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International Cooperation For Space-Based Global Maritime Awareness – The Next Step

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Issue / Abstract
This paper aims to put forward for discussion a number of possible ways to promote international cooperation for global maritime awareness, in particular using space-based assets. Maritime awareness concerns the knowledge of human activities going on at sea, so for a large part equates to ship traffic detection and monitoring for safety, security and protection of resources and the environment.

The essential benefits and challenges for cooperation, and related sharing of information, are recounted. Three concrete options for global cooperation that should be viable also in view of the challenges are proposed. A public discussion with global stakeholders should follow, leading to convergence on a mechanism that should be subsequently implemented.

Motivation
Maritime awareness is a necessary ingredient to establish safety, security and stewardship in the maritime domain. Authorities who want to address issues like safety of ship traffic and life at sea, piracy, irregular immigration, terrorism, pollution or management of fisheries, need a measure of maritime awareness. In the first instance, such authorities are concerned with their local area of responsibility. However, their "need to know" goes beyond that when it comes to protecting interests on the High Seas – think of piracy or protection of migrating fish stocks. Furthermore, ship traffic is not only present globally but also moves globally, so that potential threats that demand attention may easily go unnoticed if the authorities' field of view is only local – as in cross-border crime, terrorism or smuggling (narcotics, arms or people) between continents. But also many private commercial users who operate on the global market have a global interest.

Given that government and private users in many countries need elements of the global ship traffic picture, it is obvious that there are benefits to some form of coordination in collecting such information. Space-based assets, i.e. observation and communication satellites, are characterised by global coverage, and they are therefore the logical first place to turn to for global awareness and its coordination.

History
Cooperation for maritime awareness is being actively sought and promoted for several years. The US Navy launched MSSIS (international AIS exchange), and the sharing of maritime information figures in several recent US strategies and plans. The EU under its Integrated Maritime Policy advocates maritime information sharing, as e.g. reflected in the 2010 Wise Pens paper, several European pilot projects (BlueMassMed, Marsuno, EUROSUR pilot) and the ongoing CISE initiative (Common Information Sharing Environment for the maritime domain). Many individual countries in the world subscribe to the value of international coordination and cooperation related to maritime awareness.

The C-SIGMA (Cooperation in Space for International Global Maritime Awareness) in particular has been trying to mobilise the international community, and the present paper continues that process.

Outside the maritime domain but in the area of international cooperation with global reach, the International Charter on Disasters has been very successful in providing access and increasing the use of space-based observation data for disaster recovery.

Information sharing
Any form of cooperation for maritime awareness using space-based assets will involve some level and amount of information sharing. The shared information can be either (a) ship positions, parameters and activities (derived from satellite data); (b) the data from which such information can be derived (e.g., satellite images); (c) meta-data, i.e. data describing attributes of the previous classes of data (e.g., times and locations when / where particular data are available); or (d) usage information (e.g., surveillance plans; areas or ship types of interest). Because all of these classes of information have a value, and sometimes a sensitivity, the willingness to share them is not a given. The next paragraphs will discuss the main advantages and problems with sharing. These need to be well understood before any viable way forward for cooperation can be proposed.

Benefits of sharing
The benefits of sharing maritime awareness information have essentially been mentioned under 'Motivation', and they have been frequently discussed in recent papers and meetings. Nonetheless, it is helpful to consider at this point the different types of benefit. The main benefit of sharing information is increased efficiency and

consequent cost saving. If two authorities need the same space-based data, it makes no sense to collect it twice. Indeed, entities needing some of the same data could number in the dozens. The second benefit is increased effectiveness. Increased availability of information as a consequence of sharing should lead to better results. But in addition to those two, a working international cooperation will lead to more streamlined access to data, which in turn should lead to increased usage and acceptance and a bigger market. This is a benefit to both users as well as suppliers; indeed, any workable strategy for cooperation and sharing should see to it that both these parties receive tangible benefits.

Challenges for sharing

It was mentioned that information has a value, which acts to inhibit its free exchange. Operators who receive information do so after they have incurred costs related to collection, transmission, analysis, etc. These costs need to be recuperated. Commercial operators therefore tend to sell their data, while government operators may provide them at reproduction cost, considering that the real costs will be repaid through societal benefits. However, even for government-operated systems, a price may be set for scheduling scarce assets such as satellite time (observation or communication), in order to properly allocate the economically optimal use. Similarly, archived data may carry a small price to avoid unnecessary access to the archive.

Commercial operators frequently use a licensing model for the pricing of their data, which means that once bought, these data may not be given to others. However, this applies to the sold data itself (e.g., satellite images, or received AIS messages); derived information (e.g., ship positions extracted from the image) is subject to fewer restrictions. The latter, however, has taken effort to generate, and its producer may consider it unfair to part with it without any compensation.

The above concerns prices set by the suppliers. But there is also another kind of value to the data, the one that enables the user to perform his task. In many cases, this value would be deleted if the information would be available to certain other parties – this is the case for security applications such as piracy, illegal fishing, smuggling, etc. Knowledge of when and where data will be collected (category ‘d’ mentioned above) can be sensitive, especially in police operations. Some information is therefore made classified and/or subject to legal restrictions. Also especially for private stakeholders, when considering the value of information in a globally competing world, the benefit of one may not always be parallel to the benefit of others. This situation is markedly different from e.g. disaster response, where general willingness for data sharing is more easily forthcoming.

Finally, any framework for global operational cooperation will need some technical implementation, which implies some cost for setting up and running.

All the above are challenges that need to be adequately covered if cooperation is to be successful.

Options

Even if everyone can see the advantages of cooperation (and data sharing), this is not enough to make it happen spontaneously. Some mechanism or framework needs to be set up, that can be followed and will lead to incremental benefits for its subscribers, resulting in steady development of international cooperation.

Taking into account the considerations elaborated in the previous paragraphs, three possible options are proposed here.

1. To follow the model of the International Charter on Disasters, where satellite providers make a limited amount of data freely available when requested by an appointed authority, following an incident.
2. To set up a discovery service, where authorised users can see who of their global colleagues have space-based data from a time and place where they are also interested.
3. To set up a buyers’ consortium that negotiates low prices for satellite data for authorised users over maritime regions, to exploit unused satellite capacity.

Each of these options is attractive to both users (as their access to data is improved) but also to suppliers (as it is expected to lead to increased use and a bigger market). Further implementation details will need to address the identified challenges, but they depend on the option; e.g. the sensitivity of data can be managed by defining user profiles and access rights.

Way ahead

The above ideas are now being put forward to the international community for discussion. The objective is to obtain input from the operational (and potential) stakeholders in maritime awareness on the acceptability of these options, and possibly alternative options. Options need to be fleshed out, also taking into account ongoing international (and national) coordination mechanisms and standards such as GEO/GEOSS, SDI/Inspire and CISE.

This discussion is structured by presenting these ideas at appropriate international conferences, including this one, by organising dedicated meetings for actively interested stakeholders, and by providing a web forum to host an on-line discussion.

When this public discussion converges on one (or maybe more) models for cooperation, the next step is to implement that. The exact nature of the implementation clearly depends strongly on the nature of the option chosen, but elements could include e.g. an MoU for participants to sign, a clearing house, some technical support staff, etc.

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