁶ Ibid.

²⁸⁷ Ibid.

²⁸⁸ Fuhrmann, Christian, and Dieter Berg. op. cit.

globally monitoring vessel traffic whatever the location and having up to date information, as well as in the timeliness of information acquired from afar and in planning operations far from home, based only on European capacities, and in areas under different policies and organisations.²⁸⁹

Communication is of paramount importance in combating piracy (SatCom plays a major role).²⁹⁰ Thus the commercial maritime industry should be encouraged to make greater use of enabling communication.²⁹¹

In line with the innovative Integrate Maritime Management approach of the European Commission, the industry should provide integrated systems of products ranging from space applications (optical and RADAR satellite systems) to in-situ surveillance technology (suitably equipped aircraft and helicopter) guaranteeing continuous maritime surveillance capabilities while at the same time also guaranteeing monitoring of related areas such as critical infrastructures (e.g. ports) and related land points of interest (e.g. pirate bases, land borders or land-based transportation).

The industry should further get involved in outreach activities, moving beyond mere demonstrations so as to enlarge the group of addressees. The European Maritime Day (EMD) stakeholder conference has established itself as the annual event where highly productive exchanges take place across different constituencies. The Commission will further support increased stakeholder involvement in this event. At the same time, stakeholders will be encouraged to again organise de-centralised events around European Maritime Day, thus reflecting national, regional and local contributions to the Integrated Maritime Policy (IMP).²⁹²

During the EMD in 2009, several speakers in the related workshop suggested the creation of a marine and maritime platform to promote stakeholder consultation, composed of five pillars: science, industry/employment, environmental concern, public authorities/regions and leisure/users of the sea.²⁹³

²⁸⁹ Jacq, Fabienne, Jean-Yves LeBras, Antoine Monsaingeon. op. cit..

²⁹⁰ Türk, Helmut. op. cit..

²⁹¹ Chalk, Peter. op. cit. Xv.

²⁹² Commission of the European Communities. Progress Report on the EU's Integrated Maritime Policy. COM (2009) 540final of 15 Oct. 2009. Brussels: European Communities. 5.

²⁹³ see for example the intervention by Johan vande Lanotte or Xavier Gizard in Publications Office of the European Union, ed. Proceedings of the European Maritime Day Stakeholder Conference, 18-20 May 2009, Rome, Italy. Luxembourg: Publications Office of the European Union, 2009.

Another workshop outcome was the importance of drawing on the experience and knowledge of stakeholders.²⁹⁴

5.3.2 NGOs, Think Tanks and Academia

The pursuit of EU-wide governance in security research and innovation is a complex task: there remain significant differences between Members States' national policies concerning risk perception and approaches. Such differences are noticeable too in their security concepts and national governance models.²⁹⁵ Member States need to agree on rules for dealing with pirates. Think tanks and academia should be involved in research shedding light on the different approaches of the Member States to piracy.

It is essential that EU-wide governance in security research and innovation is "user" and "capability" driven. ESRIF has concluded that "[t]he search for governance in this area must proceed in parallel with the development of a "European security culture".²⁹⁶ In those fields where the EU has adopted policies (e.g., border management or the protection of critical infrastructures) there is the opportunity and need to first develop complementary and interoperable capabilities, then shared ones and, ultimately, common ones.²⁹⁶ Thus NGOs, think tanks and/or academia should further conduct research into existing national surveillance systems with the objective of establishing an inventory of the assets (and their capabilities) that need to be procured. In this context research should take place under an appropriate data policy that counters data-flow challenges.

Transportation of people and goods will remain a critical area for security research in the next 20 years. New means of transportation will be developed, having their own security specificities. At the same time "classic" security assets must be improved. Thus NGOs, think tanks and academia should pursue:

- studies on future transportation system specificities (air/ sea/space)
- operational, inter-system (air, sea etc.) contingency plan development
- development of systems for transportation network monitoring and surveillance

²⁹⁴ Publications Office of the European Union, ed. Proceedings of the European Maritime Day Stakeholder Conference, 18-20 May 2009, Rome, Italy. Luxembourg: Publications Office of the European Union, 2009. 86.

²⁹⁵ European Security Research and Innovation Forum. Final Report. December 2009. Brussels: ESRIF. 33.

²⁹⁶ Ibid.

- adaptive simulation and modelling tools development for crisis situation.²⁹⁷

The following table summarises the findings outlined above and recommendations in the three areas.

²⁹⁷ Ibid. 257.



5.4 Summary Table of Findings and Recommendations

Regional Capacity Building	Coordination Issues	Technical Capabilities
<ul style="list-style-type: none">• Establishing a regional coast guard service• Stabilising efforts in Somalia and building up of the judiciary• Building up the rule of law• Building up long-term regional partnerships• Expanding bilateral cooperation (e.g. Djibouti CoC)	<ul style="list-style-type: none">• Introduce Governance in Security Research<ul style="list-style-type: none">• research and innovation must be user and capability driven• Reinforcing Coordination at Member States' Level<ul style="list-style-type: none">• with an eye to increased coordination at EU level• responsibilities are spread across institutions• possible to observe increasing overlap of threat assessment BUT shared European concept of security yet to emerge• Improving the Interoperability of Surveillance Systems<ul style="list-style-type: none">• COM(2009) 538 "Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain"• At the moment satellite data varies depending on sectors (purpose), region and organisation: data flow challenges• Civil-military cooperation challenges• Integration with other sensors• Improving Cooperation with other International Actors	<ul style="list-style-type: none">• Need for a dedicated maritime surveillance mission composed of radar and optical satellites• High resolution radar satellite (continuity with ERS and ENVISAT class radars)• Optical imaging satellite at two spatial resolutions: high resolution for local and regional operational monitoring applications (continuity of SPOT and Landsat class) plus medium resolution for global applications (continuity of ENVISAT)• Need to fuse satellite data with all other available data• Follow-up project on DECLIMS• Research into wake detection techniques and ship identification in satellite imagery• Make space more responsive• Continue to work on a European AIS-S• the private sector<ul style="list-style-type: none">• carriers have responsibility to implement precautionary measures• satellite industry needs to conduct research into cost effective, easy to deploy industrial solutions• industry should provide integrated systems of products ranging from space applications to in-situ surveillance technology• NGOs, Think Tanks and Academia:<ul style="list-style-type: none">• to conduct research into existing national surveillance systems with the objective of establishing an inventory of assets and their capabilities• pursue studies on future transportation system specificities• pursue studies on operational, inter-system contingency plan development• pursue studies on development of systems for transportation network monitoring and surveillance• pursue studies on adaptive simulation and modelling tools development for crisis situations

Figure 50: Summary Table of Findings and Recommendations

6. Space as an Element of a European Maritime Security Strategy

Current attempts in the field of maritime surveillance are of a sectoral character dealing with environmental issues separately from security related matters. In a similar vein, technologies like satellite applications for maritime surveillance cannot be used on their own but have to be understood as complementary to other data sources and thus need to be integrated. Better shared resources between the Member States and the EU are also needed²⁹⁸ to improve the situation.

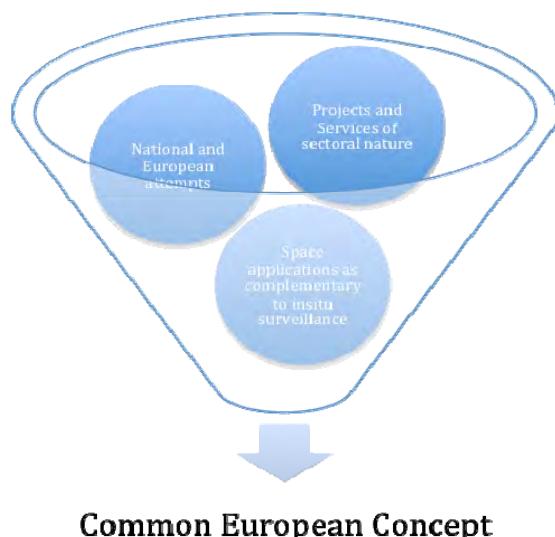


Figure 51: Visualisation of the challenges to tackle in the establishment of a common European concept

These approaches have to be integrated into one single European concept, taking into account sustainability and environmental issues at the same time as transportation and the creation of jobs. In this context different technologies contributing to the same objective should also be integrated. A push from the side of the Commission towards a more integrated approach should be acknowledged.

Given all these coordination issues the question arises as to what architecture Europe needs to build in order to establish a European Integrated Maritime Management, which includes space applications and which supports a comprehensive approach to all maritime security threats.

²⁹⁸ Chapman, John. op. cit.

When adopting such an Integrated Maritime Management (see figure below) Europe should avoid an emphasis on CSDP related maritime threats, which divert attention from the general field of surveillance of the maritime area. Instead ways should be sought to achieve mutual enhancement and cohesion between various inter-related areas of maritime surveillance.²⁹⁹

The analysis has also shown that factors such as illegal fishing are intertwined with other maritime security threats such as piracy and thus should not be treated separately. The Council has most recently invited

- » the High Representative, together with the Commission and the Member States, to undertake work with a view to preparing options for the possible elaboration of a Security Strategy for the global maritime domain.³⁰⁰

Drawing upon the previous analysis this final section will provide elements for such a strategy.

The European Maritime Security Strategy should not only solve the coordination issues and data-flow challenges as mentioned previously but should also clarify the competences of the institutions involved as well as institutionalising cooperation with other international organisations. The resulting comprehensive operational joint situational awareness will allow all actors involved to develop effective action plans.³⁰¹

²⁹⁹ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 17.

³⁰⁰ Council of the European Union. Council Conclusions on Maritime Security Strategy of 26 Apr. 2010. Luxembourg: European Communities.

³⁰¹ Perrimond, Guy. "What kind of Architecture to counter Piracy?" TTU International Bimonthly Newsletter on defence and Strategy (May 2009). <<http://www.ttu.fr/english/endocpdf/EADSpiracy2009.pdf>>.



European Maritime Area - Integrated Maritime Management

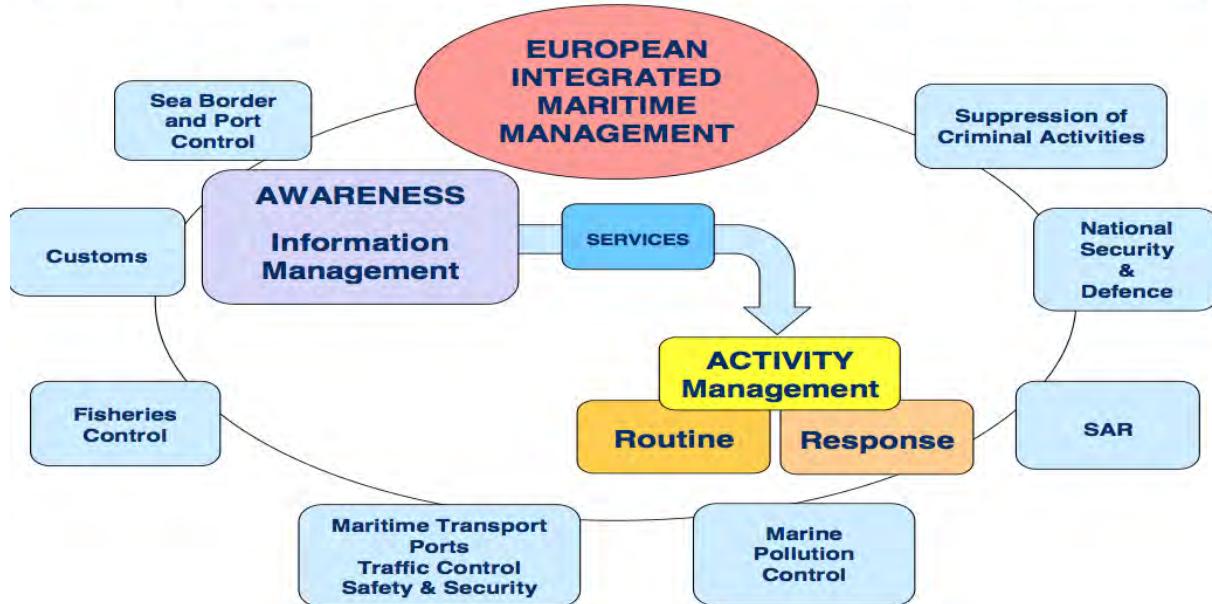


Figure 52: European Maritime Area – Integrated Maritime Management³⁰²

6.1 The Role of Space in a Maritime Security Strategy

Further, the EU Maritime Security Strategy should stress the importance of the use of technology – space applications in particular – for the provision of maritime security. The European Space Policy has identified that the strategic mission of space activities in Europe must inter alia seek “to develop and exploit space applications serving Europe’s public policy objectives and the needs of European enterprises and citizens”.³⁰³

While pirates generally adapt to counter-piracy measures by augmenting their weapons or by attacking further away from the coast when maritime surveillance capabilities increase through coastal radars, they can hardly adapt to the increased situational awareness provided by space applications.

Commercial space applications drive many of the system developments. Thus many different users utilise the same satellites for similar types of applications. The provision of maritime security thus cannot be looked at in isolation but should be part of a larger attempt to coordinate applications development.

Given the technical limitations of space applications such as the so far relatively low revisiting time, they need to be used as part of a wider system. This makes the integration of all technologies in use even more important.

Also, there is a need for a dedicated maritime surveillance mission composed of a combination of both radar and optical satellites.

When investing in space technology, it is of equal importance to invest in security for the assets themselves to ensure proper access and operational capability at any time, under any conditions. Advanced anti-jamming and encryption techniques, the hardening of systems and equipment against electronic attacks, autonomous protection tools and distributed capabilities (over a number of satellites) are examples of security measures to be considered.³⁰⁴

One of the main conclusions from ESPI’s workshop was that in many cases the technology needed is readily available but the political will to operationalise it is missing. Industry needs an impetus from policy and decision makers to develop the necessary tools such as a dedicated European Maritime Surveillance Mission or a European AIS-S.

ESA and EC funded projects need to move beyond the demonstrations phase. ESA and EC thus have to ensure that the actors involved properly deal with the transition from demonstration to operation.

³⁰² Mattila, Isto. op. cit.

³⁰³ cf. For example Commission of the European Communities. European Space Policy Progress Report. COM(2008)561 final of 11 Sep. 2008. Brussels: European Communities. 14.

³⁰⁴ European Security Research and Innovation Forum. Final Report. December 2009. Brussels: ESRIF. 33.

Better coordination among projects and improved dissemination of project results will lead to improved continuity of research in space applications and services.

Users are central to the development of new operational services but many potential users are unaware of the potential contribution of space-based services. They are thus often unable to request space-based services. The space sector in turn has limited knowledge and understanding of the demand for space-based services and lacks user requirements as a basis for new satellite missions.³⁰⁵ There is an urgent need to improve communication with the public to achieve public understanding of the added value of space.

A systematic and large-scale approach is needed to further promote the use of space and to identify, understand, federate and structure the demand for space-based services in Europe. A Google-like attitude to services provided through technologies like space applications has to be established and adopted by users. Tools need to be developed that make it easier for users to find the right service and service provider (a first step is the current STRAW project which is developing a Technology Watch including a search tool). Existing systems need to be able to "talk" to each other and see or display the other system's data. As previously identified by the U.S., data has to be made:

1. Visible (you can discover it)
2. Accessible (everybody who is authorised can access it)
3. Understandable (need for a common vocabulary for communities)
4. Trusted (people have comfort with sharing and using data knowing who will use it and where it came from)
5. Interoperable (everyone can use it), and
6. Governable (a joint approach requires some governance).³⁰⁶

Outreach projects can show the potential of space applications for maritime security and bring users and the space community together to achieve mutual understanding of

³⁰⁵ For more information on the transition between demonstration and operation cf. Matthieu, Charlotte. "Space-Based Services in Europe – Addressing the Transition between Demonstration and Operation." Report 17. Vienna: European Space Policy Institute. 6.

³⁰⁶ A similar conclusion was drawn when the U.S. looked at this matter cf. Tumin, Zachary. "Maritime Domain Awareness: A Case Study in Cross-Boundary Information Sharing Among the United States Navy, Coast Guard and Department of Transportation." 2007. Harvard University. 9 Jun. 2010 <<http://cio-nii.defense.gov/docs/MDA.pdf>>.

the benefits. It is mostly a question of communication. There is a need to create a symposium with the general public. This could be achieved through the establishment of a User-Exchange mechanism. Best practices for user involvement should be shared. EMSA seems to be a good starting point for such a process.

Building on a study of the legal aspects of the integration of maritime monitoring and surveillance data,³⁰⁷ a data policy for the sharing of maritime surveillance data has to be established so as to ensure the ability of timely decision-making for employing navies either stand-alone or in support of civil activities. At the same time certain categories of information are of a sensitive nature and thus require a decentralised approach. Currently this kind of data is being collected, fused, analysed and disseminated by the Member States at the national level. In the future national authorities should aim for data exchange in a bilateral or multinational manner, as appropriate. This way Member States keep control and ownership of the information. In addition, certain categories of information should be collected and disseminated in a centralised manner as this is more cost-efficient (e.g. port arrival and departure notifications, notifications on dangerous and polluting goods, AIS and LRIT as envisaged under SafeSeaNet). In this context, the existing Community system SafeSeaNet should be used and developed further to function as the main platform for information exchange on regular traffic in the EU maritime area.³⁰⁸

Greater cooperation among the Member States and other relevant European agencies should be promoted. National platforms dedicated to maritime surveillance should be procured. In this context cooperation between the coast guard services of EU Member States has to be strengthened following the example of the European Patrolling Network (EPN) of the Mediterranean.³⁰⁹ The EC's Mari-

³⁰⁷ Commission of the European Communities. Legal Aspect of Maritime Monitoring and Surveillance Data. FISH/2006/09 – LOT2 of Oct. 2008. Brussels: European Communities.

<http://ec.europa.eu/maritimeaffairs/studies/legal_aspects_maritime_monitoring_en.pdf>.

³⁰⁸ Mattila, Isto. "Towards an Integrated Surveillance System." Presentation. European Maritime Day. European Stakeholders' Conference. Rome, Italy. 19-20 May 2009. <http://ec.europa.eu/maritimeaffairs/maritimeday/pdf/works_hop_14/ws14_mattila.pdf>.

³⁰⁹ Opinions concerning the progressive creation of a European coast guard at EU level as put forward by the European Parliament and Council in Article 11 of Directive 2005/35/EC diverge with the ESDA/WEU (European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 17.) being in favour while the Wise Pen Team objects to this (to name only two examples). The directive invites the Com-

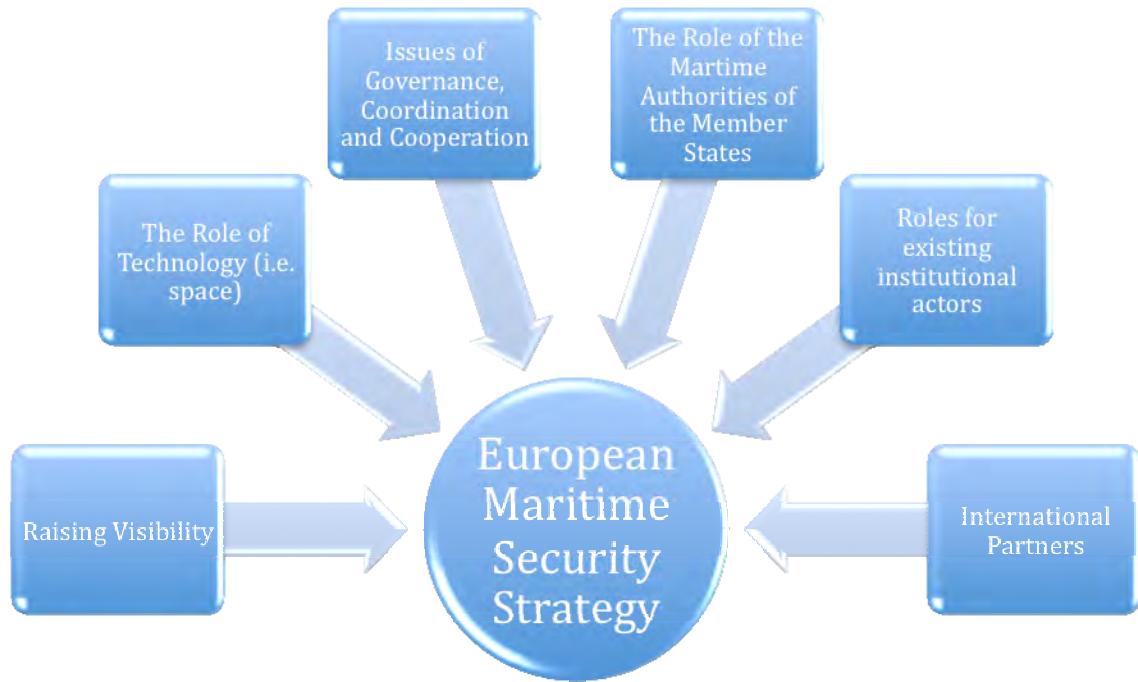


Figure 53: Three Main Categories of Elements for a European Maritime Security Strategy

time Task Force could provide a forum for the procurement of existing national surveillance systems.

6.2 Formulating a Strategy for the Development of a European Maritime Security Strategy

Apart from emphasising the role of technologies such as space applications, several more categories of elements of a European Maritime Security Strategy can be identified, which will be elaborated upon in the next sections (see Figure 54).

While raising the visibility of the EU and highlighting the role of technologies such as space applications in the provision of maritime security, the EMSS needs to solve questions of governance, coordination and cooperation, and clarify the role of the maritime authorities of the Member States as well as of the existing institutional actors with an eye to avoiding duplication. The EMSS should also lay the foundation for improved cooperation

with international partners and particularly the space-faring nations.

6.2.1 Raising Visibility

Among the priority action areas identified by the Commission for an EU integrated maritime policy is the promotion of Europe's leadership in international maritime affairs:

- » The EU will work towards more efficient international governance of maritime affairs and effective enforcement of international maritime law, urging Member States to ratify the relevant instruments. It will promote coordination of European interests in key international fora.³¹⁰

The European Union has a responsibility to play an active role by taking the lead in developing a comprehensive approach to maritime security linking the security dimension with the other fields involved (e.g. fisheries, environment etc.). It needs to combine the use of civil and military means. Only through coordinated action can Europe's leadership in international affairs be promoted and Europe's visibility in maritime security be raised.

mission to submit a feasibility study on a European coast guard. The same issue was raised in the Green Paper on EU Maritime Policy submitted by the Commission in June 2006. Moreover, the European Pact on Migration and Asylum, which was adopted by the European Council in October 2008, refers to the possible creation of a European border guard corps.

³¹⁰ Wouters, Jan, Sijbren de Jong, Axel Marx, and Philip De Man. "Study for the Assessment of the EU's Role in International Maritime Organisations." Leuven: Leuven Centre for Global Governance Studies, 2009. 19 Mar. 2010 <http://ec.europa.eu/maritimeaffairs/studies/eu_role_international_organisations_en.pdf>.

Legal Status	Name of Agreement / Organisation
Contracting party / full member (EC)	ICCAT, NAFO, NEAFC, NASCO, IOTC, WCPFC, SEAFO
Contracting party / full member (EC + MS)	UNCLOS, Part XI UNCLOS, EIA, OSPAR, HELCOM, BARCOM, FAO, UNFSA, GFCM/FAO, IBSFC, CCAMLR, CMS, CBD, AIDCP, Vienna Conv., Basel Conv., UNFCCC, Rotterdam Conv., Bonn Agr., Lisbon Agr., TBEIA, UN Conv. Illicit Traffic Narcotic Drugs, UN Conv. Transnational Organised Crime, Nuclear Safety, Safety on spent Fuel
Full participant	CSD
Observer (* Observer status European Commission)	UNGA, RAMSAR, Cartagena Conv., UNEP, Bucharest Commission, CCSBT ⁸² , IWC, CITES, IATTC ⁸³ , IMO*, UNCND, IAEA, ILO
No recognised status	Antarctic Treaty

Figure 54: Overview of EC Participation in IMAOs according to the Legal Status³¹¹

The table in Figure 55 shows Europe's participation in international organisations related to maritime affairs.³¹¹

In order for Europe to raise its visibility, ways and procedures need to be sought and established that guarantee that Europe is speaking with one voice in these fora. The EC is a full member in a number of International Maritime Affairs Organisations (IMAOs) especially in the area of fisheries and is a contracting party to many international agreements in the maritime field. Community participation is often hampered both from an institutional and a procedural point of view.³¹² The related study by Leuven University on the EU's role in international maritime organisations concluded the following:³¹³

- the EC should make good use of the opportunities offered by Article 302 TEC and act within its power to ensure a timely reception of all documents from IMAOs needed for proper coordination, pursuant to its task of maintaining all appropriate relations with international organisations
- all EU actors should cooperate in ensuring that difficulties arising during internal coordination are resolved in a timely manner before the start of an IMAO session

- EU actors should cooperate to enhance the visibility of the EU on the international scene by explaining its specific competences
- procedural guarantees should be established ensuring more consistency and coherence in coordination on the spot during sessions, emphasising thereby the crucial role of the Presidency and the Commission in this regard. If the current Presidency is held by a Member State with limited maritime interests or not involved in the specific regional forum, its coordination tasks could be fulfilled for instance by the preceding or succeeding Presidency.³¹⁴

6.2.2 Issues of Governance, Coordination and Organisation

Security Research needs to be supported by a proper institutional structure that coordinates

³¹¹ Wouters, Jan, Sijbren de Jong, Axel Marx, and Philip De Man. op. cit. 30.

³¹² Ibid.

³¹³ Ibid.

³¹⁴ According to the above mentioned study "the comport of Member States with regard to the adoption and expression of Community, common and coordinated positions is dictated by their duty of loyal cooperation, as enshrined in Article 10 TEC, and by what the ECJ has termed "the requirement of unity in the international representation of the Community". Especially for international negotiations of areas falling under shared competences, the ECJ has repeatedly stressed that it is essential to ensure close cooperation between the Member States and EC institutions, "both in the process of negotiation and conclusion and in the fulfillment of the commitments entered into. [...] The Community institutions and the Member States must take all necessary steps to ensure the best possible cooperation in that regard". Case C-25/94 Commission v Council [1996] ECR I-1469, para. 48. Quoted in Ibid.

projects, disseminates their results and provides for continuity. Effective coordination between national and European research activities is needed. Otherwise Europe risks delays and continuous problematic approaches. Research in space applications and services will also benefit from an improved governance structure.

ESRIF has recently proposed the following structure and approach (see Figure 56).

Areas of authority among the European institutions must be clarified and the provision of maritime security established as a matter that cuts across institutions and policy areas. The main challenge is to bring together different instruments and capacities created over time within different institutional structures and different rationales. The current institutional set-up must be reviewed.

The EMSS also has to address the issue of coordination at Member State level and the problem of interoperability of surveillance systems.

6.2.3 What Role for the Maritime Authorities of EU Member States?

From a security point of view, the main re-

quirements from Member States and Europe are simple:

- to protect their economic interests whatever their location and routes, thus all over the globe, thus at long range
- to prevent potential threats that could reach European coasts by detecting suspect activities and react before the incident could occur
- to ensure that coastal areas remain environmentally friendly and safe from threats.³¹⁶

The European Maritime Strategy and the related Integrated Maritime Management need to take the existing platforms into account particularly the national navies, who have the greatest number of assets deployed at sea in coastal and international waters and also have permanently available command structures in maritime operation centres, allowing the position of ships at sea to be identified and continually updated.³¹⁷

The European Maritime Security Strategy also needs to foresee and formulate a role for candidate (e.g. Turkey) and associated countries. For example, the EU and Turkey have signed an agreement concerning illegal immi-

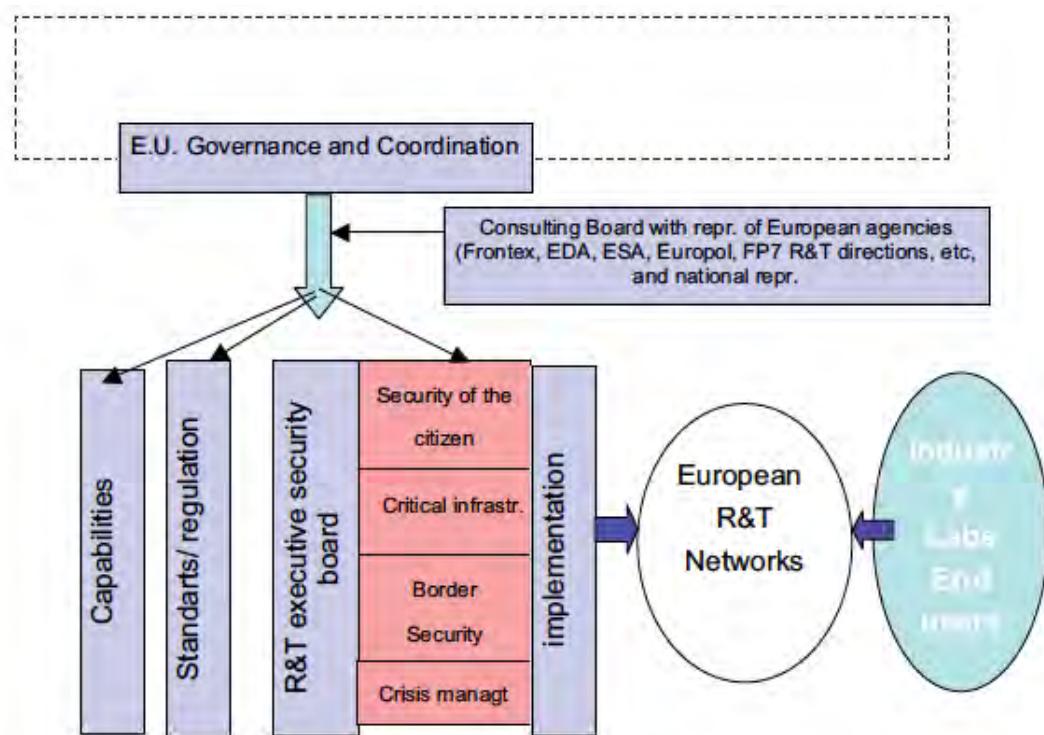


Figure 55: EU Governance and Coordination for Security Research as proposed by ESRIF³¹⁵

³¹⁶ Jacq, Fabienne, Jean-Yves LeBras, Antoine Monsaingeon. op. cit..

³¹⁷ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 13.

³¹⁵ ESRIF 226

gration. Turkey should be supported in building up the necessary infrastructure to implement this agreement.

Member States should support the efforts of the EC, Frontex and EMSA to coordinate maritime surveillance operations³¹⁸ and take the necessary actions at national level to improve coordination among the different government departments involved in maritime surveillance activities and designated responsible authorities.³¹⁹

It is particularly important to create the political will to change things. Oceans, seas and coasts have to be brought onto the political agenda.³²⁰ Current and upcoming EU Presidencies should actively promote this matter.

6.2.4 Roles for Existing European Institutional Actors

The European Maritime Security Strategy needs to lay down the roles of current European institutional actors, which have evolved gradually and have thus become involved into the provision of maritime security.

The EC as an “initiator” should continue to provide the policy background for an integrated approach while the EP should act as a forum to bring together expertise and provide recommendations to the Council.

Specifically, the EC should pursue efforts to organise sound cooperation with the countries on the southern Mediterranean and Atlantic coast of Africa in order to combat effectively all forms of trafficking in particular drug trafficking and illegal immigration as well as to establish a sound counter-piracy policy.³²¹

Europe needs to participate in the reconciliation process in Somalia in order to establish the rule of law there.³²²

The EC should support EMSA’s efforts to enhance the quality of data by integrating the SSN, CSN and LRIT surveillance system into STIRES.³²³

As has been shown, the current EU ATALANTA NAVFOR mission relies to a high degree on information provided by the European Union Satellite Centre. The latter has already acquired some experience in GEOINT

and the production of products to support ESDP missions. This experience and know-how should be made available to other areas in the broader field of maritime security. On the one hand, EUSC’s products could also be of assistance to other policy fields (currently it is mandated to support ESDP and CFSP missions only); on the other, EUSC’s products and know-how could be used to convince policy makers and decision makers of the necessity to include space applications as an instrument within the overall EU strategy for maritime security and maritime surveillance.

The prominence of piracy in the media and the success of EUSC’s support to the EU ATALANTA NAVFOR mission could be used to increase the general awareness of the media and the public about the added value of space applications in the provision of security.

The EC’s Maritime Task Force could provide a forum for the procurement of existing national surveillance systems.

The JRC has already acquired some experience in testing and experimenting with maritime security systems. It should further conduct research into cost-effective initiatives for better securing ships and oceanic freight. “Security operatives will increasingly be faced with enormous amounts of information. These need to be filtered, made sense of, displayed and visualised in interfaces that are capable of handling massive amounts of data input, in order to create a comprehensive and detailed yet not cluttered common operation picture.”³²⁴ Thus, as recommended by ESRIF, further research on optimum methodologies for the conduct of operations is necessary. Given the expertise acquired, JRC is a suitable actor to do this.

ESA and EC have to ensure that all maritime threat areas are covered equally in an integrated management structure. Results from demonstrations and FP research should be seriously considered by ESA when planning and deciding on new satellite missions. User requirements should provide building blocks for new satellite projects.

6.2.5 International Partners

An integrated maritime policy also requires extensive cooperation with international organisations and relevant multilateral fora, as

³¹⁸ Ibid. 2-3.

³¹⁹ Ibid.

³²⁰ Publications Office of the European Union, ed. Proceedings of the European Maritime Day Stakeholder Conference, 18-20 May 2009, Rome, Italy. Luxembourg: Publications Office of the European Union, 2009. 86.

³²¹ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 2-3.

³²² Ibid. 2.

³²³ Ibid. 2-3.

³²⁴ European Security Research and Innovation Forum (ESRIF) “European Security Research and Innovation in Support of European Security Policies. Final Report.” Luxembourg: Office for Official Publications of the European Communities, 2009.

<http://www.esrif.eu/documents/esrif_final_report.pdf>. 258.



well as third countries. The EU should actively seek cooperation with other countries and relevant international organisations on a proper institutional basis. The European Maritime Security Strategy needs to account for the active cooperation of the EU with other international partners while at the same time establishing a mechanism to ensure that the EU speaks with a single voice on the international stage and in international fora such as the IMO. The EU and ESA should engage in a dialogue with organisations like IMO, UN, NATO and OSCE.

The European Union and its Member States are part of a highly interdependent and complex world. Thus the future needs of European security policy, strategy and research should be driven not only by internal developments related to the process of European integration. Rather a dialogue should take place both at the EU and the transatlantic level. Although the United States and Europe

have taken a lead role in organising the two main multinational fleets patrolling the waters off Somalia, their governments need to harmonise their foreign seaport and maritime trade security assistance programmes.³²⁵ Greater U.S.-European cooperation in the field of maritime security is needed. Without systematic pan-European and transatlantic coordination, each side of the Atlantic is at greater risk.

The U.S. and Europe should aim at presenting a unified message to the world both about their commitment and their values. Even though they each have a completely different institutional set-up, mechanisms have to be found to arrange for cooperation and coordination.

In particular, NATO and the EU should work together against piracy. The existing relationship between NATO and the EU needs to be improved, making them ever more integrated, reducing duplication and creating permanent joint structures of cooperation, while respecting the independent nature of both organisations.³²⁶

³²⁵ Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. op. cit.

³²⁶ European Security Research and Innovation Forum (ESRIF) "European Security Research and Innovation in Support of European Security Policies. Final Report." Luxembourg: Office for Official Publications of the European Communities, 2009. <http://www.esrif.eu/documents/esrif_final_report.pdf>. 222.

Actors	Proposed Actions
Council and HR	<ul style="list-style-type: none"> - formulate an EU Maritime Security Strategy, which <ul style="list-style-type: none"> - integrates sectoral approaches - lays down the European Approach to the provision of maritime security - promotes leadership and raises visibility - provides overall guidance - provides a mechanism for Europe to speak with one voice in international fora related to maritime affairs - <i>highlights the added value of space applications</i> - <i>provides for the integration of civil and military capabilities</i> - formulates a role for candidate and associate countries - complements the ESS - prove the EU is an "actor" - <i>security research (incl. that related to space) needs to be supported by a proper institutional structure, coordinating projects, disseminating their results and providing for continuity</i> - <i>establish a data policy with the purpose of sharing maritime surveillance data</i> - review the mandates and missions of the EU agencies (e.g. EUSC, EMSA etc.) - establish a dialogue with the U.S. to increase transatlantic coordination <ul style="list-style-type: none"> - a dialogue should take place both at the EU and the transatlantic level - the EU and the U.S. should aim at presenting a unified message about both their commitment and the fundamental values they espouse. - <i>The EU and the U.S. have to establish mechanisms with the objective of sharing best practices at both a strategic and practical level ranging from data sharing to the sharing of expertise in technology development and particularly the use of space applications in this realm</i> - increased coordination and cooperation is only possible if both sides provide a certain degree of openness towards the other sides approach - mechanisms have to be found to arrange for cooperation and coordination among EU institutional actors, among EU and Member State authorities, and among EU and international partners ensuring coordination of projects, dissemination of project results and avoiding duplication of efforts - it is of particular importance to clarify institutional responsibilities at EU level and to communicate these to U.S. counterparts as a basis for an increased dialogue even at agency level in order to have close cooperation even at lower levels for sharing best-practices - <i>expert groups for specific topics could provide for enhanced cooperation and coordination in specific fields</i> - HR to foster common positions among the Member States to create the political will for change: oceans, seas and coasts have to be brought onto the political agenda - actively seek international cooperation - increase cooperation and coordination with NATO
Member States	<ul style="list-style-type: none"> - <i>improve coordination between national security (incl. space) research activities and European level research programmes</i> - <i>security research (incl. the one related to space) needs to be supported by a proper institutional structure, coordinating projects, disseminating their results and providing for continuity</i> - <i>make publicly available national efforts and results and findings of studies regarding the use of space applications for maritime security to show what capabilities and projects have already been conducted in order to decrease the potential for duplication</i> - <i>share best practices in space applications for the provision of maritime security</i> - <i>make data available so as to integrate national vessel monitoring systems</i>



	<p>(like the EADS VTS on the coast of Portugal) into a community vessel monitoring system</p> <ul style="list-style-type: none">- support the efforts by the EC, Frontex and EMSA to coordinate maritime surveillance operations and take the necessary actions at national level to improve coordination among different national authorities involved
European Commission	<ul style="list-style-type: none">- continue to provide the policy background for an integrated approach- pursue efforts to organise sound cooperation between regional players- support EMSA's efforts to integrate SSN, CSN and LRIT into STIRES- the Maritime Task Force can act as a forum for the procurement of existing national surveillance systems- ensure that all maritime threat areas are covered equally in an integrated manner- support stakeholder involvement in the European Maritime Day- create a marine and maritime platform to promote stakeholder consultation
European Parliament	<ul style="list-style-type: none">- act as a forum to bring together expertise and become involved through recommendations to the Council regarding the formulation of a Maritime Security Strategy
Council Secretariat (EUMS, COPS, EUMC)	<ul style="list-style-type: none">- create necessary expertise through the organisation of research conferences as was done when formulating the ESS- inform the EP on progress (EP has financial oversight)
Industry	<ul style="list-style-type: none">- satellite industry to conduct further research into cost effective, easy to deploy industrial solutions- provide integrated systems or products guaranteeing continuous monitoring and availability of maritime surveillance data- show added value of space applications for the provision of maritime security- make an effort to integrate new fields of users- present space-applications as innovative solutions particularly in times of financial and economic crisis- educate users so that they will demand services
ESA	<ul style="list-style-type: none">- encourage cooperation among the industry- foster multi-purpose missions- ensure that the actors involved in ESA funded projects properly deal with the transition from demonstration to operation- establish a user-exchange mechanism- seriously consider results from demonstrations and FP research when planning and deciding on new satellite missions- user requirements should provide building blocks for new satellite projects- educate users so that they will demand services- Giants and IAP shall form part of a greater effort to establish a dialogue between users- help to foster a Google-like attitude to technology-led services
EMSA	<ul style="list-style-type: none">- help to foster a Google-like attitude to technology-led services through its existing and well-established contacts with users- SSN to become basis for integrated maritime surveillance system
JRC	<ul style="list-style-type: none">- conduct research into cost-effective initiatives for better securing ships and oceanic freights- research on methodologies of optimum operations conduct is needed
NGOs, Think Tanks and Academia	<ul style="list-style-type: none">- become involved in research shedding light on the different approaches of the Member States to piracy (threat scenarios, definition of security etc.)- conduct further research into current national surveillance systems with the objective of establishing an inventory of the assets and capabilities that need to be procured- conduct research into an appropriate data policy countering data-flow chal-

	<p><i>lenges and allowing for the sharing of maritime surveillance data with the objective of establishing a joint operational situational maritime awareness.</i></p> <ul style="list-style-type: none">- Conduct studies on<ul style="list-style-type: none">o future transportation system specificitieso operational, inter-system contingency plan developmento development of systems for transportation network monitoring and surveillanceo adaptive simulation and modelling tools development for crisis situation
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Figure 56: Overview of Proposed Actions³²⁷

³²⁷ italics indicate the relation to space applications



Annex

A.1 Definitional Aspects

Art.101 of the United Nations Convention on the Law of the Sea (UNCLOS) of 1982 defines piracy as

- » (a) any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed: (i) on the high seas, against another ship or aircraft, or against persons or property on board such ship or aircraft; (ii) against a ship, aircraft, persons or property in a place outside the jurisdiction of any State;
- » (b) any act of voluntary participation in the operation of a ship or of an aircraft with knowledge of facts making it a pirate ship or aircraft;
- » (c) any act of inciting or of intentionally facilitating an act described in subparagraph (a) or (b).³²⁸

The UNCLOS definition of piracy has become recognised as international law and has been accepted by the International Maritime Organization (IMO). Thus international law restricts "piracy" to incidents that take place on the high seas or outside the jurisdiction of any State. However, according to the IMB, nearly all illegal acts in Southeast Asia occur within territorial waters and thus would not fall under the definition of piracy.^{329 330 331} Technically, if an attack occurs within the territorial jurisdiction of a State, the event is only classified as piracy if that nation's penal code criminalises it as such. Moreover, the IMO defines any unlawful act of violence or detention or any act of depredation at anchor, off ports or when underway through a coastal State's territorial waters as armed robbery against ships.

Consequently the IMB uses a wider definition of "piracy" thereby overcoming the distinc-

³²⁸ For the full text of the UNCLOS cf. <http://www.un.org/Depts/los/convention_agreements/texts/unclos/part7.htm>. The same definition was first codified in the UN Convention on the High Seas of 1958 (Art. 15).

³²⁹ "Defining Maritime Terrorism and Piracy." Maritime Terrorism Research Center 22 Feb. 2010 <<http://www.maritimeterrorism.com/definitions>>.

³³⁰ Chalk, Peter. op. cit. 3.

³³¹ Türk, Helmut. op. cit..

tions between high seas and territorial waters, defining it as

- » an act of boarding or attempting to board any ship with the apparent intent to commit theft or any other crime and with the apparent intent or capability to use force in furtherance of that act³³²

This IMB definition also abolishes the traditional two-ship requirement, meaning that attacks from a raft or even the dockside would be counted as an act of piracy.³³³ The IMB differentiates between three main types of crimes currently occurring in global waters:

1. low-level armed robbery: anchorage attacks mounted against ships at harbour;
2. medium level armed robbery: violent thefts involving serious injury or murder by well-organised gangs who usually operate from a "mother ship" and are equipped with modern weaponry
3. major criminal hijacks: assaults involving the outright theft of ships and their subsequent conversion for the purpose of illegal trading³³⁴ often referred to as the phantom ship phenomenon.³³⁵

While this wider definition allows the IMB to produce a more comprehensive picture of maritime crime, its definition is not recognised by international law.³³⁶ However, the IMO at the 74th meeting of the MSC in December 2002 addressed the issue of definition in the context of the draft Code of Practice for the Investigation of Crimes of Piracy

³³² Fuhrmann, Christian, and Dieter Berg. op. cit.

³³³ Chalk, Peter. op. cit. 3.

³³⁴ This form of piracy follows a typical pattern: A vessel is first seized and its cargo offloaded into lighters at sea. The ships are then renamed and reregistered under flags of convenience (FoCs) and issued with false documentation to enable them to take on fresh payloads. The new cargo, which is never delivered to its intended destination, is taken to a designated port where it is sold to a buyer who is often a willing participant in the venture.

³³⁵ Chalk, Peter. op. cit. 5-6; Stehr, Michael. "Piraterie und Terrorismus auf See: Zwei Bedrohungen – eine Gefahr." Informationsdienst Terrorismus 5 (2004): III-V.

³³⁶ "Defining Maritime Terrorism and Piracy." Maritime Terrorism Research Center 22 Feb. 2010 <<http://www.maritimeterrorism.com/definitions>>.

and Armed Robbery against Ships (MSC/Circ.984) article (2.2) (The Code of Practice) and combined both definitions. The related article now repeats the UNCLOS' definition but adds the following

- » [a]rmed Robbery against Ships means any unlawful act of violence or detention or any act of depredation, or threat thereof, other than an act of "piracy", directed against a ship or against persons or property on board such ship, within a State's jurisdiction over such offences³³⁷

The above definitions now cover actual or attempted attacks whether the ship is berthed, at anchor or at sea.³³⁸

The term piracy is often used to refer to a range of crimes committed against or on seafaring vessels or on the water. Not all of these count as piracy by the strict legal definition, nor would all be subject to universal jurisdiction since these other crimes often fall within the jurisdiction of a territorial sovereign.³³⁹

Contemporary research often draws on working definitions of the term "piracy" or "piratical attack" in order to circumvent persisting loopholes in existing definitions.³⁴⁰

A.2 The Maritime Terrorism – Piracy Nexus

Recent incidents together with generally heightened security apprehensions post-9/11 have galvanised fears that terrorists, particularly those connected with the international jihadist network could move beyond purely territorially-bound "theatres" and engage in maritime terrorism.³⁴¹ One of the main concerns is that terrorist groups will seek to overcome existing operational constraints on sea-based capabilities by working in conjunction with or subcontracting out missions to pirates.³⁴² Some even claim that if boarding a tanker is so easy that pirates are capable of doing so, terrorists would be able to do so also. Once a ship is hijacked, terrorists would

have a whole range of potentially disastrous tools at their disposal.³⁴³

In contrast to piracy, maritime terrorism refers to

- » the undertaking of terrorist acts and activities (1) within the maritime environment, (2) using or against vessels or fixed platforms at sea or in port, or against any one of their passenger or personnel (3) against coastal facilities or settlements, incl. tourist resorts, port areas and port towns or cities.^{344 345}

The RAND Corporation has identified five main factors that support the argument of a presumed shift in extremist focus to water-based environments:

1. many of the vulnerabilities that have encouraged a higher rate of pirate attacks also apply to terrorism;
2. the growth of commercial enterprises specialising in maritime sports and equipment has arguably provided terrorist with a readily accessible conduit through which to gain the necessary training and resources for operating at sea;
3. maritime attacks offer terrorists an alternate means of causing mass economic destabilisation;
4. sea-based terrorism constitutes a further means of inflicting mass coercive punishment on enemy audiences;
5. the expansive global container-shipping complex offers terrorists a viable logistical conduit for facilitating the covert movement of weapons and personnel in two critical respects: first, because much of the maritime trading system is designed to be as accessible and flexible as possible (to keep costs low and turnover high) there is no strong incentive to enact a stringent and disruptive regime of security measures and, second, the highly complex nature of the containerised-supply chain combined with the ineffectiveness of point-of-origin inspections, creates a plethora of openings for terrorist infiltration by

³³⁷ For the full text of the Code refer to <http://www.imo.org/includes/blastDataOnly.asp?data_id%3D1880/984.pdf>.

³³⁸ ICC International Maritime Bureau. op. cit.

³³⁹ Andersen, Elisabeth, Benjamin Brockman-Hawe, and Patricia Golf. op. cit..

³⁴⁰ see for example the analysis in Scheffler, Alessandro. "Piracy – Threat or Nuisance?" NATO Defense College Research paper 56 (2010). Rome: NATO Defence College, 2010.

³⁴¹ Chalk, Peter. op. cit. Xiii.

³⁴² Chalk, Peter. op. cit. 31.

³⁴³ Stehr, Michael. "Piraterie und Terrorismus auf See: Zwei Bedrohungen – eine Gefahr." *Informationsdienst Terrorismus* 5 (2004): III-V.

³⁴⁴ This definition is used by the Council for Security Cooperation in the Asia Pacific Working Group on Maritime Terrorism. Although relatively broad it captures the essential qualities of the phenomenon in question. Chalk, Peter. op. cit. 3.

³⁴⁵ "Defining Maritime Terrorism and Piracy." Maritime Terrorism Research Center 22 Feb. 2010 <<http://www.maritimeterrorism.com/definitions>>.



providing extremists with numerous opportunities to "stuff" or otherwise tamper with boxed crates.³⁴⁶

Given these supportive arguments, there is an emerging concern that maritime piracy could become linked with extremist movements³⁴⁷ leading to the emergence of a tactical nexus between piracy and terrorism,³⁴⁸ in which pirates become agents of international terrorist networks.

According to a Chatham House analysis, money from ransoms is already helping to pay for the war in Somalia including funds to the U.S. terror-listed Al-Shabaab.³⁴⁹ The Heritage Foundation supports this argument claiming that Al-Shabaab benefits from pirate activities in several ways, for example, pirates are used to smuggle goods and weapons from Yemen to Somalia. There are also documented cases where pirates have transported foreign fighters into the country and terrorists out, including one of the perpetrators on a bombing in Yemen in March 2009 that killed four South Korean tourists. Moreover, pirates share the proceeds with Al-Shabaab as they are allowed to operate in the areas controlled by the Islamist group. Some reports suggest that pirates have been helping train and equip the militias so that they can expand Islamist control over Somali coastal waters.³⁵⁰ Such a line of argumentation has however not been supported by any European governmental authority. On the contrary, in response to questions by several insurance companies as to whether there is indeed a connection between terrorists and pirates, governments presently deny this and stress that there is no proof of ransoms supporting terrorist activity.³⁵¹

Acknowledging the supportive arguments for the emergence of a maritime terrorism-piracy nexus, operating at sea requires terrorists to have marine skills, access to appropriate assault and transport vehicles, the ability to mount and sustain operations from a non-land based environment and certain specialist capabilities (e.g. surface and underwater demolition techniques).³⁵² Thus, while such a scenario is definitely thinkable, presumed convergence between maritime terrorism and piracy remains highly questionable. To date there has been no credible evidence to sup-

port speculation that such a nexus is indeed emerging.

The objectives of the respective actors remain entirely distinct.³⁵³ While the business of piracy is directly dependent on a thriving and active global shipping industry and is aimed at profit, terrorists in contrast are at least in the context of the contemporary jihadist network assumed to be seeking the destruction of the global maritime trade network as part of their self-defined economic war against the West.³⁵⁴ Pirates and terrorists thus in fact contradict each other. Research into terrorism has also proved that terrorists are inherently conservative when it comes to choosing attack modalities: they adhere to tried and tested methods.³⁵⁵ Moreover, an attack on a ship is less likely to attract the same publicity as an attack on land-based targets.³⁵⁶

A.3 Keynote speech by Judge Helmut Türk: Space and Maritime Security – Strategies and Capabilities to Counter Piracy

Keynote speech by Judge Helmut Türk, Vice-President of the International Tribunal for the Law of the Sea

Vienna, 30 November 2009

Dear Mr. President of the Austrian Institute for European and Security Policy,

Dear Mr. Director of the European Space Policy Institute,

Ladies and Gentlemen,

It is a distinct honour and high privilege indeed to have been asked to speak before such a distinguished and well-informed audience on the question of piracy, which in recent years has become a true scourge for the international community. I am very much looking forward to today's discussions on "Space and Maritime Security – Strategies and Capabilities to Counter Piracy" which will, I am certain, be enlightening for all of us. Although the focus of this Workshop will mainly be on the technical aspects of combating piracy, as an international lawyer and a judge, I will concentrate on some of the legal issues involved, which are of equal importance.

³⁴⁶ Chalk, Peter. op. cit. Xiii.

³⁴⁷ Türk, Helmut. op. cit..

³⁴⁸ Chalk, Peter. op. cit. XIV.

³⁴⁹ Middleton, Roger. "Piracy in Somalia – Threatening Global Trade, Feeding Local Wars." Chatham House Briefing Paper. London: Chatham House, 2008..

³⁵⁰ Carafano, James Jay, Richard Weitz, and Martin Edwin Andersen. op. cit. 9.

³⁵¹ Fuhrmann, Christian, and Dieter Berg. op. cit.

³⁵² Chalk, Peter. op. cit. 19.

³⁵³ Ibid. XIV.

³⁵⁴ Ibid. 31.

³⁵⁵ Ibid. 19.

³⁵⁶ Ibid. 20.

Let me first of all recall that the oceans and the marginal seas have long been an indispensable arena for intercourse between human communities. Before there was air traffic and instantaneous communication, people, goods, and ideas travelled the world by ship. Today, even with advances in technology, seaborne commerce remains the linchpin of the global economy. According to the International Maritime Organization (IMO) "more than 90 percent of global trade is carried by sea". The same percentage holds true for the external trade of the European Community and furthermore, over 40% of its internal trade is carried by sea. As you are aware, there are critical chokepoints for maritime traffic, in particular, the Strait of Malacca, transited by around 50.000 vessels annually transporting about 50 % of the total volume of oil transported by sea and the Gulf of Aden, with about 22.000 vessels annually coming from or sailing to the Suez Canal, carrying more than 12 % of that volume.

In 2008, maritime piracy reached its highest level since the Piracy Reporting Centre (PRC) of the International Maritime Bureau (IMB), a specialized division of the International Chamber of Commerce (ICC), began tracking piracy incidents in 1992. In that year global piracy increased by 11 % with piracy in East Africa up a stunning 200 %, with more than 120 attacks of piracy and armed robbery having taken place off the coast of Somalia. I am afraid that for this year the final statistics will not be much better, if not worse. This surge in sea robbery is unprecedented and perhaps the most significant eruption of such criminal activity in 200 years, with the pirates making no discrimination among vessels. Many pirates seek to justify their actions as a response to illegal foreign fishing and the dumping of toxic waste in Somali waters, respectively the country's 200-nautical mile exclusive economic zone.

As has been pointed out in a document jointly elaborated by the United Nations Office on Drugs and Crime and the European Commission, pirate groups may often be linked to other forms of organized crime since they maintain relatively sophisticated intelligence collection networks and are engaged in the systematic corruption of local officials. Funds from ransoms are widely distributed within local communities, and in some areas of Somalia piracy is becoming a major source of income. A parallel illicit economy has been created, leading to a growing dependency of coastal communities on funds obtained from piracy. There is also evidence that the rise of maritime piracy feeds the conflicts in Somalia and contributes to further destabilizing the country by strengthening the resources avail-

able to certain groups. Finally, an emerging concern is that maritime piracy could become linked with extremist movements.

Let me underline that today's pirates constitute a serious threat not only for those at the front line: seafarers, fishermen and shipping companies, but also for the international community at large, due to the repercussions they have on world trade and international security. Current day piracy has been estimated to cost between \$13 and \$16 billion every year, a figure that could even be substantially higher in the future. This resurgence of piracy and armed robbery against ships is attributable to many factors, from the poverty of coastal populations and desire for financial gain, to the weakness of some States' policing functions, or even, as in the case of Somalia, the absence of an effective government and economic collapse, to the deficiencies of the legal environment characterized by both an insufficient legal framework and the lack of a response mechanism to counter piratical activities.

Ladies and Gentlemen,

What is commonly thought of as piracy has existed for thousands of years. It, however, dwindled to a controllable and almost unnoticeable activity at the end of the 19th century, only to make a strong comeback, though in a different cast, in recent years. Indeed, at the turn of the 19th century and for the greater part of the 20th century, piracy seemed to have faded away into the mists of history. The crime of piracy thus also began to disappear from some criminal codes or was not included therein in the first place. In the 1960s, piracy, however, slowly started its surge towards emerging once more as a regional, if not a global, menace by the 1980s. South-East Asia first took centre stage in this unfolding drama, only recently to be replaced by the region off the coast of Somalia as the piracy hotspot of the world.

The notion of piracy was first codified by the 1958 Geneva Convention on the High Seas and later by the 1982 United Nations Convention on the Law of the Sea, although being circumscribed by these legal instruments in a rather narrow manner, as it includes only acts committed for "private ends" on the high seas and only undertaken by one ship or aircraft against another ship or aircraft. Pirates are thus able to evade pursuit by crossing into territorial waters, which constitutes a genuine problem. In 2001, the IMO therefore adopted a definition of "armed robbery against ships" which is "any unlawful act of violence or detention or any act of depredation, or threat thereof, other than an act of

'piracy', directed against a ship or against persons or property on board such a ship within a State's jurisdiction over such offences".

Piracy is the oldest and one of the few crimes where universal jurisdiction has been generally recognized under customary international law. The right to take enforcement measures against pirates is vested in all States. Anyone of them has therefore the right to capture and punish pirates under its own municipal law even when the accused pirate is not a national of the State and the crime was neither committed against its nationals nor within its territorial waters. States accepted universal jurisdiction over piracy because pirates indiscriminately attacked all States' ships and were a threat to everyone – which is still the case today.

According to the 1958 Convention on the High Seas and the United Nations Convention on the Law of the Sea "all States shall cooperate to the fullest possible extent in the repression of piracy on the high seas or in any other place outside the jurisdiction of any State." The question has arisen whether these Conventions regulate the seizure of pirates as a right or a duty; whether the States are obliged to adopt and implement anti-piracy legislation. The view seems certainly justified that the suppression of piracy besides being a right is also an international duty. Obviously, States must be allowed a certain latitude as to the measures they should take to this end in any individual case."

The steadily increasing danger for navigation in the Gulf of Aden and off the coast of Somalia as well as the outrage caused by pirate attacks on ships carrying humanitarian supplies to the Somali population have been decisive in prompting the international community into action in that region. In 2008, the United Nations Security Council passed several Resolutions dealing with Somali piracy, each of these pursuant to Chapter VII of the United Nations Charter, under which the Council may authorize the use of military force against threats to international security and which are binding on all U.N. member States. These Resolutions aim at remedying the limitations of the rules of current international law with respect to piracy, as far as their application to Somalia is concerned, permitting *inter alia* pursuit from the high seas into territorial waters, and also provide a legal basis for interception operations by the warships of a large number of countries.

I may leave it to other speakers to go into greater detail with respect to the military efforts in the region, in particular as regards

the European Union operation "Atalanta". Let me, however, point out that according to my information these international efforts have partly been hampered by the fact that the naval forces have to answer to individual national authorities with varied rules of engagement as well as by incompatible communications. The communications aspect, however, seems of paramount importance in combating piracy, satellite systems obviously playing a major role. In addition, there seems to be obvious disparity between the high-technology force operating in the area from distant water States and the nearly complete lack of maritime security capacity among the States of East Africa. Large warships are extremely capable but they seem too few in number and are not ideal for conducting maritime security operations. Smaller warships would certainly be more appropriate – perhaps coast guard vessels equipped with helicopters. Furthermore, East African States need assistance in developing and operating a vast network of small littoral and coastal forces. Providing military training to Somali government forces so that they can prevent maritime piracy is undoubtedly a step in the right direction.

It has correctly been stated that international law has little to say about the manner in which piracy may be suppressed. Self-defence against armed attack or threat thereof seems to be a guiding principle of States the navies of which are engaged in anti-piracy efforts off the coast of Somalia. Action against pirates can be assimilated to the exercise of the power to engage in police action on the high seas with respect to foreign vessels in accordance with international legal rules. It would, however, seem that in any case the use of force must be necessary, proportionate and should be preceded by warning shots where practicable. As the International Tribunal for the Law of the Sea has emphasized in a case before it "considerations of humanity must apply in the law of the sea, as they do in other areas of international law".

The seizing States, however, seem to be reluctant to exercise the broad powers they have with respect to prosecuting and submitting to criminal proceedings in their courts the pirates and armed robbers arrested in view of legal complexities and in particular human rights implications. Thus pirates in a number of instances have been let free or not been detained in the first place. Member States of the European Convention on Human Rights are obviously concerned that pirates might request asylum in the respective countries as they certainly would claim to risk torture or the death penalty if returned to

Somalia. Furthermore, after pirates had served a sentence and been granted asylum they might also ask for family reunion; no country would, however, be eager having to import pirate clans.

Ideally, suspects should be tried in the country where they originated but in the case of Somalia this does – at least under present circumstances - not seem to be a realistic option. Flag States could, of course, prosecute the pirates, but in many cases ships in the region fly flags of convenience of far away countries. An option, which has been made use of is to conclude bilateral agreements with a country in the region, defining procedure for the detention, transfer and prosecution of persons suspected of having committed acts of piracy, as the United States and the European Union have done with Kenya. The latter agreement contains human rights guarantees and, *inter alia*, expressly provides that such transfer may only take place on condition of humane treatment and that no one will be subjected to the death penalty, to torture or to any cruel, inhuman or degrading treatment or punishment. It remains, however, to be seen whether the Kenyan justice system will, in the long run, really be willing and able to cope with a major influx of suspected pirates. That country certainly does not wish to become a “dumping ground” for piracy suspects from the entire region.

The question is currently under discussion whether part of the legal response of the international community to piracy should be the creation of an international piracy court or tribunal. Several suggestions have been made in this respect, such as the creation of an entirely new international tribunal on the basis of a Security Council Resolution following the pattern of the international criminal tribunals for the former Yugoslavia and Rwanda, the establishment of an African regional anti-piracy court in the same manner, the creation of a hybrid tribunal following the model of the Special Court for Sierra Leone, or amending the statutes of the International Tribunal for the Law of the Sea or the International Criminal Court in the Hague by an international treaty. As regards the International Tribunal for the Law of the Sea, it must be borne in mind that, at present, it could deal with piracy issues only insofar far as they relate to disputes between States or if a legal question would be submitted to it on which it might render an advisory opinion.

Ladies and Gentlemen,

In concluding, let me emphasise that as part of the efforts to repress piracy and armed robbery against ships the enactment of fur-

ther modern national anti-piracy legislation is certainly required. Despite some recent progress regarding the adoption and implementation of relevant national legislation important challenges remain. The conclusion of a special anti-piracy convention regulating the manner in which piracy may be suppressed and the application of the principle of universal jurisdiction would certainly seem useful, although not an absolute necessity.

It yet remains to be seen whether the international community will eventually decide to establish an international mechanism for the prosecution and punishment of suspected pirates. If there are impediments in this respect in national courts, those should be addressed as a matter of urgency and not deferred in favour of attention to an international tribunal that may not anytime soon be available – if at all. What should not happen, in any case, is that pirates go free due to the lack of proper legislation or political will. No matter how intimidating the presence of an international naval force may be and how efficient that force is, pirates will not be deterred if they know that there is no law to judge them.

Thank you very much for your kind attention.

A.4 Options for Prosecuting Pirates

Overseeing prosecutions is both costly and challenging. With local communities benefiting from pirate activity, States might prove to be hesitant to oppose piracy actions. Moreover governments may “worry about the optics of prosecution (for example, Kenyans concerned about prosecuting fellow Africans for crimes committed against non-Africans).”³⁵⁷ High costs of prosecution are exacerbated by the reality that the majority of those prosecuted are the so-called “foot soldiers” from the skiffs as opposed to the “kingpins” overseeing a pirate network. Participation of Europe or the U.S. in prosecutions of, for example, “kingpins” may provide an incentive to other States to carry out prosecutions.³⁵⁸

As an alternative option to trying suspects in Kenya, the idea has arisen to amend the statutes of the International Criminal Court (ICC) or the International Tribunal for the

³⁵⁷ Andersen, Elisabeth, Benjamin Brockman-Hawe, and Patricia Golf. op. cit.

³⁵⁸ This whole section is to a large degree based on the outcomes of discussions in the following workshop: Andersen, Elisabeth, Benjamin Brockman-Hawe, and Patricia Golf. op. cit..



Law of the Sea by an international treaty or to establish a specific adhoc Piracy Tribunal following the example of the Special Court for Sierra Leone or the international criminal tribunals for the former Yugoslavia and Rwanda.

Option 1: Bringing Pirates within the International Tribunal for the Law of the Sea (ITLOS)

As regards the International Tribunal for the Law of the Sea, it must be borne in mind that, at present, it could deal with piracy issues only insofar far as they relate to disputes between States or if a legal question would be submitted to it on which it might render an advisory opinion.³⁵⁹

Option 2: Bringing Piracy within the realm of the International Criminal Court (ICC)

Bringing piracy within the realm of the ICC also proves difficult. Piracy crimes could today be brought within the jurisdiction of the ICC by amendment or through protocols annexing additional crimes. Opponents underline that annexing treaty crimes would

1. overwhelm and trivialise the Court,
2. increase the number of threats to which the Court and witnesses would be exposed,
3. require participating States to reveal information concerning intelligence gathering
4. result in a Court à la carte, and
5. raise too many complicated questions concerning the relationship between the Rome Statute and individual treaties (e.g. would a State have to ratify both the Statute and the treaty in order for treaty crimes to be covered?).

Critics also feel that States should or would only be interested in investing substantial resources in legal solutions that contributed to a culture of rule of law in the region where pirates are operating, and that prosecuting pirates before the ICC would not fulfil this purpose.

This is why the alternative idea of establishing a Special Chamber of the ICC or establishing an adhoc tribunal, which could be located anywhere and have the same positive effect on rule of law, has arisen. Such courts are often referred to as "hybrid" courts because they combine elements of both domestic and national courts as well as international tribunals.

³⁵⁹ Türk, Helmut. op. cit..

Option 3: Following the Model of the Special Court of Sierra Leone

Option one would be to establish a tribunal through a treaty between the UN and a target State, such as the Special Court for Sierra Leone. Given that there is currently no functioning government in Somalia, this model cannot be applied to Somalia but could be applied to the establishment of a piracy tribunal in Kenya or any other adjacent State.

Option 4: UN administrative body model

A second model for a piracy court could be the UN administrative body model, which has been adopted in East Timor or Kosovo, whereby the UN exercises sovereign authority, including legislative functions. This would however require the UN to be interested in taking this responsibility upon itself and establishing a court in Somalia under the administration and management of the State.

Option 5: Following the Model of the Palace of Justice trials held in Nuremberg

Another model is that of the Palace of Justice trials held in Nuremberg, which were imposed on Germany by the allied powers. Based on this model it is possible to conceive of a piracy tribunal imposed on a weak State such as Somalia with the consent of States in the global community.

Option 6: Following the Model of the ad hoc international criminal tribunals for the former Yugoslavia and Rwanda

The international *ad hoc* tribunals constituted in the past have been criticised for costing more than anticipated, permitting trials to advance at a slow pace and operating as a fig leaf to conceal international apathy. It has also been claimed that ad hoc tribunals tend to take on a life of their own. Thus, empowering multiple States to prosecute piracy cases is perceived to be cheaper than establishing a single international piracy tribunal.

A.5 Policies

Apart from the European Security Strategy,³⁶⁰ which qualified piracy as a new dimension of organised crime needing further attention, and its subsequent implementation report of 2008³⁶¹, which highlighted piracy as

³⁶⁰ The European Security Strategy of 12 Dec. 2003 <<http://www.consilium.europa.eu/uedocs/cmsUpload/78367.pdf>>.

³⁶¹ Council of the European Union. Report on the Implementation of the European Security Strategy – Providing

a single issue with respect to the stabilisation of the neighbourhood of the EU, few EU policies and documents of maritime security deal with the piracy threat alone. Rather one can identify a strong emphasis on an integrated approach, including the integration of space applications.

A.5.1 Policies Improving Maritime Surveillance (Causative Factor 4)

In 2002, Directive 303/59/EC of the European Parliament and the Council established a Community Vessel Traffic Monitoring and Information System (VTMIS) with the objective of enhancing safety. It covers all ships of 300 gross tonnage and upwards, regardless of their freight, except for: warships, fishing vessels, traditional ships and recreational craft less than 45 metres in length, and bunkers under 5,000 tons. Operators of ships bound for a European port must notify information such as ship identification, total number of persons on board, port of destination, estimated time of arrival) to the port authority at least twenty-four hours in advance, where this is feasible. Each ship built on or after 1 July 2002 calling at a European port must in addition be fitted with an AIS as well as a voyage data recorder (VDR, "black box").³⁶²

In 2006 the EU introduced a Green Paper entitled "Towards a future Maritime Policy for the Union: A European vision for the oceans and the seas"³⁶³, which declared "the particular need for an all-embracing maritime policy". The Green Paper emphasised that such a maritime policy needs to provide answers to questions related to decision-making as well as the added value of an EU policy in the context of existing national, local and private initiatives in the field. It proposes a comprehensive approach to sectors as diverse as fisheries, shipbuilding tourism, energy, environmental protection and maritime safety. All these sectors have been treated separately in the past and shall now be treated under a single heading.

The Commission in 2007 proposed the development of a European Border Surveillance

Security in a Changing World. S407/08 of 11 Dec. 2008.
Brussels: European Communities.

³⁶² "Maritime safety: Community monitoring, control and information system for maritime traffic." Summaries of EU legislations 30 July 2009
<http://europa.eu/scadplus/leg/en/lvb/l24243.htm>.

³⁶³ Commission of the European Communities. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions Towards a future Maritime Policy for the Union: A European Vision for the Oceans and Seas. COM(2006) 275 final of 7 June 2006.
Brussels: European Union.

System (EUROSUR) supporting the Member States in reaching full situational awareness at their external borders and in increasing the reaction capability of their law enforcement authorities. It would help prevent unauthorised border crossings, reduce the number of illegal immigrants losing their life at sea as well as contribute to the prevention of cross border crime. In this regard, the Commission mentions the significant contribution space applications offer for surveillance at sea.

The European Commission presented a Maritime Policy Action Plan³⁶⁴ for an "Integrated European Maritime Policy" in October 2007, enumerating a set of actions to be taken as a first step towards the implementation of the new policy. The subsequent European Council meeting of 14 December 2007 welcomed the Communication and stressed that "[t]he future integrated maritime policy should ensure synergies and coherence between sectoral policies, bring added value and fully respect the principle of subsidiarity."

The subsequent Commission Communication entitled "An Integrated Maritime Policy for the EU"³⁶⁵, the so-called "blue book", additionally emphasised the need to establish a network for maritime surveillance. It specifically mentioned vessel tracking and e-navigation including satellite monitoring and long-range identification and tracking (LRIT) as an invaluable tool. In the context of the development of a roadmap facilitating maritime spatial planning in 2008, it emphasised the importance of building on, inter alia, the GMES initiative. It called upon the EU to take steps in 2008 towards a European Marine Observation and Satellite Network and to promote the multi-dimensional mapping of Member States' waters in order to improve access to high quality data building upon GEOSS and GMES. It identified five areas of action necessary to launch an integrated maritime policy for the EU

1. Sustainable use of oceans and seas
2. Knowledge and innovation
3. Quality life in coastal regions
4. European leadership in international maritime affairs and

³⁶⁴ Commission of the European Communities. Commission Staff Working Document accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions "An Integrated Maritime Policy for the European Union.". SEC(2007) 1278 of 10 Oct. 2007. Brussels: European Communities.

³⁶⁵ Commission of the European Communities. COM(2007) 575 final. op. cit.



5. Visibility of maritime Europe and its heritage.

Given the complexity of the maritime transport sector, i.e. short sea shipping differing from deep-sea shipping and its competition with land transport as well as the differing externalities, the EU launched a wide-ranging study assessing trends and shipping scenarios over the period 2008-2018 with the aim of preparing a European strategy for maritime transport. Additionally, the Commission initiated a consultation process with stakeholders on the concept of a European Space for Maritime Transport without barriers, and implementing options including a related conference that took place in 2008.

In June 2008 the Commission issued a Working Document on Maritime Surveillance Systems³⁶⁶, summarising the information on existing systems at EU level thereby focusing on the data sharing aspects. It discussed systems like VMS, AIS, VTS, LRIT, several special reporting regimes, GMDSS and SSAS, explicitly pointing out what information is transmitted, when and to whom, for each of the systems under discussion. It concluded that VMS is relatively far advanced in operational data sharing between countries, but at the same time quite restricted in any sharing outside the fisheries sector. National and regional sharing of AIS data is developing fast. Europe-wide sharing of vessel traffic data is progressing under SafeSeaNet based on the Community vessel traffic monitoring and information system directive of 2002. The degree of integration and cooperation between surveillance systems and authorities in the southern EU countries in the framework of border security varies widely between almost non-existent cooperation in some countries, via different authorities using the same surveillance system, to relatively advanced integrated systems to which several authorities contribute.

In October 2008 the Commission published a non-paper on the current State of the art of surveillance, monitoring, tracking, identification and reporting systems put in place by EU Member States and EU Agencies, thereby identifying the main challenges ahead and indicating a set of next steps in view of the establishment of a work plan foreseen by the Action Plan.³⁶⁷ Accordingly, space is an im-

portant element in an envisaged integrated network. The non-paper recognises the existence of satellite-based systems for sectoral purposes (e.g. Vessel Monitoring System (VMS) for fisheries control, CleanSeaNet for oil spill detection etc.). By giving an overview of GMES and surveillance, it also recognises the attempts of several FP 6 and FP 7 projects to develop tools for a pan-European Maritime Surveillance capacity. In this context the EU's main objective is not to create an additional surveillance system but rather to integrate maritime policy and set-up interfaces and integrate existing systems across sectors and borders.

In the Transportation Strategy of January 2009,³⁶⁸ the Commission called for an integrated information management system interfacing with the e-Freight, e-Customs and the Intelligent Transport systems. In this context, it particularly emphasised fusion of broadband applications with other on-board and land-based monitoring and communication systems such as AIS, L RIT, SafeSeaNet³⁶⁹ and CleanSeaNet, and those that are being developed, such as Galileo and GMES. It also emphasised the need to promote the creation of a platform to ensure the convergence of sea-, land- and space-based technologies, the integrity of applications and appropriate management and control of information on a "need-to-know" basis. This will improve the integration of shipping in the various logistic chains and simplify paperwork on board ships.³⁷⁰

In January 2009, the Commission proposed an action plan with a view to establish a European maritime transport space without barriers.³⁷¹ At the same time the Commission also presented a comprehensive ten-year strategy plan³⁷² to promote safe, secure, clean and efficient shipping. In this context it explicitly mentioned the promotion of better use of information and communication tech-

³⁶⁶ European Commission/ Joint Research Centre, Ispra. Integrated Maritime Policy for the EU: Working Document III - On Maritime Surveillance Systems. 14 June 2008. Ispra. http://ec.europa.eu/maritimeaffairs/pdf/maritime_surveillance_non_paper.pdf.

³⁶⁸ The Commission of the European Communities. COM (2009) 8 final. op. cit.

³⁶⁹ SafeSeaNet is a European Platform for Maritime Data Exchange (4 types: ship, port, alert, hazmat) between Member States' maritime authorities in form of a network/Internet solution based on the concept of a distributed database.

³⁷⁰ Commission of the European Communities. SEC(2007)1278. op. cit.

³⁷¹ Commission of the European Communities. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Communication and Action Plan with a View to Establishing a European Maritime Transport Space without Barriers. COM(2009) 10 final of 21 Jan. 2009. Brussels: European Union.

³⁷² Commission of the European Communities. COM (2009) 8 final. op. cit.

nologies such as satellite broadband communications. Among the strategic goals and recommendations for the EU's transport policy, the Commission calls for a firm response from Member States and the Commission to counter piracy and armed robbery and makes protection of seafarers, fishermen and passengers on ships sailing off the coast of Somalia "the most urgent priority". As a goal for 2018, the Commission highlights the introduction of an integrated information management system enabling the identification, monitoring, tracking and reporting of all vessels at sea and on inland waterways to and from European ports and in transit through or in close proximity to EU waters. In doing so all available resources such as AIS, LRIT, SafeSeaNet, CleanSeaNet, Galileo, GMES should be taken into account. The Commission explicitly calls for ensuring the convergence of sea-, land- and space-based technologies.

In September 2009 the Commission issued a Communication entitled "Towards an Integrated Maritime Policy for better governance in the Mediterranean" (COM(2009) 466 final),³⁷³ which recognised *inter alia* that

- » in most Mediterranean States, each sectoral policy is pursued by its own administration, just as each international agreement is performed within its own set of rules, rendering an overview of the cumulative impact of maritime activities, including at basing level, a difficult objective to attain.³⁷⁴

The Commission stressed that "the development of a strategic and integrated approach at national level is at the roots of integrated maritime policy-making". The Communication provides for the following concrete steps that the Commission will undertake in order to establish an integrated maritime policy in the Mediterranean:³⁷⁵

- Support structured and informal dialogue amongst Mediterranean coastal States through high-level meetings, academic and other international organisations, with the aim of improving governance of the marine space, including at sub-regional level
- Provide an overview of existing agreements and organisations relating to maritime affairs in the Mediterranean

³⁷³ Commission of the European Communities. Towards an Integrated Maritime Policy for better governance in the Mediterranean. COM (2009) 466 final of 11 Sep. 2009. Brussels: European Union.

³⁷⁴ Commission of the European Communities. COM (2009) 466 final. op. cit.

³⁷⁵ Ibid.

- Make recommendations for the improvement of cross-sectoral cooperation between existing agreements and organisations
- Continue to encourage the ratification and concerted implementation of UNCLOS in its bilateral relations
- Launch a study on the costs and benefits of establishing maritime zones.
- Encourage stakeholder platforms to regularly address Mediterranean Sea issues, with the aim of suggesting priorities on integrated maritime policy-making at basin level.
- Explore options for better associating stakeholders from all coastal States.
- Provide a web-based inventory of ICZM tools, best practices and case studies, with a view to enhancing its implementation.
- Support under the EU's 7th Framework Programme (FP7) the development of the knowledge base on ICZM in the Mediterranean, with particular focus on international co-operation.
- Test possibilities for strengthening the land-sea interface, in particular linking up terrestrial and maritime planning, through MSP actions
- Launch a pilot project to improve co-operation amongst national authorities of Mediterranean Member States responsible for maritime monitoring, surveillance operations and exchange of information between port authorities.
- Present a set of principles guiding integrated maritime surveillance in the EU in a forthcoming Communication, so as to move progressively from a sectoral to an integrated approach to maritime surveillance at EU and national levels.

In October 2009 the Commission issued a "Progress Report on the EU's Integrated Maritime Policy".³⁷⁶

In October 2009 the Commission issued a Communication entitled "Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain" (COM(2009)538)³⁷⁷, which

³⁷⁶ Commission of the European Communities. Progress Report on the EU's Integrated Maritime Policy. COM (2009) 540 final of 15 Oct. 2009. Brussels: European Communities.

³⁷⁷ Commission of the European Communities. Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain. COM (2009) 538 final of 15 Oct. 2009. Brussels: European Union.

puts forward several guiding principles for the development of a common information sharing environment for the EU maritime domain in the context of taking "steps towards a more interoperable surveillance system, bringing together existing monitoring and tracking systems used for maritime safety and security, protection of the marine environment, fisheries control, control of external borders and other law enforcement activities."³⁷⁸

The main goals of this Communication are to establish greater cooperation amongst national authorities, improve maritime situation awareness of Member States' authorities by providing comprehensive information for better decision-making and maximise the use of existing sectoral systems by ensuring they are interoperable.³⁷⁹ In achieving these goals the EU mainly faces the following challenges: (1) to respect the principle of subsidiarity, (2) to respect different legal frameworks and (3) technical challenges.³⁸⁰ In this context the Commission stressed the interoperability of data and the abolition of duplicated data transfers when interlinking user communities.³⁸¹

The Commission is currently preparing an integrated maritime surveillance plan (roadmap) bringing together the maritime operations of the EU Member States by the end of 2010. This initiative aims at creating a maritime surveillance network through merging civilian and military operational data (1) within and (2) between, the Member States. This is envisaged in two steps:

1. to ask Member States to define the different stakeholders (i.e. customs, judicial authorities, coast guard services, armed forces etc.) on their territory needing to have access to the maritime surveillance network;
2. the Commission will work with the national governments in order to define a non-hierarchical technical framework for linking the control and surveillance systems of each of these stakeholders into a common information-sharing environment. The idea, then, is to structure the system in such a way as to allow each stake-

³⁷⁸ COM (2007) 575 final of 10.10.2007 in Commission of the European Communities. Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain. COM (2009) 538 final of 15 Oct. 2009. Brussels: European Union.

³⁷⁹ Mattila, Isto. "Space for Security - Space Systems: A key Surveillance Tool for a Global Maritime Security and Safety?." Presentation of 4 Dec. 2009.

³⁸⁰ Ibid.

³⁸¹ E.g. Traffic monitoring data should be disseminated only once via the Safe-Sea-Net system.

holder to make its data available to the others.³⁸²

A.5.2 Policies Improving Coastal and Port-Side Security (Causative Factor 5)

Coastal Security (Combating Illegal Fishing)

The Commission has been concerned with illegal, unreported and unregulated (IUU) fishing for over a decade. Based on the FAO's 2001 International Plan of Action to prevent, deter and eliminate IUU fishing the Commission adopted an Action Plan against IUU fishing in 2002. Given the deterioration of the problem of IUU, the European Community intensified its action by launching a consultation process in 2007. A Proposal to prevent, deter and eliminate IUU fishing was adopted in October 2007 and a Regulation to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing was adopted on 29 September 2008³⁸³, by unanimous political agreement. The regulation entered into force on 1 January 2010.³⁸⁴ The Commission has also drafted a handbook³⁸⁵ to facilitate the implementation of the IUU Regulation, giving practical advice for both authorities and stakeholders in EC Member States and third countries.³⁸⁶

As a result of the reform of the Common Fisheries Policy (CFP) launched on the basis of the 2001 Green Paper, the European Community External Fisheries Policy integrated sustainable development principles with particular emphasis on IUU have been incorporated.³⁸⁷

³⁸² European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 5-8.

³⁸³ For the full text of the regulation cf. <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:286:0001:0032:EN:PDF>>. Implementation rules were laid down in a subsequent Commission Regulation no. 1010/2009 of 22 October 2009, which can be found at: <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:280:0005:0041:EN:PDF>>. The Commission amended and complemented the original regulation through Commission Regulation No.86/2010 of 29 Jan. 2010, which can be accessed at: <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:026:0001:0016:EN:PDF>>.

³⁸⁴ "Combatting Illegal Fishing." DG FISH 27 Apr. 2010 <http://ec.europa.eu/fisheries/cfp/external_relations/illegal_fishing_en.htm>.

³⁸⁵ The full text of the handbook can be found at: <http://ec.europa.eu/fisheries/cfp/external_relations/illegal_fishing/pdf/handbook_en.pdf>.

³⁸⁶ A good overview of the Commissions actions in combatting IUU can be found in "Combatting Illegal Fishing." op. cit.

³⁸⁷ DG for Fisheries and Maritime Affairs. "The European Community External Fisheries Policy." Brussels: European Communities.

Port-Side Security

EU initiatives to enhance port-side security aim to complement international efforts in this area such as the International Ship and Port Facility Security Code (ISPS). The European Parliament together with the Council adopted a Directive³⁸⁸ on enhancing port security on 26 Oct. 2005, with the main objective of introducing a security system in all port areas in order “to guarantee a high and comparable level of security in all European ports”³⁸⁹. The directive complements the Commission’s Regulation (COM(2003) 229 final)³⁹⁰ of May 2003 establishing a ship and port facility security system in line with the amendments of the SOLAS (Safety of Life at Sea) Convention and the ISPS (International Ship and Port facility Security) Code. The ISPS includes detailed requirements for governments and port authorities to evaluate and improve port-side security.³⁹¹ The ISPS has been implemented through Regulation 725/2004 of 31 March 2004.³⁹²

The Directive requires Member States to nominate a port security authority for each port, which is responsible for identifying and taking the necessary port security measures. Different security levels are established in line with the perceived risk (normal, heightened or imminent threat). Member States must communicate the security level in force for each port as well as any changes thereto. Member States are also asked to nominate a security officer in each port, acting as a contact point for security related issues. Moreover, Member States are obliged to ensure that port security assessments and port security plans are reviewed every time security-relevant changes occur, and at least every five years.³⁹³

<http://ec.europa.eu/fisheries/documentation/publications/externalpolicy_en.pdf>.

³⁸⁸ The European Parliament and Council. Directive on enhancing port security. Directive 2005/65/EC of 26 Oct. 2005. Brussels: European Union.

³⁸⁹ “Port Infrastructure: Enhancing Port Security.” Europa Summaries of EU Legislation 27 Apr. 2010 <http://europa.eu/legislation_summaries/transport/waterborne_transport/l24162_en.htm>.

³⁹⁰ The full text can be found at <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2003:0229:FIN:EN:PDF>>.

³⁹¹ Delegation of the European Commission to the United States. “Securing Trade: The EU’s Approach to Port and Maritime Container Security.” EU Insight 21 (2008). <<http://www.eurunion.org/News/EUNewsletters/EUInsight/2008/EUInsightContainerJuly2008.pdf>>.

³⁹² For the full text of the regulation cf. <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:129:0006:0091:EN:PDF>>.

³⁹³ “Port Infrastructure: Enhancing Port Security.” op. cit.

Commission Regulation (EC) No. 324/2008³⁹⁴ of 9 April 2008 lays down revised procedures for conducting Commission inspections in the field of maritime security.

The security of ports also falls within the EU’s policies on critical infrastructure protection.

In 2005, the Commission created a Critical Infrastructure Warning Information Network (CIWIIN), bringing together Member State CIP specialists to assist the Commission in drawing up a programme to facilitate exchange of information on shared threats and vulnerabilities and appropriate countermeasures and strategies.³⁹⁵ In December 2006, the Commission presented a Communication on a European Programme for Critical Infrastructure Protection (EPCIP), which sets out the principles, processes and instruments proposed to implement the EPCIP.³⁹⁶ It recognises that the security and economy of the European Union as well as the well-being of its citizens depend on certain infrastructures and the services they provide. Pursuant to this, the Commission organised two seminars involving both Member States and industry and decided to put forward a Green Paper outlining the options for EPCIP.

Additionally, the Green Paper on a European Programme for Critical Infrastructure Protection (EPCIP) has laid down as the main objective of EU policy in Critical Infrastructure Protection (CIP)³⁹⁷ the ability to prepare for, protect against, mitigate, respond to, and recover from critical infrastructure disruptions or destruction.

Finally, Council Directive 2008/114/EC on the identification and designation of European critical infrastructure and the assessment of the need to improve its protection filled the gaps in the existing structures by providing definitions long yearned for. By defining European Critical Infrastructures (ECI), it laid down, inter alia, the difference between a national and a European critical infrastruc-

³⁹⁴ For the full text cf. <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:098:0005:0010:EN:PDF>>.

³⁹⁵ The U.S. has a similar system known as the Critical Infrastructure Warning Information Network (CWIN), which has been operational since 2003. Euractiv. “Critical Infrastructure.” 7 June 2005. Euractive 11 Mar 2009 <<http://www.euractiv.com/en/security/critical-infrastructure/article-140597>>.

³⁹⁶ European Council Secretariat. “European Critical Infrastructure.” EU Council Factsheet. Luxembourg: Justice and Home Affairs Council, 2008. <<http://www.eurunion.org/partner/euusterror/EUCritInfrastructFactsheet-6-5-08.pdf>>.

³⁹⁷ Commission of the European Communities. Green Paper on a European Programme for Critical Infrastructure Protection. COM (2005) 576 final of 17 Nov. 2005. Brussels: European Communities.

ture. In particular it establishes CI as part of the internal market.

While all of these documents advance the field of CIP by defining threats and vulnerabilities, none of them propose the incorporation of space applications in CIP. The policy level thus does not explicitly recognise the potential of space applications in the fight against piracy.

A.5.3 Policies Countering Corruption and Improving the Degree of Statehood of Adjacent States (Causative Factor 6 and Determinant 1)

The EU has long supported the establishment of a peaceful and secure environment in Somalia by encouraging reconciliation, democracy and the development of governance structures at all levels.³⁹⁸

The EC has committed itself politically and financially to effectively contribute to the creation of a favourable environment for the peace process in Somalia.³⁹⁹ Over the years, the European Commission has funded hundreds of development projects across all regions of Somalia such as:

- Help for Non-State Actors acquiring skills to contribute to peace building, reconciliation and dialogue
- Access to quality basic education for thousands of young girls across Somalia
- Assistance to farmers in Lower and Middle Shabelle to diversify production
- Assistance to agro-pastoralists in Somaliland and Puntland through small scale irrigation & oasis farming
- Support to veterinary services and livestock exports
- Assistance to mixed agriculture, improvement of storage facilities and plant genetic resources
- Vocational training for young adults in the field of business administration.⁴⁰⁰

³⁹⁸ "EU Relations with Somalia." European Commission 27 Apr. 2010 <http://ec.europa.eu/development/geographical/regionscountries/countries/country_profile.cfm?cid=so&type=short&Inq=en>.

³⁹⁹ For details on funding areas refer to "Somalia: Fact Sheet." European Commission 27 Apr. 2010 <http://ec.europa.eu/development/icenter/repository/assistance_UЕ_somalia_2009_EN.pdf>

⁴⁰⁰ "Somalia: Fact Sheet." European Commission 27 Apr. 2010 <http://ec.europa.eu/development/icenter/repository/assistance_UЕ_somalia_2009_EN.pdf>

In spring 2009 the EU organised an action to support the investigation and prosecution of persons suspected of having committed acts of piracy. In less than 45 days, the Commission, with the support of UNODC, set up a € 1.75 billion regional programme with the objective of helping the Kenyan authorities to bring pirates to justice.

The Commission (Directorate General for Development DG DEV) uses the European Development Fund to finance:

- promotion of long-term development in Somalia and the region;
- support to the establishment of democracy and the creation of appropriate State institutions;
- funding of AMISOM (African Union Mission in Somalia).

Moreover, the Commission has been taking action against piracy in the framework of its Instrument for Stability (IfS) programme since 2007. The IfS Strategy Paper 2007/2011 as well as the subsequent Multi-annual Indicative Programme 2009-2011⁴⁰¹ include a programme on critical maritime routes. While the focus was initially on the Malacca Straits and Singapore, it recently shifted to Djibouti, Yemen and Somalia. This led in April 2009 to the adoption of a number of proposals for regional action, and in particular to the signing of the Djibouti Code of Conduct by the various coastal States of the region.⁴⁰² The main areas of action of the critical maritime routes programme are:

- "supporting regional cooperation and building capacity of selected coastal states;
- focusing on information sharing and co-ordination, thereby contributing to better coordination with the international community and of the response capacity of coastal States in order to respond to security, piracy and safety threats;
- setting up an Information Sharing and Fusion Centre (ISFC) in Sanaa (Yemen); –setting up the Documentation and Training Centre on Maritime Affairs in Djibouti;
- reinforced capacity of coastal States' coast guards and administrations, starting with Yemen and Djibouti;

⁴⁰¹ Commission of the European Communities. The Instrument for Stability — Multi-annual Indicative Programme 2009-2011. C(2009)2641 of 8 Apr. 2009. Brussels: European Communities.

⁴⁰² This section is largely based on the account in European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit.. 15-7.

- in the medium to long term, setting up of a regional cooperation mechanism on the blueprint of ReCAAP (Regional Cooperation Agreement against Armed Robbery and Piracy)".

In a joint undertaking of the Commission and the Council, the European Union has adopted a comprehensive and integrated approach covering assistance to Somalia, improving the legal and judicial framework and regional cooperation (Factor 6: corruption / safe havens; Factor 5: lax coastal and port-side security and determinant 1: Degree of Statehood of adjacent States) as set out in the Somalia Joint Strategy Paper for 2008-2013.⁴⁰³ The annexes to this document propose six options on how to address this problem:

- appointing an EU Special Representative for the region;⁴⁰⁴
- regional maritime capability development;
- reinforcing support for the African Union in Somalia;
- capacity building for the Somali security sector (including the Somali Police Force, Coast Guard and National Security Forces);
- assistance strategy and State building;
- reinforced international legal framework to increase the risks and reduce the profits for pirates.

The documents also mention the following four overall goals:

- to help secure and consolidate the legitimate federal institutions of Somalia (Determinant 1);
- to assist the reconstruction of the State and the economy (Causative Factors 3, 5 and 6);
- to contribute to the stabilisation of the region (Determinant 1);
- to reinforce maritime security off the Somali coast in the context of a comprehensive maritime areas and resources

⁴⁰³ Cf. Somalia Joint Strategy Paper for 2008-2013 <http://ec.europa.eu/development/icenter/repository/scanned_so_csp10_en.pdf>.

⁴⁰⁴ For an overview of the EU special representatives cf. "EU Special Representatives." Council of the European Union 3 May 2010 <<http://www.consilium.europa.eu/showPage.aspx?id=263&lang=en>>.

management capability (Causative Factors 4 and 5, and Determinant 2).⁴⁰⁵

Upon an initiative by France, the EU has also announced plans to train Somali security forces in neighbouring Djibouti.⁴⁰⁶

Apart from regional initiatives aimed at improving the situation in Somalia, the EU is engaged further in regional cooperative initiatives such as cooperation with Morocco to secure the Mediterranean region, the Barcelona Process and regional cooperation with the Black Sea region (particularly with regard to the huge oil and gas transport requirements of that region) etc.⁴⁰⁷ These regional cooperative initiatives largely aim at countering illegal immigration.

Most recently the Council commended the launch of EUTM Somalia (7 Apr. 2010) a military training mission in Uguance, which will contribute to strengthening the Somali Security Forces through the provision of specific military training for 2000 Somali recruits. The mission will facilitate the coordination of EU action with AMISOM.⁴⁰⁸

A.5.4 Policies Countering Illegal Trade (Proliferation of SALW) (Causative Factor 7)

According to the European Security Strategy (ESS) the consequences of the illicit manufacture, transfer and circulation of small arms and light weapons (SALW) are central to the five challenges (i.e. terrorism, proliferation of Weapons of Mass Destruction (WMD), regional conflicts, State failure and organised crime) as highlighted by the ESS.

Even before the ESS, the EU tackled the proliferation of SALW through the Council Joint Action adopted in 1998 on SALW accumulation⁴⁰⁹ (renewed in 2002)⁴¹⁰. This Joint Action

⁴⁰⁵ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit. 15-7.

⁴⁰⁶ Strickmann, Eva. op. cit.

⁴⁰⁷ For an overview of the regional cooperative initiatives consult the related analysis in European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. Op. cit..

⁴⁰⁸ Council of the European Union. Council Conclusions on CSDP of 26 Apr. 2010. Brussels: European Union. This mission had been decided by Council of the European Union. Council Decision on a European Union military mission to contribute to the training of Somali security forces. 2010/96/CFSP of 15 February 2010. Brussels: European Union.

⁴⁰⁹ Council of the European Union. Joint Action adopted by the Council on the basis of Article J.3 of the Treaty on European Union on the European Union's contribution to combating the destabilising accumulation and spread of small arms and light weapons. 1999/34/CFSP of 17 December 1998. Brussels: European Communities.

⁴¹⁰ Council of the European Union. Joint Action on the European Union's contribution to combating the destabilis-



has been used as a basis for specific actions in Africa, Asia, Latin America, the Balkans and most recently in Ukraine.

The ESS was complemented by the Strategy to combat illicit accumulation and trafficking of SALW and their ammunition (the so-called EU SALW Strategy)⁴¹¹, which was adopted by the European Council on 15-16 December 2005.⁴¹²

The EU SALW Strategy aims to integrate all the instruments at the disposal of the EU⁴¹³:

- Member States' civilian and military capabilities
- CFSP and ESDP instruments (now: CSDP), including the Code of Conduct on Arms Exports
- Other external action instruments, including action through the European Community
- Police, customs and judiciary action within the EU.

In addition the EU has negotiated several SALW provisions on a case-by-case basis with third countries.

Moreover, the EU has fully supported the process within the UN framework leading towards an Arms Trade Treaty (ATT), with all its Members States voting in favour of the UNGA resolution adopted in 2006 and recommending the creation of a Group of Governmental Experts (GGE) that should study the feasibility, scope and draft parameters of an ATT.⁴¹⁴

ing accumulation and spread of small arms and light weapons and repealing Joint Action 1999/34/CFSP. 2002/589/CFSP of 12 July 2002. Brussels: European Communities.

⁴¹¹ The EU SALW Strategy <http://register.consilium.europa.eu/pdf/en/06/st05/st05319_en06.pdf>.

⁴¹² An overview of the legislative framework regarding the proliferation of SALW and WMD can be found here <<http://www.consilium.europa.eu/showPage.aspx?id=392&lang=DE>>; An analysis of the EU SALW Strategy can be found in Strub, Andreas. "The EU Strategy to Combat Illicit Accumulation and Trafficking of SALW and their Ammunition."

<http://www.bmlv.gv.at/pdf_pool/publikationen/small_arms_eu-strategy_a_strub.pdf>.

⁴¹³ The implementation of the EU SALW Strategy is continuously monitored by the competent bodies of the Council of the European Union. Every six months a progress report is presented to the Council for its endorsement. These progress reports can be found in the documents section of the Council's Website:

<<http://www.consilium.europa.eu/showPage.aspx?id=718&lang=en#Bookmark4>>.

⁴¹⁴ For an overview of the EU's support to the ATT consult <<http://www.consilium.europa.eu/showPage.aspx?id=1124&lang=en>>.

The IfS Strategy Paper 2007/2011, as well as the subsequent Multi-annual Indicative Programme 2009-2011⁴¹⁵ comprises a programme of Actions to prevent, combat and control the illicit trade in SALW (cf. project area 11). It aims to support the development and/or implementation of regional and sub-regional instruments which would in turn improve the implementation of the UN Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All its Aspects (UNPoA), the Protocol against the Illicit Manufacturing of and Trafficking in Firearms, Their Parts and Components and Ammunition (Protocol) and the International Instrument to Enable States to Identify and Trace in a Timely and Reliable Manner, illicit SALW (International Tracing Instrument – ITI).

The proliferation of SALW is also tackled by the EU's border policies. While primarily aimed at countering the problem of illegal immigration, they also touch upon organised crime such as in illegal trade.

The EUROSUR⁴¹⁶ initiative mentioned earlier supports Member States in reaching full situational awareness at their external borders and in increasing the reaction capability of their law enforcement authorities, and contributes to the prevention of cross border crime. When dealing with border security at sea the Commission frequently stresses the added value of space applications as surveillance tools.

A.6 Institutions involved

The EU Institutions, the European Commission (EC), its Directorate Generals (DGs), the European Parliament (EP), the Council, its Presidency, its EU Military Staff (EUMS), its EU Military Committee (EUMC), its Political and Security Committee (PSC/COPS) and the EU agencies (EMSA, EU LRIT DC, FRONTEX, EDA, Community Fisheries Control Agency (CFFCA)) are to various degrees involved in these efforts.

⁴¹⁵ Commission of the European Communities. The Instrument for Stability – Multi-annual Indicative Programme 2009-2011. C(2009)2641 of 8 Apr. 2009. Brussels: European Communities.

⁴¹⁶ Commission of the European Communities. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions Examining the creation of a European Border Surveillance System (EUROSUR). COM(2008) 68 final of 13 Feb 2008. Brussels: European Union.

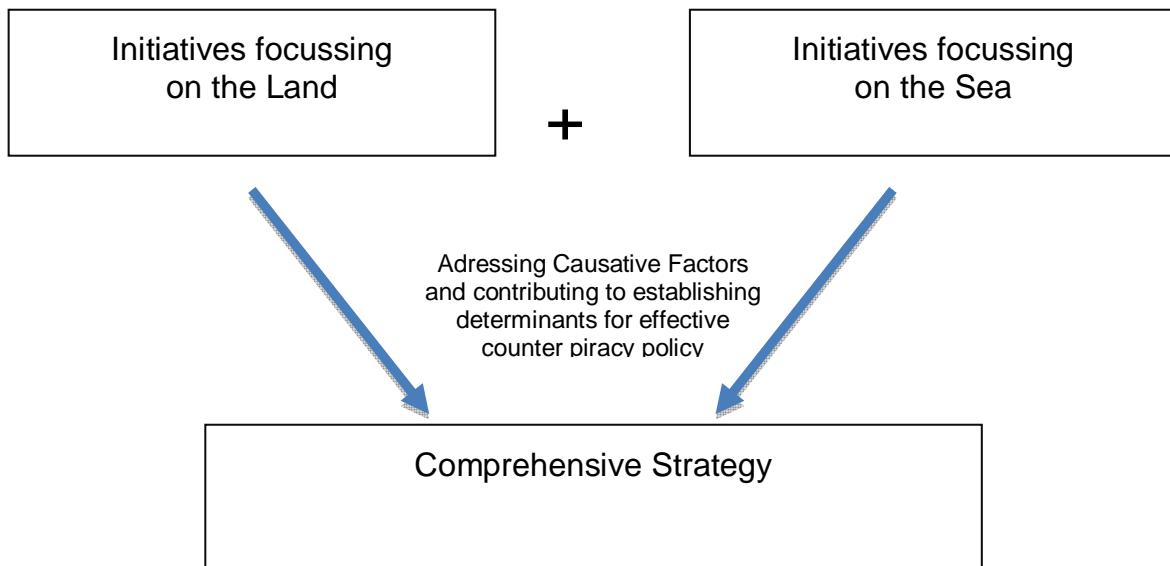


Figure 57: The two broad approaches of the European Union's Commission

In general under the European Space Policy, the European Space Agency (ESA) is responsible for implementing space capabilities that respond to EU policy needs. In this regard, the EU is cooperating strongly with ESA in the development of several security related service elements of its flagship programme Global Monitoring of Environment and Security (GMES). ESA has been actively involved in the maritime field for over the past twenty-five years. It is also working on the European Data Relay System (EDRS), which contributes to the improved provision of security through improved relays of Earth observation images and is currently in the process of developing a Global Integrated Network for iNnovative Utilisation of space for Security (formerly known as GIANUS), aimed at improving the preparedness of Europe for a variety of threats through the development of an integrated space infrastructure as part of a European security and crisis management system in coordination with other current initiatives.⁴¹⁷

A.6.1 The European Commission (EC)

One can identify two broad approaches of the Commission: (1) to Somalia and (2) to maritime security.

In the area of maritime security or more precisely the fight against piracy, its work is spread over different Directorate Generals (DGs) ranging from the former DG for Justice, Freedom and Security (DG JLS)⁴¹⁸ to the

DG Joint Research Centre (DG JRC), the DG for Mobility and Transport (DG MOVE) and the DG for Maritime Affairs and Fisheries (DG MARE).

The former DG JLS was together with FRONTEX responsible for the coordination of the European Border Surveillance System (EUROSUR) programme.⁴¹⁹ The JRC has a leading position in satellite ship surveillance and oil spill detection and thus apart from supporting FP projects, supports EU agencies with its knowledge. In particular, it cooperates with EMSA and EUSC on maritime security issues. The JRC's work however remains on a R&D level. DG MOVE is working on the technical aspects of port security with DG JRC.⁴²⁰ DG ENTR is responsible for the "Space" theme of the FP 7 supporting a European Space Policy focusing on applications such as GMES (Global Monitoring for Environment and Security), with benefits for citizens, but also on research and development in areas related to the competitiveness of the European space industry.⁴²¹ DG MARE steers the development and implementation of the

for Justice (DG JUSTICE) and Directorate-General for Home Affairs .

⁴¹⁹ For a detailed account of the work of each DG related to maritime security, see Remuss, Nina-Louisa. Space and Internal Security - Developing a Concept for the Use of Space Assets to Assure a Secure Europe." ESPI Report 20. Vienna: ESPI, 2009.

⁴²⁰ For more information on DG TREN's mission cf. Ruete, Matthias. "Mission of the Directorate-General for Energy and Transport." Directorate General for Energy and Transport 29 July 2009
http://ec.europa.eu/dgs/energy_transport/wcm/mission_dg_tren.pdf.

⁴²¹ "Grants Work Programme 2008 – General Publicity." DG Enterprise 29 July 2009
http://ec.europa.eu/enterprise/contracts-grants/calls-for-proposals/grants-work-programme-2008/index_en.htm.

⁴¹⁷ A detailed description and analysis of the institutions involved can be found in the Annex.

⁴¹⁸ On July 1, 2010, Directorate-General Justice, Freedom and Security became two directorates: Directorate-General



Integrated Maritime Policy and follows pilot projects such as AIS-S (for details see 4.4).

The Humanitarian Aid Office (ECHO) is the service of the European Commission responsible for managing humanitarian aid funds given by the Community and in this position supports Somalia as part of its strategic support to the Horn of Africa through food assistance, non-food items, health, water and sanitation.⁴²² The Civil Protection Unit (CPU) of the DG Environment has been involved in the response to maritime pollution, as part of its functions to improve responses to crisis management in Europe,.

In addition to the DGs, the EC has created the so-called EC Maritime Affairs Task Force or Maritime Policy Task Force in the framework of the overall strategic objectives of the EC for 2005-2009 to initiate "an all-embracing maritime policy" following the "aim of launching a wide consultation on a future Maritime Policy for the Union". The task force interacted with the Member State Experts Group, Inter-service Group and stakeholders for an integrated analysis (science and research, safety and security, maritime sector competitiveness, jobs, human welfare, marine environment, climate change, and maritime heritage) in order to deliver the Maritime Policy Green Paper on 7 June 2006, followed by an Action Plan presented on 10 October 2007 by the European Commission. Its Maritime Data Expert Group⁴²³ has been involved together with the Commission in the basic design principles of the European Marine Observation and Data Network (EMODNET).⁴²⁴ Most recently the Commission published the outcomes of the public consultation concerning the establishment of a Marine Data Infrastructure.⁴²⁵

The Maritime Policy Task Force has stated that EU cooperation should be made more systematic, and has proposed to:⁴²⁶:

- Increase European prevention and response capacities by integrating stand alone capacities in a more powerful meta capacity;
- Converge towards integrated management of the maritime logistic chain filled by each EU actor – private and public – but also with main EU neighbours on which the EU depends economically or in terms of borders;
- Strengthen the position of Europe in front of other countries or powers in international discussion and best preserve European interests;
- Optimise the cost of development and deployment of capacities that could be shared for several purposes (maritime safety, environmental maritime security, maritime security such as the fight against terrorism, illegal fishing and piracy, and environmental security and pollution management);
- Participate in the development of integrated management of oceans in a holistic way that is multisectoral and multidisciplinary.⁴²⁷

To date the Commission has: produced detailed overviews of the different national, regional and European initiatives on the integration of maritime surveillance (cf. SEC (2008) 2337), completed a study on the legal aspects of the integration of maritime monitoring and surveillance data⁴²⁸, and carried out a stocktaking exercise together with the European Defence Agency and the EU Military Staff (EUMS) in response to a request from the Defence Council (cf. COSDP 949/ PESC 1366⁴²⁹). It has also launched two calls for proposals for pilot projects for the integration of surveillance to promote closer cooperation between national authorities in the Mediterranean and in the North Sea basin (i.e. MARE/2008/13 and 2009/04)), totalling € 5.7 million.⁴³⁰

⁴²² cf. ReliefWeb. "ECHO Operational Strategy 2010: Horn of Africa." 6. Nov. 2009. Relief Web 6 Apr. 2010 <<http://www2.reliefweb.int/rw/rwb.nsf/db900sid/SODA-7XJNU6?OpenDocument>>.

⁴²³ For more information refer to "Marine Observation and Data Expert Group." Register of Expert Groups 30 July 2009 <<http://ec.europa.eu/transparency/regexpert/detail.cfm?ref=2146&l=M>>.

⁴²⁴ "European Marine Observation and Data Network (EMODNET)." European Commission Maritime Affairs 30 July 2009 <http://ec.europa.eu/maritimeaffairs/emodnet_en.html>.

⁴²⁵ cf. Commission of the European Communities. Commission Staff Working Document: Marine Data Infrastructure – Outcome of Public Consultation. SEC(2010) 73 final of 22 Jan. 2010. Brussels: European Communities.

⁴²⁶ Jacq, Fabienne, Jean-Yves LeBras, Antoine Monsaineon. op. cit.

⁴²⁷ Ibid.

⁴²⁸ Commission of the European Communities. Legal aspects of maritime monitoring and surveillance data. FISH/2006/09 – LOT2 of Oct. 2008. Brussels: European Communities. <http://ec.europa.eu/maritimeaffairs/studies/legal_aspects_maritime_monitoring_en.pdf>.

⁴²⁹ Council of the European Union. Maritime Surveillance - Overview Of Ongoing Activities. COSDP 949/ PESC 1366 of 4 Nov. 2008. Brussels: European Communities.

⁴³⁰ Commission of the European Communities. Progress Report on the EU's Integrated Maritime Policy. COM (2009) 540final of 15 Oct. 2009. Brussels: European Communities. 7.

A.6.2 The Council

The Council has shown strong commitment to the IMP. In its conclusions of 8 December 2008 it not only recognised the IMP's cross-cutting nature by dealing with it through the General Affairs and External Relations Council, but also "confirm(ed) that an integrated approach to maritime issues constitutes a major objective, since the synergies, the coherence and the added value of sectoral action undertaken by the European Union need to be reinforced by being integrated into a comprehensive vision of the seas, oceans and coastlines, taking account of distinctive regional features (...)."⁴³¹

The Presidency

Emphasising the need for a well coordinated and integrated cross-sectoral and cross-border approach, the Swedish Presidency has made maritime surveillance a priority during its Presidency⁴³². It recognised the "large potential for further interoperability between systems for maritime surveillance, civilian as well as military" and highlighted the importance of fostering

- » further cooperation between Member States, the European Commission, EU-agencies and relevant organisations in order to make sure that efforts on maritime surveillance and other related issues become more coordinated and cost-effective.

Building on the initiatives of previous Presidencies, the Swedish Presidency has been striving to establish a common political will as a solid foundation for the integration of maritime surveillance.

In early July, a non-paper was presented and sent to the Member States, the EC, and other relevant agencies and organisations. Together with France and the EC, a conference on maritime security was organised in Brussels.

On 15 September, a joint application was submitted by the Swedish Coast Guard for the Commission's pilot project on integration of maritime surveillance in Northern European Sea basins (now: MARSUNO). The ap-

plication included 23 project partners from ten countries (9 Member States and Norway).

Given the wide scope of maritime surveillance, the Friends of the Presidency Group (FoP) was formed with the task of developing cross-sector, cross-pillar and cross-border Council conclusions on maritime surveillance⁴³³. During the drafting of the Council conclusions EDA's Wise Pen Team briefed the FoP group on the intermediate report.

Based on this FoP Draft, on 17 December 2010 the Council adopted Council conclusions on the integration of maritime surveillance. Therein it called upon the EC

- » to present to the Council a roadmap, including a step by step approach, for its development and implementation, before the end of 2010. This roadmap would be further detailed in 2011 to take into account the results from relevant cross sectoral and cross-border projects and research and development projects in particular the pilot projects and lessons learned from ESDP operations.⁴³⁴

It encouraged the EC and Member States to "identify obstacles in EU and national legislation to the exchange of data, as well as the experience gained". It underlined its support for

- » the establishment of the Commissions' expert group with Member States representatives on the integration of maritime surveillance for the above mentioned purposes, acting as a forum for coordination, in association with other relevant EU bodies representing ESDP aspects without prejudice of their own competences, and of a High Level Focal Points Group

It further stressed the need to investigate

- » an appropriate legal framework defining the different types of data involved, the purpose of the exchange and the recipients, taking into account the principles of subsidiarity, proportionality, and citizen security in compliance with personal data protection rules, international law, confidentiality of commercial information as well as security of data.

⁴³¹ Ibid. 3.

⁴³² This section is based on: Council of the European Union. Presidency Report on Integration of Maritime Surveillance. POLGEN 177 / POLMAR 17 / PESC 1479 / COSDP 1052 / AGRI 486 / TRANS 441 / JAI 791 / ENV 769 / PECH 321 of 17 Nov. 2010. Brussels: European Communities. <http://www.europarl.europa.eu/meetdocs/2009_2014/documents/sede/dv/sede101209maritimessurveillance/_sede101209maritimessurveillance_en.pdf>.

⁴³³ i.e. Council of the European Union. Draft Council conclusions on integration of maritime surveillance. POLGEN 170 / POLMAR 14 / PESC 1429 / COSDP 1011 / AGRI 474 / TRANS 425 / JAI 745 / ENV 738 / PECH 310 of 17 Nov. 2009. Brussels: European Communities <<http://register.consilium.europa.eu/pdf/en/09/st15/st15176-re02.en09.pdf>>.

⁴³⁴ Council of the European Union. Council conclusions on integration of maritime surveillance of 17 Dec. 2009. Brussels: European Communities.



Before this, the Council had already adopted specific conclusions concerning the situation in Somalia.⁴³⁵

Joint Situation Centre (SitCen)

The Joint Situation Centre of the Council's Secretariat is producing intelligence where a single country's support would not be acceptable for political reasons. Its analysts primarily support the High Representative, COREPER II and other parts of the Council such as the Political and Security Committee (PSC), the Working Party on Terrorism (COTER), the Article 36 Committee (CATS) and the Terrorism Working Group.⁴³⁶ Its work consists of compiling national reports and complementing these with information from the EU and to a significant extent from open sources. SitCen has a Civilian Intelligence Cell (CIC) in general and a Counter Terrorism (CT) cell in particular. It also conducts situation monitoring and assessment.⁴³⁷ Its involvement in the ATALANTA NAVFOR mission is non-transparent. The same holds for its reliance on space applications as sources of information.

The EU Military Committee (EUMC)

In 2007 the EU Military Committee (EUMC) approved a Maritime Rapid Response Concept, a naval force generation mechanism enabling the EU to activate a military naval group rapidly in response to a crisis.⁴³⁸ While the Political and Security Committee (PSC) exercises the political control and strategic direction of the EU military operation, under the responsibility of the Council of the European Union, the EUMC monitors the correct execution of the operation conducted under the responsibility of the Operation Commander.⁴³⁹

The EUMC also monitors the proper execution of EUTM. Its chairman acts as the primary point of contact with the EU Mission Com-

mander. EUMC receives reports from the Mission Commander on a regular basis.⁴⁴⁰

The Political and Security Committee (COPS / PSC)

The Political and Security Committee (PSC), together with the Commission, has launched a civilian ESDP mission with the aim of providing advice and assistance for the training of coast guards in the region of Yemen, Somalia and Kenya. The mission is financed from the EU's Stability Fund and donor contributions (e.g. from the U.S., Japan and the Gulf States) and aims at integrating and co-ordinating existing initiatives (i.e. the British-trained coast guard services in Mombasa) as well as the regional initiatives taken in the context of the code of conduct on the fight against piracy signed in February 2009. The project is coordinated by the Documentation and Training Centre on Maritime Affairs in Djibouti. It is planned to provide patrol craft for operational purposes and to set up a register of ships in the region.⁴⁴¹

Under the responsibility of the Council and of the High Representative (HR) the PSC exercises political control and strategic direction over EUTM. Under Art. 38 TEU it is authorised to amend the planning documents, including the Mission Plan and the Chain of Command, and has the power to take decisions on the appointment of the EU Mission Commander. The PSC regularly reports to the Council.⁴⁴²

The EU Military Staff (EUMS)

The European Union Military Staff (EUMS) provides in-house military expertise for the High Representative of the Union for Foreign Affairs and Security Policy (HR) and undertakes early warning, strategic planning, and situation assessment tasks for EUMC and COPS. It is tasked by the EUMC to monitor the military aspects of ATALANTA NAVFOR. In this context it can propose new options to EUMC.

⁴³⁵ Council of the European Union. Council conclusions on Somalia of 27 July 2009. Brussels: European Communities.

⁴³⁶ Müller-Wille, Björn. "The Effect of International Terrorism on EU Intelligence Co-operation." *JCMS* 46.1 (2008): 49-73, 49.

⁴³⁷ "Joint Situation Center." Parliament of the UK. 11 Jun. 2010 <<http://www.parliament.the-stationery-office.co.uk/pa/l200203/lselect/ldeucom/53/5313.htm>>.

⁴³⁸ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 5-8.

⁴³⁹ "EU naval operation against piracy (EUNAVFOR Somalia - Operation ATALANTA)." Feb. 2010. European Parliament. 11 Jun. 2010 <http://www.europarl.europa.eu/meetdocs/2009_2014/documents/sede/dv/sede040310factsheetsomalia_sede040310factsheetsomalia_en.pdf>.

⁴⁴⁰ Council of the European Union. Council decision on a European Union military mission to contribute to the training of Somali security forces. Council Decision 2010/96/CFSP of 15 Feb. 2010. Brussels: European Communities.

⁴⁴¹ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit. 14-5.

⁴⁴² Council of the European Union. Council decision on a European Union military mission to contribute to the training of Somali security forces. Council Decision 2010/96/CFSP of 15 Feb. 2010. Brussels: European Communities.

A.6.3 European Parliament (EP)

The European Parliament, as the only elected body within the EU's institutional setting, is often consulted by the Council in matters related to security and crisis management. The EP can provide recommendations or ask for clarifications from the Council. Together with the Council the EP enjoys the budgetary authority of the European Union.

The EP has issued several resolutions related to maritime policy, piracy and the situation in Somalia such as the Resolution of 20 May 2008 on an integrated maritime policy for the European Union (T6-0213/2008), the Resolution on the routine killing of civilians in Somalia (RSP/2008(2603) of 19 June 2008, the Resolution on piracy at sea of 23 September 2008 (RSP/2008/2635) and the Resolution on a political solution to the problem of piracy off the Somali coast (RSP/2009/2780) of 25 November 2009. Therein EP emphasises the need to counter the root causes of piracy (which are to be found on the land). It calls for effective coordination between ATALANTA NAVFOR and other naval vessels in the region particularly those of the U.S. and Russia. Moreover, it welcomes the initiatives by the Commission to improve coordination with the European agencies responsible for maritime surveillance. The EP also regrets the lack of consultation by the Council of the EP in the decision to launch EU NAVCO⁴⁴³. Most recently, the EP asked the Council

- » to examine the possibility of setting up a new, small-scale ESDP operation in parallel to EU NAVFOR Atalanta to contribute to the training of TFG security forces, thereby bringing existing initiatives (...) into line with one another by ensuring that they take the same type of action.⁴⁴⁴

In addition, several groups and committees of the EP, including the Intergroup on Sustainable Development, the Sub-group on Maritime Affairs, Subcommittee on Security and Defence (SEDE) and the Committee on Transport and Tourism (TRAN Committee) deal with the subject area of maritime security. Together with single parties, they discuss the subject and organise workshops.

None of the EP's resolutions on maritime security, Somalia or piracy refer to supportive tools such as space applications or any other technology. Yet the resolution of 10 July 2008

⁴⁴³ European Parliament. Resolution on Piracy at Sea. RSP/2008/2635 of 23 Oct. 2008. Strasbourg: European Communities.

⁴⁴⁴ European Parliament. Resolution on a political solution to the problem of piracy off the Somali coast. RSP/2009/2780 of 25 November 2009. Strasbourg: European Communities.

on Space and security (2008/2030(INI))⁴⁴⁵ acknowledged the potential contribution of the EUSC to ESDP missions and called for ensuring complementarities with GMES observation capacities.

The EP has been involved in the European Integrated Maritime Policy with six committees working together under an enhanced cooperation procedure to produce a joint opinion. Support for a coverage of maritime policy has been very positive, yet maritime policy issues are being dealt with separately by a number of committees and structures.⁴⁴⁶

A.6.4 EU Agencies

Compared to the institutions mentioned previously, the EU agencies are more directly involved in the fight against piracy rather than just touching upon it while dealing with the broader area of maritime security.⁴⁴⁷

The European Union Satellite Centre (EUSC) had been tasked by the OHQ in support of the ATALANTA NAVFOR Operation,⁴⁴⁸ which aims at helping deter, prevent and repress acts of piracy and armed robbery off the coast of Somalia, to analyse imagery and report on key ports and specific coastal areas with the objective of improving understanding of the current infrastructure and service ability and providing an outline of possible access/regress routes important to the operation.

The European Maritime Safety Agency (EMSA) provides technical assistance to the Commission in order to improve ships' identification and traffic monitoring in EU waters⁴⁴⁹ and is in this position responsible for the community vessel traffic monitoring and information systems (SafeSeaNet (SSN), SafeSeaNet Tracking Information Relay and Exchange System (STIRES), CleanSeaNet (CSN) and European Union Long Range Identification and Tracking of ships Data Centre

⁴⁴⁵ Find the full text here <[http://www.europarl.europa.eu/meetdocs/2009_2014/documents/ta/10/07/2008%20-%20200365/p6_ta-prov\(2008\)0365_en.pdf](http://www.europarl.europa.eu/meetdocs/2009_2014/documents/ta/10/07/2008%20-%20200365/p6_ta-prov(2008)0365_en.pdf)>

⁴⁴⁶ Commission of the European Communities. Progress Report on the EU's Integrated Maritime Policy. COM (2009) 540final of 15 Oct. 2009. Brussels: European Communities. 4.

⁴⁴⁷ For a more detailed account on the general characteristics of agencies consult the annex.

⁴⁴⁸ "EU NAVFOR Somalia. European Security and Defence Policy." Council of the European Union 30 July 2009 <<http://www.consilium.europa.eu/showPage.aspx?id=1518&lang=en>>.

⁴⁴⁹ Commission of the European Communities. Commission Staff Working Document – An integrated Maritime Policy for the European Union. SEC(2007)1278. Brussels: European Union.

(EU LRIT Data Centre)). SSN does not rely on satellites for its service. It is a network for the exchange of ship and cargo movement information with the objectives of improving responses and prevention and facilitating / optimising logistical processes. It has been operational since September 2009 and builds on AIS coastal stations, HAZMAT and port notifications. It allows for real time monitoring of ships, indicating their destination, speed and cargo. In contrast, CSN is satellite-based (radar: ENVISAT, Radarsat-1 and Radarsat-2) and allows for near-real time (30 mins) monitoring of oil spills (acquisition and processing – oil spill analyst – alert and product delivery). Products are ordered by the Member States. It has been operational since April 2007. Through a combination of satellite imagery of the oil spill with SSN (relying on AIS) it is possible to identify the polluter by backtracking. This combination of CSN with SSN is known as the vessel detection layer. EMSA is also developing a 24/7 Maritime Support Service as a means of supporting Member States in their requests for maritime data. EMSA cooperates closely with national administrations and provides technical input to discussions within the International Maritime Organisation (IMO), as well as to the development of Galileo and its application to maritime navigation.⁴⁵⁰ EMSA relied on EUSC's experience when incorporating satellites into its services and closely cooperates with ESA. EMSA can be characterised as an intermediate body establishing contacts for ESA with maritime sector users.

EMSA is also developing, operating and in charge of the maintenance of the EU Long Range Identification and Tracking of Ships Data Centre (EU LRIT DC), which in addition to tracking EU-flagged ships, provides Member States, on request, with the LRIT information of any third country vessel bound to, or sailing within, EU waters within a 1,000 nautical mile zone of a participating State's coastline no matter what flag the ship is flying.⁴⁵¹ LRIT is used for safety, security, SAR and environmental protection. Normally positions are received 4 times a day by the flag State. EMSA has however recently (September 2009) started a pilot project in the context of the prevention of pirate attacks. EU merchant ships entering the ATALANTA NavFor monitoring zone send their LRIT information six times a day. Through this anti-piracy tool, EMSA is helping the ATALANTA

mission to better allocate its resources. Most recently, EMSA has started to look into the identification of pirate skiffs in satellite imagery.⁴⁵²

EMSA is working on an agreement with the European Space Agency concerning cooperation on the use of space-based systems and data in support of maritime activities. The agreement lays down the following activity domains:

- identification, collection and consolidation of user requirements;
- assessment of the operational status, technical performance, accessibility and availability of satellite data, including assistance for the provision of satellite data, relevant for EMSA's operational maritime activities
- development, validation, implementation and operation of space-based systems and associated services, including fast response procedures for satellite assistance in case of emergency situations.

The European Agency for the Management of Operational Cooperation at the External Borders (FRONTEX) within the framework of European external relations policy, establishes technical working arrangements for joint operations with relevant third countries and invites them to participate in operational activities where appropriate. In the maritime realm FRONTEX cooperates with EMSA and the Joint Research Centre (JRC). FRONTEX is also involved in the FP 6 project LIMES which among other things deals with land and sea border surveillance. FRONTEX is developing a permanent regional border security concept, the European Patrols Network (EPN), which is based on the preceding studies MEDSEA and BORTEC, and has the objective of integrating the EPN into a European Surveillance System (EUROSUR). FRONTEX has set up a Central Record of Available Technical Equipment (CRATE) for border control and surveillance belonging to Member States. At present, the database contains over a hundred vessels, around 20 aircraft, 25 helicopters and several hundred items of border control equipment such as mobile radar units, vehicles, thermal cameras and mobile detectors. It is primarily intended to be used on a bilateral basis between Member States but can also be relied upon for joint operations.⁴⁵³

⁴⁵⁰ European Security and Defence Assembly / Assembly of Western European Union. European Maritime Surveillance. op. cit.

⁴⁵¹ European Maritime Safety Agency. "The EU LRIT Data Centre is in Production." Press Release. 3 June 2009. <http://www.emsa.europa.eu/Docs/other/press_release_03-06-2009.pdf>.

⁴⁵² De Ruiter, William. "The Role of EMSA." Presentation. WEU Seminar on European Maritime Surveillance. King George Palace, Athens, Greece. 10-11 May 2010.

⁴⁵³ "The FRONTEX Agency: Evaluation and future development." MEMO/08/84 of 13 Feb. 2008. Brussels: European Communities.

Established in 2004, the European Defence Agency's (EDA) mission is to "support the Member States and the Council in their effort to improve European defence capabilities in the field of crisis management and to sustain the European Security and Defence Policy as it stands now and develops in the future". Its functions and tasks mainly relate to improving Europe's defence performance by promoting coherence.⁴⁵⁴ EDA is also conducting the EDA PT MARSUR project aimed at linking up different national military surveillance systems. This is currently in the experimentation phase. Most recently, EDA's Wise Pen Team published its final report entitled "Maritime Surveillance in Support of CSDP", which highlights twelve areas for action (as summarised in the table below).⁴⁵⁵

⁴⁵⁴ "Background." 3 May 2005. European Defence Agency
20 June 2009
<<http://www.eda.europa.eu/genericitem.aspx?area=Background&id=122>>.

⁴⁵⁵ <<http://www.eda.europa.eu/newsitem.aspx?id=631>>.



Area	Problem	Necessary Action
Definitions	Confusion and competition continue because of a lack of agreed definitions of basic terms such as "safety" and "security" → result: misunderstandings; people talking past each other	An "EU champion" required to work on the acceptance of working definitions → suggestion: DG MARE
Cooperation	Insufficient degree of cooperation	"Round Table" groups of stakeholders are required at various levels to raise awareness, create understanding, develop trust, build linkages and improve effectiveness. Existing informal forums like CHENS and the North Atlantic Coast guard Forum can be expanded.
Navies	Suspicion remains, but the MSSIS system has been transformed from its initial American military roots to a genuinely open global system (currently over 60 subscribers) to which agencies like EMSA could usefully subscribe.	Navies need to change secretive habits and join in, not just as consumers, but as providers, for which they are well equipped.
Schengen	By comparison with trucks and aircraft, ships fare badly from Schengen, due to the conflicting requirements of the Maritime Law Enforcement Agencies.	Commission work required
Active Surveillance	Over 90% of current ship data relies on the ships co-operating and transmitting. Small and illegal vessels currently escape detection.	More terrestrial and satellite-based radar, electro-optic, and infra red monitoring is required at key nodes such as straits, ports and nuclear installations. Naval units can provide deployable capabilities.
Stakeholder involvement	Current stakeholder involvement is limited	A greater involvement of all stakeholders, particularly navies, in collection, collation and distribution of maritime surveillance elements, is required for a real improvement of EU Maritime Domain Awareness (MDA).
Governance	SOLAS, IALA, & IMO show that governance models exist for international maritime cooperation without succumbing to deadlock over legal or sovereignty issues.	Agree on governance in maritime surveillance through agreeing on delegated authorities and responsibilities.
Coast guard	The time is not yet ripe for an EU Coast Guard	elements of the same functionality can be delivered by virtual means. Further advances in realising virtual coast guard functions will emerge naturally as projects already in train, such as eborder, e-maritime, e-customs, etc., become operational. DG MARE would appear to be best placed to identify and promote the potential synergies.
Architecture	Need for an architecture for improved data sharing	Thanks to the Internet and related developments, distributing and protecting data has made the goal of an

Area	Problem	Necessary Action
		affordable, COTS based, service-oriented, loosely-coupled federation of systems readily achievable. Indeed it is already evolving through AIS-LRIT-STIRES; SafeSeaNet-IALANET; EU NAVFOR Atalanta's <i>Mercury</i> and unifying tools like the EDA's Common Standard User Interface (CSUI), which are ideally suited to handling the complexities of information sharing and being synthesised by different authorities for different purposes at different levels.
Protection of Information	Although it is widely understood that the "need to know" principle needs to be replaced by <i>the need to share</i> , in practice risk aversion still prevents this happening and a <i>responsibility to provide</i> obligation is needed to redress the balance.	A Commission directive is required to clarify real and perceived data protection constraints and to remove those that are legally perverse or counterproductive to European security.
Data, Information, Knowledge		A three layer construct facilitates clarity of ownership, protection and distribution providing that the "need to share" principle is replaced by the "need to know" in a service oriented "federation of systems" approach.
Preferred Approach		The preferred approach is regional. Maritime surveillance is a continuous worldwide process whereas response action tends to be local or regional. The global <i>white picture</i> network (see para. 78) must therefore be capable of more detailed enlargement for regional level mission purposes. Progressive implementation should permit information and intelligence exchange by first connecting National Maritime Coordination Centres (NMCCs) through MARSUR on a by request basis, second, developing these exchanges at the regional level, and, in the final phase, the RCC would assume the predominant co-ordinating role.

Figure 58: Summary of the Wise Pen Report⁴⁵⁶

⁴⁵⁶ "Wise Pen Team report on Maritime Surveillance (MARSUR)." 26 Apr. 2010 ESDA 7 June 2010 <<http://www.eda.europa.eu/newsitem.aspx?id=631>>.

JRC is in liaison with PT MARSUR in this context. EDA has engaged in the so-called "Structured Dialogue on Space" with the European Commission, the Council General Secretariat, the European Space Agency and Member States, aimed at raising awareness about programmes and identifying opportunities for the complementary development of space based assets for respective user communities. In this context valuable interfaces have been created with other key players. The European Commission's activities within the FP 7 in areas such as Space and Security research are of high interest to EDA participating Member States. In this context the cooperative European Framework Initiative was formed in April/May 2009, creating joint programmes and committees, which might build the bridge between FP 7 and FP 8. Apart from EDA initiated projects (Ad Hoc Cat A projects), EDA is conducting projects initiated by Member States (Ad Hoc Cat B projects).⁴⁵⁷ Among the latter, two projects are currently in the definitional phase: (1) a demonstration of Maritime Surveillance Network Architecture, initiated by Germany and the Netherlands and (2) the role of space for land and maritime surveillance (initiated by Belgium, Finland, and Norway).

The Community Fisheries Control Agency (CFCA) was established in 2005 to organise operational coordination of fisheries control and inspection activities by Member States and to assist them to cooperate so as to comply with the rules of the Common EU Fisheries Policy in order to ensure its effective and uniform application.⁴⁵⁸

The EU agencies are totally independent of the EC. They have built up good cooperative structures.

A.6.5 Other European Agencies and Institutions: The European Space Agency

Under the European Space Policy in general, the European Space Agency (ESA) is responsible for implementing space capabilities that respond to EU policy needs. In this regard, the EU is cooperating strongly with ESA in the development of several security related service elements of its flagship programme Global Monitoring of Environment and Security (GMES). ESA is however also following its own projects in the area of the provision of security and has been actively involved in the maritime field for over the past twenty-five years.⁴⁵⁹ ESA is also working on the European Data Relay System (EDRS), which contributes to the improved provision of security through improved relays of Earth observation images. Additionally, it is currently in the process of developing a Global Integrated Network for iNNovative Utilisation of space for Security (formerly known as GIANUS), aimed at improving European preparedness for a variety of threats through the development of an integrated space infrastructure as part of a European security and crisis management system in coordination with other current initiatives.

⁴⁵⁷ Starlinger FFG. Presentation. Space and Security – Aktueller Status und Entwicklungen. Österreichische Forschungsförderungsgesellschaft (FFG), Vienna, Austria. 15 May 2009.

⁴⁵⁸ "Welcome to CFCA." CFCA 28 Apr. 2010 <<http://cfca.europa.eu/pages/home/home.htm>>.

⁴⁵⁹ "EC unveils new EU Maritime Policy." European Space Agency. 12 Oct. 2007. European Space Agency 16 Mar 2009 <www.esa.int/esaCP/SEM6DE2PL7F_index_2.html>.

A.7 Detailed Precautions for Ship Crews (as advised by the IMB)⁴⁶⁰

All vessels transiting the area are advised to take additional precautionary measures and maintain strict 24 hours visual and radar anti piracy watch using all available means. Watch keeping crews should lookout for small suspicious boats converging to own vessel. Early sightings/detection and accurate assessment will allow Masters to increase speed and take evasive manoeuvres to escape from the pirates and at the same time request for assistance from various Authorities/Agencies including the IMB PRC. Masters using the IRTC are not relieved of their obligation to secure their vessel and should continue to maintain a strict 24-hour lookout using all available means to get an early warning of an approaching threat. Some vessels have been attacked / hijacked in the corridor. Ships and shipowners are advised to register their details on the MSCHOA website (www.mschoa.org) and obtain further information regarding the close support protection details for ships transiting the Gulf of Aden. Ships are encouraged to conduct their passage through the IRTC in groups based on their transit speed of 10, 12, 14, 16 and 18 kts. Masters are also advised to maintain a listening watch on recommended VHF channels in order to hear the Maritime Advisory Calls from the warships in the area. Masters are also strongly advised to monitor the IMB Piracy Reporting Centre (PRC) broadcast and Warnings via Inmarsat C EGC Safety Net. The IMB PRC in cooperation with the MSCHOA advises that vessels not making scheduled calls to ports in Somalia should keep as far away as possible from the Somali coast, preferably more than 600 nautical miles from the coastline and when routing north / south consider keeping east of 60°E longitude until east of Seychelles. In view of recent attacks, all vessels are advised that when proceeding to and from ports in South Africa, Tanzania, Kenya and Somalia they should consider routing south of 10°S and east of 60°E, avoiding the area between the Somali coast and north and west of Seychelles. Mariners are advised to report any suspicious boats to the PRC. A 24-hour visual and radar watch must be maintained as early sightings / detection and accurate assessment will allow Masters to take evasive actions and increase speed and at the same time request for assistance and escape.

⁴⁶⁰ ICC International Maritime Bureau. op. cit. 22-3.



List of Acronyms

Acronym	Explanation
A	
AIES	Austrian Institute for European and Security Policy
AIS	Automatic Identification System
AIS-SART	AIS Search and Rescue Transmitter
AMISOM	African Union Mission to Somalia
AOO	Area Of Operation
ARES	Automated Search and rescue System
ARF	Asean Regional Forum
ATT	Arms Trade Treaty
C	
CFP	Common Fisheries Policy
CGPCS	Contact Group on Piracy off the Coast of Somalia
CHENS	CHiefs of the European NavieS
CIP	Critical Infrastructure Protection
CIWIIN	Critical Infrastructure Warning Information Network
COMINT	COMunications INTelligence
COPS/ PSC	Political and Security Committee
CRATE	Central Record of Available Technical Equipment
CSDP	Common Security and Defence Policy
CSI	Container Security Initiative
CSN	CleanSeaNet
CSTDMA	Carrier Sense Time Division Multiple Access
CTF	Combined Task Force
D	
DG	Directorate General
DGI	Digital Geographic Information
E	
EC	European Commission
ECI	European Critical Infrastructure
ECHO	Humanitarian Aid Office
EDA	European Defence Agency

Acronym	Explanation
EEZ	Exclusive Economic Zone
ELINT	Electronic INTelligence
EMD	European Maritime Day
EMODNET	European Marine Observation and Data Network
EMS	European Maritime Surveillance System
EMSA	European Maritime Safety Agency
EO	Earth Observation
EP	European Parliament
EPCIP	European Programme for Critical Infrastructure Protection
EPN	European Patronl Network
ESA	European Space Agency
ESDP	European Security and Defence Policy
ESP	European Space Policy
ESRAB	European Security Research Advisory Board
ESRIA	European Security Research and Innovation Agenda
ESRIF	European Security and Research Innovation Forum
ESS	European Security Strategy
EU	European Union
EUROSUR	European Boarder Surveillance System
EUSC	European Union Satellite Centre
EUTM	European Union Training Mission
F	
FP	Framework Programme for Research and Technological Development
FRONTEX	European Agency for the Management of Opeational Cooperation at the External Borders
G	
GDP	Gross Domestic Product
GEOINT	GEOspatial INTelligence
GEOSS	Global Earth Observation System of Systems
GGE	Group of Governmental Experts
GIANUS	Global Integrated Architecture for iNovativ Utilisation of space for Security
GMDSS	Global Maritime Distress Safety System
GMES	Global Monitoring for Environment and Security
GMTI	Ground Moving Target Indication
Gop	Group of Personalities; here: Group of Personalities for Security Research
GURG	GIANUS User Representative Group
H	



Acronym	Explanation
HAZMAT	HAZardeous MATerial reporting
I	
IA	Imagery Analyst
ICC	International Criminal Court
IfS	Instrument for Stability
IMB PRC	International Maritime Bureau Piracy Reporting Center
IMCO	Inter-Governmental Maritime Consultative Organization
IMINT	IMagery INTelligence
IMAO	International Maritime Affairs Organisations
IMO	International Maritime Organization
IMP	Integrated Maritime Policy
IRTC	International Recommended Transit Corridor
ISFC	Information Sharing and Fusion Centre
ISPS	International Ship and Port Facility Security Code
ITI	International Tracing Instrument
IUU	Illegal, unreported and unregulated
J	
JRC	Joint Research Centre
L	
LIMES	Land and sea Integrated Monitoring for European Security
LRIT	long-range identification and tracking
M	
MARISS	MARitime Security Service project
MarNis	Maritime Navigtion and Information Services
MCS	Marine Core Service
MERSEA	Marine Environemnt and Security for the European Area
MERSIT	Merchant Vessel Situation
MEXS	Maritime EXchange System
MSCHOA	Maritime Security Centre Horn of Africa
P	
PASR	Preparatory Action on the Enhancement of the European industrial potential in the field of Security Research
PSI	Proliferation Security Initiative
R	

Acronym	Explanation
R&D	Research and Development
ReCAAP	Regional Cooperation Agreement against Armed Robbery and Piracy
RS	Responsive Space
S	
SALW	Small Arms and Light Weapons
SAR	Synthetic Aperture Radar
SatCom	Satellite Communication
SatNav	Satellite Navigation
SECTRONIC	Security System for maritime infrastructures, ports and coastal zones
SEDE	Subcommittee on Security and Defence
SIGINT	SIGnal INTElligence
SITCEN	Joint Situation Centre
SNMG 1 / SNMG 2	Standing Maritime Group 1 and 2
SOLAS	International Convention for the Safety of Life at Sea
SOTDMA	Self Organizing Time Division Multiple Access
SPASEC	Space and Security Panel of Experts
SSA	Space Situational Awareness
SSAS	Ship Security Alert System
SSN	SafeSeaNet
STIRES	SafeSeaNet Tracking Information Relay and Exchange System
SUA	Suppression of Unlawful Acts against the Safety of Maritime Navigation Convention
SUMO	Search Unidentified Marine Object
T	
TAS	ThalesAlenia Space
TEU	Treaty of the European Union
TFG	Transitional Federal Government
U	
UNCLOS	United Nations Convention on the Law of the Sea
UNIFIL	United Nations Interim Force in Lebanon
UNITAR	United Nations Institute for Training and Research
UNODC	United Nations Office on Drugs and Crimes
UNPoA	United Nations Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All its Aspects
UN SC	United Nations Security Council
V	
VESPO	VEssel Surveillance and POrt security



Acronym	Explanation
VMS	Vessel Monitoring System
V-RTMC	Virtual Regional Maritime Traffic Centre
VTMIS	Vessel Traffic Monitoring and Information System
VTS	Vessel Traffic Service
W	
WETREP	West European Tanker REPorting System
WFP	World Food Programme

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