

# A STUDY ON MARITIME SECURITY MEASURES FOR NON-SOLAS VESSELS

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## Forward

Only a year after the September 11th terrorist attacks, the International Maritime Organization adopted the “International Ship and Port Facility Security Code” (ISPS Code) in December 2002. This Code was incorporated as a special security chapter in the SOLAS Convention and entered into force in July 2004. This initiative of the IMO has been highly welcomed by the international community. At the same time, it should be noted that the special security chapter of the SOLAS Convention is only valid for cargo vessels of 500 GT and above, passenger vessels and mobile offshore drilling units that are engaged in international trade.

The security measures for less than 500 GT vessels can be disseminated at the discretion of the individual member states. When we observe the vast number of these small vessels and their variety of usages, the above differences under the discretion can be considered as practical. However, when we have faced recent cases of armed robbery at sea, it seems to us that the time has come to examine the possibility of introducing security measures for less than 500 GT vessels.

Therefore, the Japan International Transport Institute produced this report on maritime security measures for non-SOLAS vessels in order to disclose an overview on non-SOLAS vessels, possible measures for them and cooperation among relevant parties.

Jiro Hanyu

President

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## Part I - Overview on Current Situation of Maritime Security Measures for Non-SOLAS Vessels

### 1 MARITIME SECURITY MEASURES FOR NON-SOLAS VESSELS IN JAPAN

#### A. Security measures already in place

*Security measures for vessels calling at ports:* Even though security measures for non-SOLAS vessels, in general, have not been implemented, foreign vessels calling at a port in Japan are obliged to submit their security information to the Japan Coast Guard. This information is examined on a case-by-case basis.

According to the domestic law (Article No. 46 of the Law for the Security of Ships and of Port Facilities), every vessel calling at the ports in Japan that is engaged in international navigation should report the vessel's security information to the Japan Coast Guard, which may conduct boarding inspections on such vessel in which security cannot be assured based on information reported. Foreign vessels call at Japanese ports approximately 110 thousand times, as a cumulative total per year, and approximately 15% of this total is estimated to be non-SOLAS vessels.

Also, a system for registration of ships, including ownership information, is established in Japan and covers not only vessels engaged in international voyages and vessels engaged in domestic voyages, but also very small ships such as pleasure boats and fishing vessels. The ownership information is open to the public, so it has a certain effect as a brake against theft, which can lead to unlawful acts.

#### B. Insight

Although a high evaluation can be given to the fact that a system is established to screen every security countermeasures of vessels engaged in international voyages, it is considered that the characteristics and the service routes of the vessels calling at Japanese ports are different, for instance, between the Pacific Ocean side and the northern and western waters located at the opposite of the archipelago. In other words, there is room for establishing maritime security measures for non-SOLAS vessels in further detail according to these characteristics.

Especially on the Sea of Japan side, many vessels calling at Japanese ports that are engaged in international voyages are conducting short-distance navigation between neighboring countries. Thus, we must consider establishing an effective structure for cooperation with the agencies of these neighboring countries to share information on vessel registration and calling.

**Table 1 Indicative Statistics on Non-SOLAS Vessels in Japan**

Type of vessel	Amount
1) SOLAS vessels	200
2) Non-SOLAS vessels	
a) engaged in international voyage	50
b) domestic voyage only	9,000
c) Fishing vessels	340,000
d) Crafts under 20 GT	500,000
3) Foreign vessels	
a) total number calling at domestic ports	110,000
b) non-SOLAS vessels	16,500

## 2 MARITIME SECURITY MEASURES FOR NON-SOLAS VESSELS IN SOUTH EAST ASIA

### A. Security measures already in place

One country in South East Asia has identified three security issues in its geographical area:

- 1) the security of ships not covered under the ISPS Code,
- 2) the security of the supply chain, and
- 3) the security of key sea lanes and waterways such as the Straits of Malacca and Singapore.

This country is considering / has taken some steps to address security of its port waters by introducing the following maritime security measures for vessels below 500 GT:

- a. Locally-registered craft known as harbour craft operating within the port would be required to carry a low-cost transponder system called HARTS (Harbour Craft Transponder System). This local system would allow the port authorities to monitor all movements of such vessels and to identify almost all craft and vessels calling at its ports.
- b. Non-SOLAS vessels that are not registered harbour craft calling at the port would also be required to carry HARTS in the near future.
- c. Harbour craft including tenders and barges have to comply with the “Harbour Craft Security Code” (HCSC). It contains security measures in the area of access control, activity security, navigation in port waters, and communication – all of this to ensure the security readiness when operating in port waters. The masters of harbor crafts are required to prove compliance with the HCSC by keeping a logbook on ship security.
- d. Small sea-going vessels are required to complete a “Ship Self Security Assessment” (SSSA) checklist prior to entry into the port, which has to be kept on board for verification by port officials or security agencies at all times. The purpose of this checklist is to raise the security awareness of the master and crew members, provide information on the security measures that need to be implemented by the vessels during various security levels of the port, and finally to assist the Port Facility Security Officers to complete the Declaration of Security (DOS) required by the ISPS Code.
- e. Certain vessels are required to operate on designated routes in the port.

### B. Possible measures for the future

Neighboring countries in South East Asia are exploring possibilities to co-operate with the country to which we are referring in paragraph A, in order to enhance security in this geographical area and especially in the Straits of Malacca and Singapore.

### C. Views on a possible international maritime security system for smaller vessels

This South East Asian country believes that members of the IMO ought to share experiences and approaches in dealing with the issue of maritime security. The IMO is indeed a key organization to deliver a global vision for maritime security, enabling the industry to stay ahead of potential security threats.

### D. Insight

In the Singapore Straits, and especially within the Port of Singapore, various measures are being exhaustively implemented. However, besides the co-ordinated patrol between the neighboring countries, the measures remain within the territorial sea of individual countries. The Straits of Malacca and Singapore are a series in a continuous route, and a security measure implemented only in one part of the route does not lessen the burden for the vessels to prepare necessary countermeasures to use the Straits. Therefore, the option is that maritime security measures for non-SOLAS vessels must be implemented for the Straits of Malacca and Singapore as a whole.

**Table 2 Indicative Statistics on Non-SOLAS Vessels in South East Asia**

Type of vessel	Amount
1) Vessels arriving per month	13,000
2) Non-SOLAS vessels	
a) Operating in port	3,000
b) Harbour crafts	1,200
c) Calling port daily (sea-going)	80



### 3 MARITIME SECURITY MEASURES FOR NON-SOLAS VESSELS IN NORTH AMERICA

#### A. Security measures already in place

In North America, there is an awareness of the potential security threat posed by non-SOLAS vessels. National legislation was put in place in 2002 that extends measures of the ISPS-Code to vessels with a tonnage greater than 100 GT.

#### B. Possible measures for the future

There are no current plans to impose additional security measures for small vessels. As an alternative, however, there is a readiness to intensify Coast Guard patrols and its policing capabilities. The rationale is that it is difficult to identify all categories of smaller vessels, which could be a threat to security. Random checks might therefore be just as efficient.

#### C. Views on a possible international maritime security system for smaller vessels

The Northern American state in question believes it would make sense to consider establishing security measures for all vessels including pleasure boats. However, due to the varieties of these smaller vessels on the one hand and different regional characteristics on the other, the North American state acknowledges the difficulty of having uniform international rules on security measures for non-SOLAS vessels.

#### D. Insight

In North America, regulations already cover vessels smaller than those stipulated in the Convention. If the scope of regulation is expanded further to smaller vessels, then fishing vessels and pleasure boats will also become applicable, which should make the implementation of regulation difficult. Thus, it is considered that it will place more responsibility on agencies such as the Coast Guard to, for instance, intensify patrols, rather than placing responsibility on the vessels to enact such security measures. Furthermore, the Coast Guard encourage civilians to report, as well, on the environment surrounding the vessels rather than on the vessel itself. Also, because crimes by small vessels coming from Caribbean countries are predictable, in the coastal waters of the Caribbean Sea, there is room for establishing an effective structure for cooperation with the neighboring countries, and not by the country alone, to implement maritime security measures for non-SOLAS vessels, based on the assumption of transnational organized crimes.

**Table 1 Indicative Statistics on Non-SOLAS Vessels in North America**

Type of vessel	Amount
1) Foreign SOLAS vessels (Calling ports between 01/06-07/12/04)	5,237
2) ISPS/MTSA exams (foreign vessels) a) Dockside ISPS/MTSA exams b) At sea ISPS/MTSA exams	4,451 160
3) Major control actions related to ISPS a) In total b) ISPS-Code denial of entries c) ISPS-Code expulsions d) ISPS-Code detentions	86 6 19 61
4) Non-SOLAS vessels (registered) a) Commercial towing vessels b) Passenger vessels under 100 GT c) Passenger vessels over 100 GT d) Research vessels (some may be SOLAS) e) Oil spill recovery vessels f) Offshore supply vessels (very few may be SOLAS)	5,000 13,949 1,292 222 390 1,200
5) Foreign non-SOLAS vessels a) Distinct vessels calling between 01/06-07/12/04 b) Vessels called in total	190 1,800

## 4 MARITIME SECURITY MEASURES FOR NON-SOLAS VESSELS IN EUROPE

To identify security measures in Europe, it is necessary to take into account that some measures might be taken at the European Union (EU) level and others at a national level. At the European Union level, 25 countries are now members of the European Union. Together with Norway and Iceland, which are tied up to EU maritime security legislation through the EEA Agreement, these countries will be legally bound by EU legislation in the field. Member States can, however, within certain limits take additional national measures as a complement to EU legislation.

### A. Security measures already in place

#### *Measures at EU level:*

The Council of Ministers adopted Regulation 725/2004 on enhancing ship and port facility security in March 2004. In this Regulation, the EU transposed the terms and conditions of the ISPS Code into mandatory EU legislation, which entered into force at the same time as the ISPS Code itself on 1 July 2004. In addition to making Part A of the Code mandatory for EU Member States, the Regulation states that for EU Member States, Norway, and Iceland, Part A of the ISPS Code should also apply to a certain passenger ships (Class A passenger ships) in domestic trade by July 1st, 2005. The same is the case for port facilities, which accommodate such passenger services (Article 3.2).

Class A passenger ships are defined in Article 4 of Council Directive 98/18/EC of 17 March 1998 as follows:

- “Class A” refers to a passenger ship engaged in domestic voyages other than voyages covered by Classes B, C and D.
- “Class B” refers to a passenger ship engaged in domestic voyages in the course of which it is at no time more than 20 miles from the coastline, where shipwrecked persons can land, corresponding to the medium tide height.
- “Class C” refers to a passenger ship engaged in domestic voyages in sea areas where the probability of exceeding 2.5 metres significant wave height is smaller than 10 % over a one-year period for all-year-round operation, or over a specific restricted period of the year for operation exclusively in such period (e.g. summer period operation), in the course of which it is at no time more than 15 miles from a place of refuge, nor more than 5 miles from the line of coast, where shipwrecked persons can land, corresponding to the medium tide height.
- “Class D” refers to a passenger ship engaged in domestic voyages in sea areas where the probability of exceeding 1.5 metres significant wave height is smaller than 10 % over a one-year period for all-year-round operation, or over a specific restricted period of the year for operation exclusively in such a period (e.g. summer period operation), in the course of which it is at no time more than 6 miles from a place of refuge, nor more than 3 miles from the line of coast, where shipwrecked persons can land, corresponding to the medium tide height.

Non-SOLAS vessels are indirectly addressed, however, in Article 3.8 of the EU Regulation, which states that Member States shall ensure that ship security plans and port facility security plans contain appropriate provisions to ensure that the security of SOLAS ships is not compromised by any ship not subject to the Regulation (i.e. non-SOLAS ships).

In general, however, when it comes to ship categories that are not covered by the ISPS Code, each individual Member State is left to decide whether it sees the need for further action. Based on risk assessment, EU Member States have until July 1st, 2007 to decide whether such additional national measures should be put in place.

As a conclusion, it is fair to say that even though the EU has not specifically put in place maritime security measures for non-SOLAS vessels, Regulation 725/2004 allows for dealing with the potential threat from non-SOLAS vessels at a national level and from three different angles:

- The application of Part A of the ISPS code to a certain passenger ships in domestic trades by July 1st, 2005, which will also encompass some non-SOLAS vessels.
- Based on risk assessments, Member States are free to apply the provisions of the ISPS Code to non-SOLAS ships in domestic trades from July 2007.
- In any case, Member States are obliged to include in their security plans and port facility plans appropriate provisions to ensure that the security of SOLAS vessels is not jeopardized by “any ship not subject to the Regulation”.

#### *Measures at national level:*

Telephone interviews and discussions with officials from a number of EU Member States seem to indicate that no particular security measures for non-SOLAS vessels have so far been put in place in EU Member States (or Norway/Iceland).

However, one EU Member State reported that, it has for some specific regions of the world, established a special protocol with shipping companies operating vessels flying its flag. Under this security protocol, the vessel’s master informs the Member State’s (the flag state’s) national security authority about the observed security threats in foreign ports, including those arising from non-SOLAS vessels. Based on this and other information, the national security authority in question returns security information to its fleet in the region, together with an estimate on the actual level of threat.

#### B. Measures considered for the future

##### *Measures considered at an EU level*

At the EU level, a draft Directive on Port Security<sup>1</sup> is currently under discussion. So far, there seems to be a large degree of consensus between the EU institutions (Commission, Council, and the Parliament) on the provisions of the proposed Directive. There is wide political agreement that European ports and harbors are at risk, that terrorist attacks in ports can easily result in serious

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Link to the draft Directive on enhancing port security:

[http://www.europa.eu.int/comm/transport/maritime/security/doc/com\\_2004\\_0076\\_en.pdf](http://www.europa.eu.int/comm/transport/maritime/security/doc/com_2004_0076_en.pdf)

disruptions of Europe's economic activity, and that they can directly harm people in the port itself as well as the neighboring population. The EU approach is therefore to enhance security measures by putting in place requirements and measures, which would secure European ports from any unlawful acts, committed by any type of vessel (including non-SOLAS) or cargo.

The draft Directive provides for security checks in ports and for vessels to submit information on security before entering a port. Member States will be required to carry out analyses of port security on the basis of which security plans should then be drawn up.

It is widely expected that the new Port Security Directive will soon be adopted. The remaining discussions are mainly focusing on the scope of the directive; the main topic for discussion is whether, and to what extent, the Directive should apply to areas outside the port itself (for instance to terminal installations such as petro-chemical plants etc.). It is likely that in the end, these considerations might be left to each individual Member State to decide.

There seems to be little doubt, however, that through the adoption of the Port Security Directive, EU Member States, as well as Norway and Iceland, will address the security threats represented by non-SOLAS vessels through the setting up of mandatory port security plans.

#### *Measures considered at European National Level (EU Member States)*

It seems that for the moment, only two EU Member State are actively considering to apply parts of the ISPS Code to non-SOLAS vessels (vessels between 100 and 500 GT). Neither Member state is particularly advanced in its thinking, yet both are open to discuss these measures with other EU Member States.

One Member State expressed the view that in order to identify non-SOLAS vessels, it would be sufficient to conclude the IMO discussions dealing with a Long Range Tracking System.

Views were also expressed to the effect that the need for security measures for non-SOLAS vessels are higher in regions outside Europe and in parts of South East Asia in particular.

Therefore, some EU Member States stated that they would welcome the possibility of establishing security measures for non-SOLAS vessels at the international level. A combination of the following measures was mentioned as potentially useful:

- Self-defense measures like the one provided by the ISPS Code facilitating the protection of vessels from the threats posed by others,
- Measures to transmit the identity and the position of the ship (AIS: Automatic Identification System) for identification of non-SOLAS vessels,
- Reinforcement of the information exchange and network among agencies in neighbouring countries.

### C. Insight

Implementation of maritime security measures for non-SOLAS vessels in Europe is left to the judgment of individual countries, except for some measures for ships engaged in domestic voyages. However, because there are sea areas surrounded by several countries including the North Sea and international straits, maritime security measure for non-SOLAS vessels may be considered for cooperative implementation between these countries, based on the recognition that the vessels may join transnational unlawful acts such as smuggling and illicit trading.

**Table 4 Indicative European Statistics on Non-SOLAS Vessels**

Type of vessel	Amount
1) Non-SOLAS vessels calling at the Port of Rotterdam*	1300
2) Non-SOLAS vesels registered in the EU	1236
3) Fishing vessels registered in the EU	± 97000

\* 2003 statistics. With a total number of sea-going vessels calling Rotterdam numbering 29,450, the non-SOLAS part was approximately 4.5%.

## Part II - Necessities of Measures for Non-SOLAS Vessels

### 1 Numerical Balance of Non-SOLAS Vessels

The numbers of non-SOLAS vessels are studied in each of the tables shown in Part I. As can be seen, the number of fishing vessels in the figures of Japan and Europe is notably high. It may be suggested that a similar situation can be observed in other areas as well, if there are valid statistical data. The International numerical balance of non-SOLAS vessels can be seen by observing the number of merchant vessels in Japan and Europe, followed by the number of merchant vessels of less than 500 GT in size.

Table 5 Numbers of Registered Vessels

Gross tonnage	No. of Japanese vessels	Gross tonnage	No. of registered merchant vessels in the world
20-499	7,922 (84.4%)	100-499	44,291 (49.3%)
500-999	687 ( 7.3%)	500-999	9,503 (10.6%)
1,000-10,000	602 ( 6.4%)	1,000-10,000	21,900 (24.4%)
Over 10,000	171 (1.8%)	Over 10,000	14,205 (15.8%)
Total	9,382	Total	89,899

*The number of recorded vessels in Japan:  
as of February 2005, data from the Maritime Bureau,  
Ministry of Land, Infrastructure and Transport*

*The number of recorded merchant vessels in the world:  
as of the end of December 2003, data from World Fleet Statistics*

In Japan, vessels engaged in domestic voyages and fishing vessels are dominant among the calling vessels. When compared to the figures for the Port of Rotterdam, it can be considered that there are many cases among the ports of the world where measures for non-SOLAS vessels can be potentially determined according to the characteristics of the vessels entering that port. This idea is consistent with the movement of developing security measures for ports and harbours in Europe.

Table 6 Numbers of Vessels Calling Ports and Harbors in Japan (Year 2003)

Gross tonnage	Merchant vessels engaged in domestic voyage	Merchant vessels engaged in inter-national voyage	Fishing vessels	Others	Total
5-500	1,832,881	12,760	1,910,961 (34.3%)	1,486,839 (26.3%)	5,651,428
Over 500	264,034	113,953			
Total	2,096,915 (37.1%)	126,713 (2.2%)			

*“Others” include the other categories based on ports and harbours statistics, as well as vessels transporting automobiles, vessels for evacuation and railroad ferries.*

*Data from Ministry of Land, Infrastructure and Transport*

## 2 Understanding the Security Risk

In the coastal waters, maritime crimes that requires an employment of security measures such as smuggling and piracy, while occurring infrequently, represent a potential risk requiring security measures. In addition, the possibility that small vessels, which are large in actual numbers, will be used in these crimes cannot be ruled out.

Upon consideration of security measures, it is integral to understand the security risk (what kind of acts of terrorism occur in which sea area and in what frequency) and to consider security measures that adequately address these risks.

Regarding small vessels,

- (1) Cases assumed in ISPS, where the vessels are attacked from outside and used for acts of terrorism and crimes by hijacking, and;
- (2) Cases where vessels owned and controlled by those who have intentions of criminal acts and are used as a means of attack;

can be assumed. Because small vessels are easy to own and maintain, the risk for case (2) is considered to be high, so this risk must also be addressed adequately.



In important ports and harbors with many calling vessels as well as in congested straits and waterways, small vessels with different navigational modes, such as fishing vessels, frequent the area in large numbers, raising not only collision danger but also the risk for acts of terrorism by taking advantage of the area's importance and high economic value for the maritime traffic. It should be appropriate to evaluate the risks and consider employing adequate security measures, and selecting the sea areas with high risk and implementing regional measures with priority in those sea areas, for example.

### 3 Necessity of Measures

Maritime safety agencies of each country are enhancing information gathering and analysis activities and strengthening connections with the organizations concerned. They are also efficiently utilizing the numbers at the actual site and strengthening the system to monitor and capture suspicious vessels in advance, in order to prevent the occurrence of terrorist offences and maritime crimes. However, when vessels encounter acts of terrorism or marine casualties, maritime safety agencies and other vessels must rely on reports from the vessel in question to detect such terrorism or casualties. It is difficult to establish a system to ensure maritime safety by the safety agency alone, so it is necessary to prepare appropriate measures for the vessels as well.

The following are some of the security measures that can be considered for the vessel itself:

- (1) Self-security measures for the vessel itself and for the ports
- (2) Measures that can contribute to supporting the activities of safety agencies (for instance, employment of a system where the maritime safety agency (and the navigating vessels by itself if possible) can confirm the position and ID of the vessels navigating the sea areas in question)

The existing measures to report from vessels include a system such as reporting/warning equipment (SSAS) that is required to be installed on board under ISPS. However, it is often very difficult to make a reliable report from the vessel that is experiencing criminal acts at the moment. It can be also pointed out that measures to report from small vessels, for which the installment of SSAS is not required, are far from sufficient.

In general, non-SOLAS vessels are beyond the international rules. Therefore, in sea areas where measures for unlawful acts such as smuggling and piracy are required, one must take maritime security measures in regard to non-SOLAS vessels.

### Part III - Possible Maritime Security Measures for Non-SOLAS Vessels

As for maritime security measures for non-SOLAS vessels, it is necessary to combine a (1) system that contributes to the self-defense of the vessel itself, (2) system that contributes to the identification of the vessel, and (3) system to share information on vessel security accordingly by taking into account the characteristics of the sea area the vessel is navigating.

#### (1) Self-defense

- Self-defense measures like the one provided by the ISPS Code facilitating the protection of vessels from the threats posed by others,

These are measures to address the unlawful acts that place the vessel itself as the target of attack, such as breaking into the vessel.

#### (2) Identification

- Measures to transmit the identity and the position of the ship (AIS) for identification of non-SOLAS vessels,

These are measures to identify the vessels through the Low Cost AIS (Simplified AIS) in order to prevent unlawful acts.

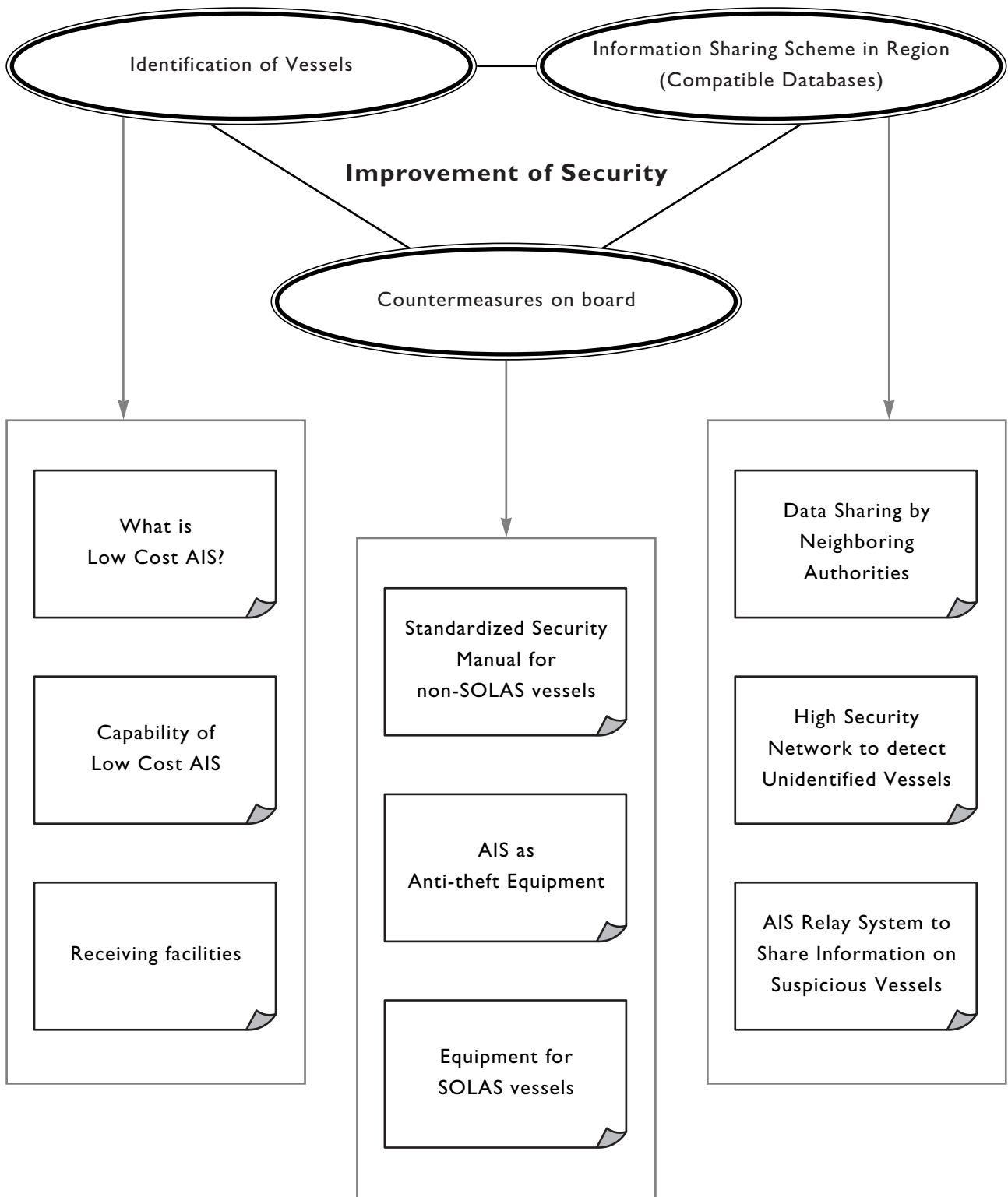
#### (3) Information sharing among the neighboring agencies

- Reinforcement of the information exchange and network among agencies in neighboring countries.

Sharing information on vessels is essential to evaluate the risks of navigating vessels. Security should be improved through the cooperation between the agencies neighboring the relevant sea areas by sharing information such as vessels registration, port calling and black/white lists.

## Possible Security Measures for Improving Security on Non-SOLAS Vessels

<Measures would be selected or arranged according to the feature of each sea area.>



## 1 Employment of Self-Defense Measures Against Non-SOLAS Vessels

The necessity of strengthening anti-terrorism “self-defense” measures against non-SOLAS vessels (such as freight ships less than 500 tons) to which the SOLAS Convention is not applied is considered here.

There is a proposal to enforce the requirements for anti-terrorism self-defense measures (enforcement based on the current Convention on non-SOLAS vessels), similar to those provided in the ISPS Code, uniformly across the world for non-SOLAS vessels. However, since the Convention was put into effect, currently there is not enough valuable information and experience to decide the revision of the scope of Convention, and there is no international proposal brought forth to revise the Convention in that regard, at least at the present moment. Thus, it is believed that it is an international consensus to regard the idea as premature.

However, this does not refute the approach by each country (region) to employ anti-terrorism self-defense measures based on regional risk analysis and evaluation.

There are countries (regions) already stipulating anti-terrorism self-defense measures for non-SOLAS vessels. For example, in North America, adaptation of ISPS Code is already required for vessels of 100 GT and larger, not only for domestic vessels but also for foreign vessels calling at ports in the U.S., to implement port state control. Europe is also trying to enforce the self-defense measures for some of the non-SOLAS vessels.

Considering that navigating areas for non-SOLAS vessels, which are relatively small, is usually specific and limited to coastal areas of their own country, it stands to reason that their risk becomes highly regional. Thus, it is believed to be adequate for each country (region) to consider employment of flexible measures (Regional Approach) according to its risk.

It is believed that this is also consistent with the purpose of the Conference resolution 7 of the SOLAS Conference, which calls on the Member States to consider appropriate anti-terrorism measures against non-SOLAS vessels (although not limited to self-defense measures).

## 2 International Trends on the Low Cost AIS

### 2.1 Overall Condition

Development of the AIS equipment with affordable prices is awaited. The standardization and development of the “AIS Class-B,” which is more adaptable to small vessels (non-SOLAS vessels), is making progress by reducing the price of the AIS (AIS Class-A), which is the requirement of the Convention. Technology standards for Class-A are provided in M.1371-1 of ITU-R (ITU: International Telecommunication Union, Radio-communication Sector) and 61993-2 of IEC (International Electrotechnical Commission). However, there are no specific technology standards set for Class-B, other than being required to have technical commonality with Class-A, so it is now considered by IEC.

At this stage, it is expected that compared to Class A, Class-B will be able to transmit less information, have a shorter effective communication range, and require longer intervals of transmission. With these changes, the equipment price can be reduced compared to Class-A, to make it easier to employ for small vessels as well. The price for the equipment itself is still being discussed, but it is generally requested to make it less than 100 thousand yen (USD 1,000).

It is pointed out that a drastic cost reduction is difficult because of the necessity to keep the basic technology specifications at the same level as Class-A. However, if Class-B is prepared based on original standards different from Class-A, it will lead to another problem that two different systems for Class A and Class B must be prepared. From the public security perspective in particular, vessels and safety agencies already using Class-A must install different equipment or prepare a different network, in order to grasp the movement of small vessels that might carry out acts of piracy or terrorism. Furthermore, if Class-A vessels and Class-B vessels cannot be detected with a single system, it may be detrimental to the original purposes of the AIS, such as collision prevention and maritime traffic control. Therefore, considering the safe operation of the AIS as a whole, it would be inevitable to unify the technical specifications.

When using the AIS to monitor piracy and terrorism, one must clear the obstacle of establishing a network to receive radio-waves transmitted from vessels navigating the sea area in question, in order to avoid the slippage of receiving radio-waves at the agency side. In other words, in order to grasp the movements of small vessels, infrastructure establishment on a large scale will be required: setting substantial numbers of base stations to cover the entire sea area in question by considering the effective communication range of Class-B (About 20 nautical miles at maximum between vessels and shore-based facilities; about 8 nautical miles at maximum between vessels. For reference, Class-A will be 60 nautical miles at maximum between vessels and shore-based facilities; about 30 nautical miles at maximum between vessels.), connect these base stations with a network, and separately establish facilities and equipment to integrate information. If several countries are to be involved, establishment of an international network will also be necessary, and there might be a difficulty in making adjustments in terms of cost burden, standards unification and the location of an information-distribution center. In such cases, there may be occasions where international organizations must take initiatives.

Table 7 Comparison between Class-A AIS and Class-B AIS

	Class-A AIS	Class-B AIS
Vessel applied	<p>SOLAS vessel</p> <p>* In the US case:                      Added to SOLAS vessel, installation is mandatory to;                      - each self-propelled vessel of 65 feet or more in length                      - each towing vessel of 26 feet or more in length and more than 600 horsepower                      - each passenger vessel engaged domestic service</p>	<p>Non-SOLAS vessel</p> <p>* Installation is basically voluntary, but should be complied with the regulations prescribed by the administration of each country.</p>
Access Scheme	SOTDMA (Self Organized Time Division Multiple Access)	CSTDMA (Carrier Sensing Time Division Multiple Access)
Frequency Range	156.025 – 162.025MHz	161.500 – 162.025MHz
Transmitter Power	12.5W / 2W	1W
Communication Range	<p>15 - 30 nautical miles (ship to ship)</p> <p>60 nautical miles (ship to shore)</p>	<p>5 – 8 nautical miles (ship to ship)</p> <p>20 nautical miles (ship to shore)</p>
Reporting Interval	<p>Variable by ship speed and course</p> <p>In anchoring: 3-minute interval</p> <p>In navigation: min. 2-second interval</p>	<p>2-step fixing by ship speed</p> <p>Less than 2-knot: 3-minute interval</p> <p>Over 2-knot: 20-second interval</p>
Communication IDs	IMO number / MMSI number	MMSI number
Devices Connected	<p>GPS Receiver</p> <p>True Heading Device (e.g. Gyro compass)</p>	unnecessary
Market Price	Approx. ¥1,000,000 JPY (USD 10,000)	Less than ¥100,000 JPY (USD 1,000)

In Southeast Asia, where the Straits of Malacca and Singapore are located and acts of piracy are being carried out by small vessels, a test for the Low Cost transponder system called “HARTS (Harbour Craft Transponder System)” was implemented. This is a system to keep track of domestic vessels by installing HARTS on them, but covers only the territorial waters of Singapore. Although HARTS employs GSM system and not VHF, effective communication range and reporting interval clears the level of standards for the AIS Class-B, and the price for the equipment itself is said to be less than 70 thousand yen (USD 700). The test carried out over 6 months in 2004 went trouble-free. It is building a reputation within the region as a system not requiring additional cost or manpower. Although it is regarded as the Low Cost transponder, because its technical specification differs from that of the AIS (Class-A) and is operated within a relatively small area (which means it requires a smaller burden for network preparation), it cannot be evaluated to correspond with the AIS Class-B as is. Nonetheless, it is very interesting in terms of showing an example that if the installation cost can be kept low, installing the AIS among small vessels does not necessarily encounter too much difficulty.

## 2.2 Improving the Environment for Installing the Low Cost AIS

Installment of the Low Cost AIS on non-SOLAS vessels is an effective measure to keep track of vessels. Upon employing this system, barriers for adaptation can be kept low if the sea areas requiring the installment of the system are sufficiently extensive.

That is to say, if the number of installed equipment increases, the price of the equipment can be reduced through mass production. As for shore-based infrastructure that will receive information from this equipment, necessary sea areas can be covered with measures such as setting buoys to relay radio-waves based on the communication range.

### 3 Data Sharing Among Neighboring Agencies

What is considered here is a methodology to share information on non-SOLAS vessels engaged in navigation within certain sea areas among neighboring agencies, and to effectively ensure maritime safety. First we study the method to achieve this without requiring any additional equipment on vessels, and then we show that information can be obtained more effectively by using the Low Cost AIS mentioned in 2 above.

#### 3.1 Basic Information

Vessel information useful for security measures and obtained relatively easily includes vessel registration information in each country and information submitted to each port by the vessels entering the port.

Registration information on merchant vessels, fishing vessels information and information submitted to each port by the vessels entering the port are all separately managed in Japan. Information sharing will be necessary not only among the domestic organizations involved, but also with each coastal country and flag state of the vessel passing the sea area in question. However, this should be what is known as a white list check, and there are several tasks in order to improve the reasonability and correctness of the monitoring function.

The first assumption is that the registration system is already established. It is also desirable if the information on port entry is computerized. Furthermore, a system to share the information among neighboring agencies will be necessary. Although there is an opinion that information on caution-requiring vessels, or a black list, must be shared among relevant countries in order to ensure highly reliable security measures, we can first utilize the individual black list held by each agency.

Because vessel registration information and information on entry into each port referred to are established individually, based on different designs, it can be assumed that either their description format or the language used differ with one another, or that the information is not computerized. Before sharing the data, it should be necessary to computerize each database as well as to develop a gateway to convert the format into standardized code.

It would be necessary to economically build a global network to integrate the databases in relevant countries and organizations. While access though the commercial-based Internet is adequate, handling of important information on maritime security will require not only privacy protection but also countermeasures against cyber-terrorism such as interception and falsification. Thus, it is important to take the latest information security measures such as Ipv6 along with using the low-cost and highly versatile Internet.

#### 3.2 Real-Time Information Grasping Using the Low Cost AIS

If an identification system for non-SOLAS vessel is employed in a form similar to the Low Cost AIS, and combined with the attachment of the AIS Class A to large vessels that is already stipulated in Chapter V, Regulation 19 of the SOLAS Convention, it will make a virtually real-time access to any vessel's navigation information.



Here we will study the potential and problems of such security measures that utilize the information by the AIS/Low Cost AIS as well as vessels data already held by administrative authorities of each country.

The specific process of security measures will be as follows:

a security monitoring organization will monitor the AIS/Low Cost AIS information on a real-time basis;

comparison of this information and vessel registration information will allow the understanding of the information unique to that certain vessel;

this unique information can be cross-checked with the port entry information to detect suspiciously-behaving vessels.

### 3.3 Attachment of the AIS/Low Cost AIS to All Vessels

Small vessels have relatively limited areas of navigation. Therefore, implementation of security measures limited to certain sea areas with high priority will be relatively easy if the coastal countries can coordinate their policies on the Low Cost AIS attached to small vessels. Also, the expense burden required will be limited if the Low Cost AIS is provided economically.

In addition, there are cases where it is highly unlikely that the vessels will comply with the order by the flag state to attach the Low Cost AIS, such as the case of pirate ships in certain sea areas.

North America is progressing in the direction of identifying vessels on the sea and monitoring suspicious vessels using Maritime Domain Awareness (MDA).

If security measures based on the AIS/Low Cost AIS will be implemented on the sea areas of high priority, one must consider the necessity of such approach.

Next, we will study the measures in terms of database and network environment to share this information. Because databases and monitoring systems of the involved organizations of relevant countries will be connected to the network, there are several technical problems to be solved in order to realize smooth information sharing.

Sending and receiving information between the AIS/Low Cost AIS vessels and shore-based facilities use the frequency provided as the international standard under ITU-R (International Telecommunication Union Radio-communication sector). It is therefore applicable universally. Because it is highly versatile and allows the simultaneous promotion of security measures in the sea areas of high priority, it is likely that the economical efficiency of the Low Cost AIS equipment itself will improve.

However, its wireless sending and receiving standard is based on an assumption of usage in waters of about 12 nautical miles distance from the coast. Therefore, in order to implement security measures in the high seas, it will require the employment of a system to relay signals transmitted from vessels.

In North America, a system to receive signals on patrol ships/aircrafts and relay them to shore-based station facilities is being considered. Consideration on relaying methods will be necessary in other countries as well, together with the decision on the compatibility with other countries.

Based on such information sharing, it will also be necessary to consider methods on actual usage, such as how to report information to the vessels passing the sea area where the incident occurs, or how to make emergency contact upon encountering acts of piracy. Taking economic factors into consideration, it will be adequate to establish these methods on the assumption of using the existing networks, including Inmarsat and International VHF. It is also necessary to set methods to share information to be used for coast guard activities.

#### Part IV - Proposal (IMO-Based Approach)

Decision on the necessity of maritime security measures on non-SOLAS vessels should be made based on circumstances peculiar to each sea area, because the targeted vessels are relatively small compared to vessels uniformly imposed of obligate requirements under the SOLAS Convention, and have shorter voyage. As for the specific images of security measures, several possibilities are shown in Part III. The selection and combination among these measures should also be decided on circumstances peculiar to each sea area, taking into account the possibility of non-SOLAS vessels joining the transnational unlawful acts. In addition, the enhancement of a registration system related to information on flag states and ownership, which also covers non-SOLAS vessels, is important in terms of clarifying basic information on these vessels.

Decision on the entity to implement these measures is entrusted to each country under the CONFERENCE RESOLUTION 7: Establishment of Appropriate Measures to Enhance the Security of Ships, Port Facilities, Mobile Offshore Drilling Units on Location and Fixed and Floating Platforms Not Covered by Chapter XI-2 of the 1974 SOLAS Convention (December 2002, IMO). However, it is clear that the unlawful acts such as terrorism, smuggling, illicit trading and piracy are not carried on based on territorial limits. Therefore, it is apparent that neighboring agencies should cooperatively take measures in sea areas there is a high possibility of unlawful acts may occur, rather than having the safety agencies implement measures individually.

Furthermore, because major international straits, that are usually congested with SOLAS and non-SOLAS vessels, are highly important sea areas in terms of trouble-free maintenance of maritime trade that supports international economy, coastal countries and countries using the strait must ensure the safety of such sea areas on mutual understanding. Accordingly, in sea areas where maritime security measures on non-SOLAS vessels are necessary, measures should be established based on regional cooperation under mutual understanding and support of several countries.

Although it is possible that regional cooperation for maritime security measures on non-SOLAS vessels to be entrusted to dialogues among the neighboring countries, for important international sea areas that support international maritime trade, achievement of regional cooperation can be expected only by entrusting the initiative to the IMO, which have been taking leadership on global maritime safety, considering the international value of such sea areas and predictable conflict of interests in them.

Therefore, the Japan International Transport Institute makes proposals as follows.

- 1 Inform and publicize to each country, through international seminars and in other venues, of the fact that there is an international task of developing security measures on non-SOLAS vessels.
- 2 Discuss among political leaders such matters as regional cooperation related to maritime security measures on non-SOLAS vessels, including the role to be played by the IMO, and then present an action plan.
- 3 The initiatives to be taken by the IMO should be considered as means to encourage the enhancement of a registration system of non-SOLAS vessels that includes information on their nationality and ownership, the promotion of regional cooperation related to maritime security measures on non-SOLAS vessels, and to make the organizational resolution that the IMO should designate important international straits where international cooperation is necessary, in the near future.