REPUBLIC OF SINGAPORE

INTERNATIONAL MARITIME ORGANIZATION

SINGAPORE MEETING ON THE STRAITS OF MALACCA AND SINGAPORE: ENHANCING SAFETY, SECURITY AND ENVIRONMENTAL PROTECTION
4 - 6 September 2007
Agenda item 3

IMO/SGP 1/3
4 September 2007
ENGLISH ONLY

IDENTIFICATION AND PRIORITIZATION OF NEEDS FOR PROJECTS ON SAFETY OF NAVIGATION AND ENVIRONMENTAL PROTECTION

Submitted by Indonesia, Malaysia and Singapore

SUMMARY

Executive summary:	The littoral States, following a comprehensive analysis and assessment of the current and future needs of the Straits of Malacca and Singapore in the fields of safety of navigation and environmental protection presented, during the Kuala Lumpur Meeting, six related project proposals. Since then China has agreed to undertake one of the projects and the United States of America, together with China, have carried out a need assessment to refine another one of the projects. As a result of the efforts to secure sponsorships for the remaining projects, the littoral States have undertaken a review of the proposals they had put forward during the Kuala Lumpur Meeting and the updated project proposals are set out in the annex to this document. The littoral States have also reached the conclusion that, at this stage, it will be best to seek and secure sponsors for the remaining five projects rather than to identify and prioritize, in response to what it has been agreed during the Kuala Lumpur Meeting, any new needs in the fields of safety of navigation and environmental protection.
Action to be taken:	Paragraph 10
Related documents:	IMO/JKT 1/2; IMO/KUL 1/3; IMO/KUL 1/4; C/ES.23/8; C/ES.23/D, paragraph 8; C 97/12; and C 97/D, paragraph 12

1 The Jakarta Meeting[1], desiring to enhance safety, security and environmental protection of the Straits of Malacca and Singapore (the Straits), invited[2] the International Maritime Organization (IMO) to consider, in consultation with Indonesia, Malaysia and Singapore (the littoral States), convening a series of follow-on meetings for the littoral States to identify and

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1 Meeting on the Straits of Malacca and Singapore: Enhancing Safety, Security and Environmental Protection held at Jakarta, Indonesia, on 7 and 8 September 2005.

2 The Jakarta Statement is set document IMO/SGP 1/INF.3, annex 5. It is also found in document IMO/JKT 1/2 and in document C/ES.23/8 (Secretary-General), annex 2.

prioritize their needs and for user States to identify possible assistance to respond to those needs, which may include information-exchange, capacity-building, training and technical support, with a view to promoting and co-ordinating co-operative measures.

2 In response, the Council of IMO, at twenty-third extraordinary session (17 and 18 November 2005) under its agenda on the Protection of Vital Shipping Lanes, considered the outcome[3] of the Jakarta Meeting and, *inter alia*, authorized the Secretary-General of IMO to convene in consultation with the littoral States the Kuala Lumpur Meeting[4].

3 During the Kuala Lumpur Meeting, the littoral States, taking into account the prevailing and projected volume of vessel traffic through the Straits and as a result of a comprehensive analysis and assessment of their current and future needs in the fields of safety of navigation and environmental protection, presented[5] the following six related project proposals:

- Project 1: Removal of wrecks in the Traffic Separation Scheme in the Straits of Malacca and Singapore
- Project 2: Cooperation and capacity building on Hazardous and Noxious Substance (HNS) preparedness and response in the Straits of Malacca and Singapore
- Project 3: Demonstration project of class B automatic identification system (AIS) transponder on small ships
- Project 4: Setting up a tide, current and wind measurement system for the Straits of Malacca and Singapore to enhance navigation safety and marine environment protection
- Project 5: Replacement and maintenance of aids to navigation in the Straits of Malacca and Singapore
- Project 6: Replacement of aids to navigation damaged by the tsunami incident in December 2004

4 The Kuala Lumpur Meeting, *inter alia*:

- agreed[6] that the projects presented by the littoral States for enhancing safety of navigation and environmental protection should be supported; and
- invited IMO to continue to co-operate with the littoral States and to provide every assistance possible in attracting sponsors for the agreed projects and contributors for the maintenance, repair and replacement of the aids to navigation in the Straits.

5 In response, the Council of IMO, at ninety-seventh session (17 and 18 November 2006) under its agenda on the Protection of Vital Shipping Lanes, considered the outcome[7] of the Kuala

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3 Refer to document C/ES.23/8 (Secretary-General).

4 Meeting on the Straits of Malacca and Singapore: Enhancing Safety, Security and Environmental Protection held at Kuala Lumpur, Malaysia, from 18 to 20 September 2006.

5 Refer to document IMO/KUL 1/3 (Indonesia, Malaysia and Singapore).

6 The Kuala Lumpur Statement is set out in document IMO/SGP 1/INF.3, annex 6. It is also found in document IMO/KUL 1/4 and in document C 97/12 (Secretary-General), annex 2.

7 Refer to document C 97/12 (Secretary-General).

Lumpur Meeting and, *inter alia*, requested the Secretary-General of IMO to provide to the littoral States assistance in attracting sponsors for the agreed projects and contributors for the maintenance, repair and replacement of the aids to navigation in the Straits and authorized him to convene in consultation with the littoral States the Singapore Meeting[8].

6 China, following the interest it expressed during the Kuala Lumpur Meeting and an initial meeting with the littoral States and IMO held in Penang, Malaysia in December 2006 had held extensive and detailed consultations with Indonesia in relation to undertaking and delivering Project 6. It has been confirmed by China that it will undertake the project in its entirety in a step-by-step implementation approach. Details in relation to the state of implementation of Project 6 will be reported during the Singapore Meeting.

7 The United States of America, following the interest it expressed during the Kuala Lumpur Meeting and a series of consultation with the littoral States and IMO, in an effort to promote the implementation of Project 2, agreed to carry out a needs assessment to serve as the basis for the establishment of an HNS preparedness and response capability and capacity in the littoral States. The field visits of the needs assessment took place from 14 to 21 August 2007. As a follow-up to its expression of interest in this project, China also sent its officials to take part in the field visits to the littoral States. Details of the outcome of the field visits of the need assessment will be reported during the Singapore Meeting.

8 As a result of the efforts to secure sponsorships for the remaining five projects and in the light of the developments in the implementation of the MEH project[9], the littoral States have undertaken a review of the proposals they had put forward during the Kuala Lumpur Meeting in relation to Projects 1 to 5. This review was carried out at a meeting hosted by Indonesia in Bandung, Indonesia from 19 to 20 June 2007. As part of the review, the littoral States updated each project to provide greater clarity and smaller-sized components to facilitate participation by user States and other users of the Straits, as well as to build upon complementarities and minimise duplication following the progress made in the implementation of the MEH project. The updated project proposals are set out in the annex and the littoral States will be presenting these for the consideration during the Singapore Meeting.

9 The littoral States have also reached the conclusion that, at this stage, it will be best to seek and secure sponsors for the remaining five projects rather than to identify and prioritize, in response to what it has been agreed during the Kuala Lumpur Meeting, any new needs in the fields of safety of navigation and environmental protection. At the same time the littoral States note that the five projects represent high priority needs and that they have decided not to put forward proposals on projects dealing with issues which need attention but, at present, are of a lesser priority.

Action requested of the Singapore Meeting

10 The Singapore Meeting is invited to note the information provided, to consider the updated project proposals set out in the annex and to comment and decide as it may deem appropriate.

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8 Meeting on the Straits of Malacca and Singapore: Enhancing Safety, Security and Environmental Protection to be held in Singapore, from 4 and 6 September 2007.

9 Marine Electronic Highway Demonstration Project for the Straits of Malacca and Singapore developed by IMO in co-operation with the littoral States and funded by the Global Environment Facility of the World Bank and the Republic of Korea.

ANNEX

THE UPDATED PROJECT PROPOSALS

GENERAL INTRODUCTION

1 Introduction

1.1 The Jakarta Meeting agreed, among others, to support and encourage the implementation of article 43 of the United Nations Convention on the Law of the Sea (UNCLOS) and to facilitate co-operation in keeping the Straits of Malacca and Singapore (the Straits) safe and open to navigation, including exploring the possible options for burden sharing.

1.2 In this regard, and as a follow-up to the Jakarta Meeting, Indonesia, Malaysia and Singapore (the littoral States) have identified and proposed, on the basis of co-operative partnership with user States and users of the Straits with the common objective to enhance the safety of navigation and environmental protection in the Straits six projects.

1.3 The six projects[1] were presented at the Kuala Lumpur Meeting where they received broad in-principle support from user States, users of the Straits and other stakeholders.

1.4 Since then, a number of user States and other stakeholders have translated their interest and support into concrete commitment. Following extensive discussions with Indonesia and a detailed site survey, China has made a firm commitment to undertake Project 6 in its entirety, with the project to be implemented in a phased step-by-step approach. The United States of America, together with China, has also carried out a needs assessment to serve as a basis for the establishment of an HNS preparedness and response capability and capacity in the littoral States and to promote the further implementation of Project 2. A number of other States have advised that they are studying some of the projects.

1.5 Overall, the projects as presented provide an excellent opportunity for co-operation between the littoral States and user States and users of the Straits within the principles of article 43 of UNCLOS.

2 Background

2.1 The Straits have for centuries been one of the most important and busiest shipping routes in the world. It has long served as a major artery of trade between countries in the east and those in the west. As a result, the rapid growth, and more recent acceleration, in world trade have seen a marked increase in shipping traffic through the Straits. Today, one-third of the world's trade and half of the world's oil supply are carried through the Straits by some 90,000 vessels which use the Straits each year. Thus the Straits' marine environment and resources are vulnerable to the threat of oil pollution from ships. Such a situation demands due efforts and resources in ensuring the safe passage of these oil tankers through the Straits.

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[1] Refer to document IMO/KUL 1/3 (Indonesia, Malaysia and Singapore).

2.2 The Straits are also an important source of marine resources for the littoral States. A significant proportion of the population of the littoral States lives within 50 km of the Straits and many are directly dependent on it.

2.3 Presently, Japan through the Malacca Straits Council has been the most active in co-operating with the littoral States, in particular for the provision and maintenance of aids to navigation. Since 1969, Japan has contributed more than USD 130 million in this respect. Such arrangement has seen a significant impact in reducing the number of shipping incidents in the Straits. However, with marked changes in the economic landscape, in particular the emergence of other major economies in the region and their use of the Straits, it is timely to widen and enhance the existing partnership of co-operation in the Straits.

3 Scope of projects

3.1 The projects set out in this document entail the following:

.1 Removal of wrecks in the Traffic Separation Scheme in the Straits of Malacca and Singapore;

.2 Co-operation and capacity building on Hazardous and Noxious Substance (HNS) preparedness and response in the Straits of Malacca and Singapore;

.3 Demonstration project of class B automatic identification system (AIS) transponder on small ships;

.4 Setting up a tide, current and wind measurement system for the Straits of Malacca and Singapore to enhance navigation safety and marine environment protection; and

.5 Replacement and maintenance of aids to navigation in the Straits of Malacca and Singapore.

3.2 The project entailing the Replacement of aids to navigation damaged by the tsunami incident in December 2004, which was included in the package of projects presented during the Kuala Lumpur Meeting, has not been included as it is undertaken by China.

4 Benefits

4.1 The proposed projects are designed to further enhance the safety of navigation of ships through the Straits and the protection of the marine environment. They include measures to further improve the management of safety of navigation and environmental protection in the Straits as well as preventative and response measures.

4.2 The main feature of the proposed projects include the provision of specific equipment, capacity building and training, development of specialized management tools and direct financial funding.

4.3 The benefits include the improvement of resources and capacity in managing safety of navigation and environmental protection on the part of the littoral States. On the other hand, by

helping to ensure that the Straits remain safe and open to shipping at all times, users will benefit through the continued and uninterrupted use of the Straits.

5 Scope of users' participation

5.1 Each of the six projects has an important role towards enhancing the safety of navigation and the marine environment in the Straits. More significantly, they provide an excellent opportunity for the littoral States, user States, the shipping industry and other stakeholders to co-operate towards achieving the stated aim of ensuring that the Straits remain safe and open to shipping at all times.

5.2 Among the possible areas of co-operation being sought from the user States and other stakeholders include direct financial funding, supply of equipment, technical assistance and expert consultancy. The co-operation and sponsorship provided may be for a total project package or an individual component or even specific aspects of a project.

6 Project implementation

6.1 Any agreed project could be implemented, on a bilateral or multilateral arrangement, through the co-operation and agreement of one or more user States and stakeholders with one or more littoral States.

6.2 Specifically, a Project Coordination Committee (PCC), comprising the littoral States and sponsors of/contributors to projects, will oversee the co-ordination of the implementation of these projects. The PCC will enable the sponsors of projects to have a role in the overall project co-ordination.

6.3 In addition, the littoral States directly involved and the sponsors of a specific project can establish a joint project implementation team, or an agreed mechanism, for the technical management and implementation of the project. The PCC and the project implementation teams will ensure that the projects are implemented smoothly and that sponsors are involved in the management and implementation of the projects.

List of projects

Project 1	Removal of wrecks in the Traffic Separation Scheme in the Straits of Malacca and Singapore
Project 2	Cooperation and capacity building on Hazardous and Noxious Substance (HNS) preparedness and response in the Straits of Malacca and Singapore
Project 3	Demonstration project of class B automatic identification system (AIS) transponder on small ships
Project 4	Setting up a tide, current and wind measurement system for the Straits of Malacca and Singapore to enhance navigation safety and marine environment protection
Project 5	Replacement and maintenance of aids to navigation in the Straits of Malacca and Singapore

PROJECT 1

REMOVAL OF WRECKS IN THE TRAFFIC SEPARATION SCHEME IN THE STRAITS OF MALACCA AND SINGAPORE

1 Objective

1.1 The objective of this project is to enhance the safety of navigation in the Straits of Malacca and Singapore (the Straits) particularly within the Traffic Separation Scheme (TSS) for deep draft vessels by determining the risks and removing hazards to allow for continuous and unobstructed navigation.

2 Current status

2.1 Annually more than 90,000 ships passed through the Straits. On average about 3,500 of these were deep draft vessels and carrying oil as shown in appendix 1. The rules[1] for vessels navigating the Straits require deep draught vessels and Very Large Crude Carriers (VLCC) to have Under Keel Clearance (UKC) of at least 3.5 metres. Several of these vessels were recorded with drafts of 21 metres. In view of the UKC requirement these vessels will need at least 24.5 metres of available depth of water to safely pass through the Straits without waiting for high tide.

2.2 While wrecks lying along the Straits do not pose an immediate threat to shallow draft vessels, these wrecks remain to be a navigation challenge for deeper draft vessels. Vessels with drafts of greater than 20 metres will have to carefully plan their passage through the Straits to coincide with the incident of high water to ensure unimpeded passage.

2.3 A number of critical wrecks have been identified that may become obstacles and hazards to safe navigation for deep draft vessels. The position and location of eleven (11) of these critical wrecks are as identified in appendix 2. Normal good seamanship practice will encourage shipmaster to avoid passing over the wrecks in the passage planning, although there is sufficient depth of water for them to pass through. Hence, the divergence of a ship's course may in the long run change the traffic pattern throughout the Straits within the position of the wrecks. Further to that, some of the wrecks are located at the narrow bend of the TSS and these may cause a bottleneck effect to traffic as illustrated in appendix 3.

3 Need for the project

3.1 Wrecks particularly in a confined navigation channel continue to be a bane for safe navigation of ships. Therefore the removal of wrecks is vital to ensure continuous safe passage of vessel transiting the Straits. Due to economic needs, deep draft vessels especially VLCC use the Straits although at times these vessels are required to wait for tide to allow for sufficient UKC.

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[1] The Amended rules for vessels navigating through the Straits of Malacca and Singapore are set out in annex 1 SN/Circ.198 on Routeing measures other than traffic separation schemes.

3.2 A wreck in particular, the "Royal Pacific" lies in the separation zone of the Port Klang to Port Dickson TSS near the precautionary area off Port Dickson as in appendix 4. The removal of this wreck will provide unobstructed passage in the TSS in particular for very large tankers and deep draft vessels encountering manoeuvring problems in the vicinity.

4 Potential benefits

4.1 The proposed project will greatly enhance the safety of navigation in the Straits by reducing the risk elements and will in turn also reduce the threat to the marine environment. The potential benefits are:

.1 Improved safe passage for transiting vessels by not having to consider departing from the intended course;

.2 Deep draft vessels (up to 21 metres) will also have continuous deep water sufficient to transit through irrespective of the tide; and

.3 Vessels will have greater room for manoeuvring when in emergency situations thus reducing the risk of an incident occurring.

4.2 The proposed project will also benefit shipowners and navigators by identifying the risks elements and the removal of hazards to transiting vessels.

4.3 The processed data from the hydrographic survey to be conducted under the Marine Electronic Highway demonstration project for the Straits of Malacca and Singapore (the MEH project) will be utilised as initial input in carrying out the risk assessment to identify the critical wrecks in the TSS.

4.4 It is also envisaged that the outcome of any hydrographic survey, risk assessment and wreck monitoring can also be used in the development and updating of any model for search and rescue or pollution control as proposed in the other projects. The outcome can also be used for the purpose of planning in the provision of aids to navigation in the Straits.

5 Scope of project

5.1 There are four (4) main components of the project:

.1 Hydrographic survey of the TSS will be undertaken under the MEH project. Based on the outcome of that hydrographic survey, a detailed site survey to be taken under this project would be required for the wrecks already identified;

.2 To conduct risk assessment of the project area to identify the risks faced by vessels passing through the Straits and to identify any consequential risk when removing any of the wreck;

.3 To remove critical wrecks throughout the Straits to provide a minimum safe depth of 24.5 metres to allow deep draft vessels with 21 metres draft to pass through the Straits; and

.4 To develop a Wreck Management Information System.

6 Resources required

6.1 Resources and funding will be required for detailed site survey of the identified wrecks, risk assessment and the removal of these wrecks. This may also include training of personnel, the procurement of equipment and tools for site survey, risk assessment, wreck monitoring and for the removal of wrecks.

7 Estimated cost

7.1 The estimated cost for the project component is:

.1	Hydrographic survey	*To be provided by the littoral States*
.2	Risk assessment of wrecks	USD 5 million
.3	Removal of wrecks *(subject to site survey analysis)*	USD 5 million per wreck
.4	Wreck Management Information System	USD 500,000
.5	Training of resource persons	USD 800,000

7.2 The above cost also include the procurement, maintenance and updating of site survey, risk assessment equipment and tools, where appropriate for a period of at least five years.

8 Proposed schedule

8.1 The exact duration of the project will only be known after a detailed site survey and risk assessment has been conducted. This project will also take into consideration the schedule of the hydrographic survey performed under the MEH project. It is expected that the total project duration will be initially implemented for a period of at least five years with the anticipated breakdown as illustrated in the table below.

TABLE 1

PROPOSED PROJECT IMPLEMENTATION SCHEDULE

No.	Items/Year	Yr1	Yr2	Yr3	Yr4	Yr5
1	Hydrographic survey under the MEH project					
2	Development of human resources and training: - risk assessment - site survey and underwater technique - wreck removal & salvage methodology - wreck monitoring					
3	Risk assessment process Development of standard operating procedures, including procurement of risk assessment tools					
4	Detailed site survey of the identified wrecks and removal of wrecks					
5	Development of wreck monitoring tool					
6	Maintenance and updating of equipment and tools					

8.2 Actual removal of the wrecks will be carried out after analysing the outcome of the detailed site survey and the risk assessment.

9 Possible co-operation areas

9.1 One or more users may cooperate and provide assistance in the form of:

.1 Contribution of fund for the site survey, risk assessment, wreck monitoring and wreck removal;

.2 Contribution in kind for equipment and tools;

.3 Technical expert assistance; and

.4 Training in the field of survey, risk assessment, wreck monitoring and wreck removal.

10 Project implementation

10.1 The littoral States shall cooperate through the agreed mechanism for the implementation of the project. However, each littoral State shall be responsible for the implementation of the project within its own area of jurisdiction.

APPENDIX 1

VESSELS REPORTING TO THE VESSEL TRAFFIC SERVICE (VTS) CENTER AT PORT KLANG

	Number of vessels			
Year/Type	**Total**	**Tankers /VLCCs**	**Other types**	**Deep draft** (d >15m)
2000	55 597	13 343	42 254	3163
2001	59 314	14 276	45 038	3303
2002	60 034	14 591	45 443	3301
2003	62 334	15 667	46 667	3487
2004	63 636	16 403	47 233	3477
2005	62 621	14 759	47 862	3788
2006	65 649	14 784	50 865	3851
Average	61 312	14 832	46 480	3481

Source: VTS Center, Port Klang

Notes:
Vessels of >15m draft are considered as deep draft vessels.
VLCCs are vessels of >150,000 dwt.

APPENDIX 2

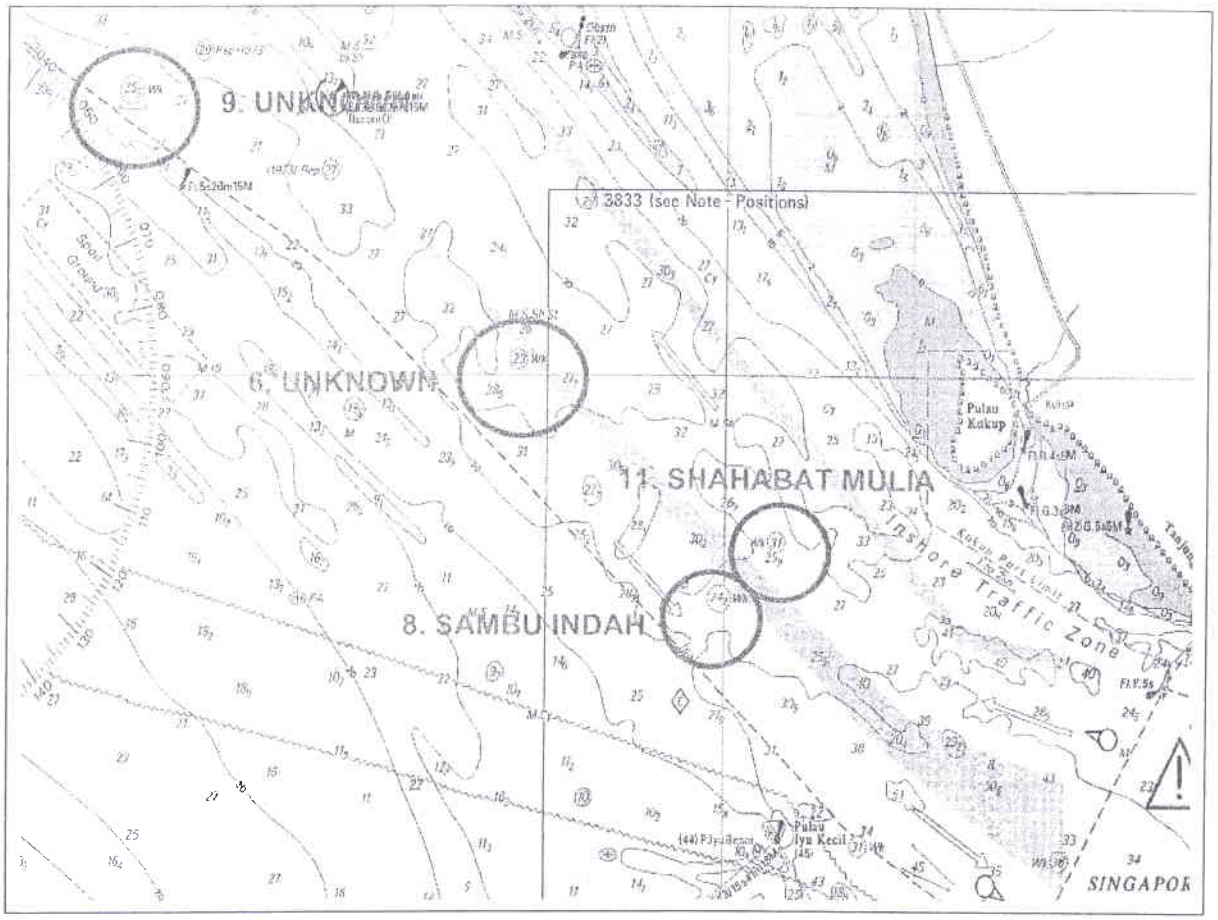
LIST OF CRITICAL WRECKS IN THE
STRAITS OF MALACCA AND SINGAPORE

No	Name of the wrecks	Latitude	Longitude	Location	Depth (m)	Charts
1	Unknown	02° 56.547 N	100° 50.536 E	Indonesia	16.0	MAL 532
2	Royal Pacific	02° 27.148 N	101° 36.304 E	Malaysia	16.1	MAL 532
3	Unknown*	01° 43.501 N	102° 44.20 E	Malaysia	<28	MAL 521
4	Kyoryu Maru	01° 08.192 N	103° 43.442 E	Indonesia	21.5	BA 3833
5	Unknown	02° 57.594 N	100° 48.346 E	Indonesia	22.3	MAL 532
6	Unknown	01° 20.295 N	103° 15.468 E	Malaysia	23.0	MAL 521
7	Adhas	02° 58.640 N	100° 49.647 E	Indonesia	23.6	MAL 532
8	Sambu Indah	01° 15.898 N	103° 19.820 E	Malaysia	24.0	MAL 521
9	Unknown	01° 25.459 N	103° 06.727 E	Malaysia	25.5	MAL 521
10	Coaster	02° 48.784 N	101° 00.850 E	Indonesia	26.3	MAL 532
11	Shahabat Mulia	01° 16.942 N	103° 21.039 E	Malaysia	31.0	MAL 521

Notes:
* *Identified and marked as a hazard to navigation in the chart.*
Depth is the depth of water from chart datum.

APPENDIX 3

WRECKS LOCATED AT THE NARROW BEND OF THE
TRAFFIC SEPARATION SCHEME (TSS)



PROJECT 2

COOPERATION AND CAPACITY BUILDING ON HNS PREPAREDNESS AND RESPONSE IN THE STRAITS OF MALACCA AND SINGAPORE

1 Objective

1.1 The objective of the project is to enhance marine environmental protection in the Straits of Malacca and Singapore (Straits) by enhancing the preparedness and response capabilities of the littoral States against any ship-sourced pollution incidents by hazardous and noxious substances.

2 Current Status

2.1 An innumerable variety of products is carried on board ships transiting the Straits. A large proportion of this includes dangerous cargoes such as oil, gas and chemical products. Yearly five per cent (5%) from the total number of ships transiting the Straits are LNG/LPG carrier and another twenty five per cent (25%) are tankers. On top of these numerous others are carry chemical products. Therefore, the Straits is extremely vulnerable to pollution incidents which threaten its natural biological resources such as fish, mangroves, sea grass beds, coral reefs and extensive aquaculture activities.

2.2 The Protocol on Oil Pollution Preparedness and Response and Cooperation to Pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS Protocol) was adopted by the International Maritime Organization on 15 March 2000 and entered into force on 14 June 2007. Among the littoral States, only Singapore has become a party to the OPRC-HNS Protocol so far (as on 4 September 2007).

2.3 Currently there is very minimal hazardous and noxious substances (HNS) preparedness and response capabilities along the Straits. This inadequacy will drastically reduce the capability of littoral States to prevent serious damage to the marine environment and resources in the Straits in the events of any ship-sourced pollution incident by HNS (HNS spill). The economical livelihood of thousands of fishermen along the Straits may also be impacted.

3 Need for the project

3.1 In view of the above, there is a serious need for acquiring the required knowledge and capacity building on preventive and curative alternatives available in an event of HNS spill in the Straits.

3.2 The establishment of HNS Databank and response capacity and co-operation will significantly increase the capability of the littoral States to prevent great damage to the marine environment in the Straits.

4 Potential benefits

4.1 The proposed project is expected to enhance the protection of the marine environment in the Straits. The potential benefits are:

.1 Each littoral State will have a common HNS Databank and its own National Response Equipment Centre to combat HNS spills from ships;

.2 The common standard operating procedure (SOP) and co-ordinated training will enable greater co-operation among littoral States in the Straits;

.3 Increase ability to protect the marine environment and resource; and

.4 Indirect contribution to the maintenance of safety of navigation as a result of improved capability to deal with ships involved in HNS incidents.

4.2 The information collated in the common HNS Databank may be useful input for the on-going Marine Electronic Highway (MEH) demonstration project on the Straits of Malacca and Singapore (the MEH demonstration project). The MEH demonstration project may even include the common HNS Databank that is developed in this project as part of the MEH database. Furthermore other States in the region, for example ASEAN Member States, may be given access to any of the established common HNS Databank or established their own similar common HNS Databanks.

5 Scope of project

5.1 There are four (4) components of the project:

.1 Establishment of a common HNS Databank

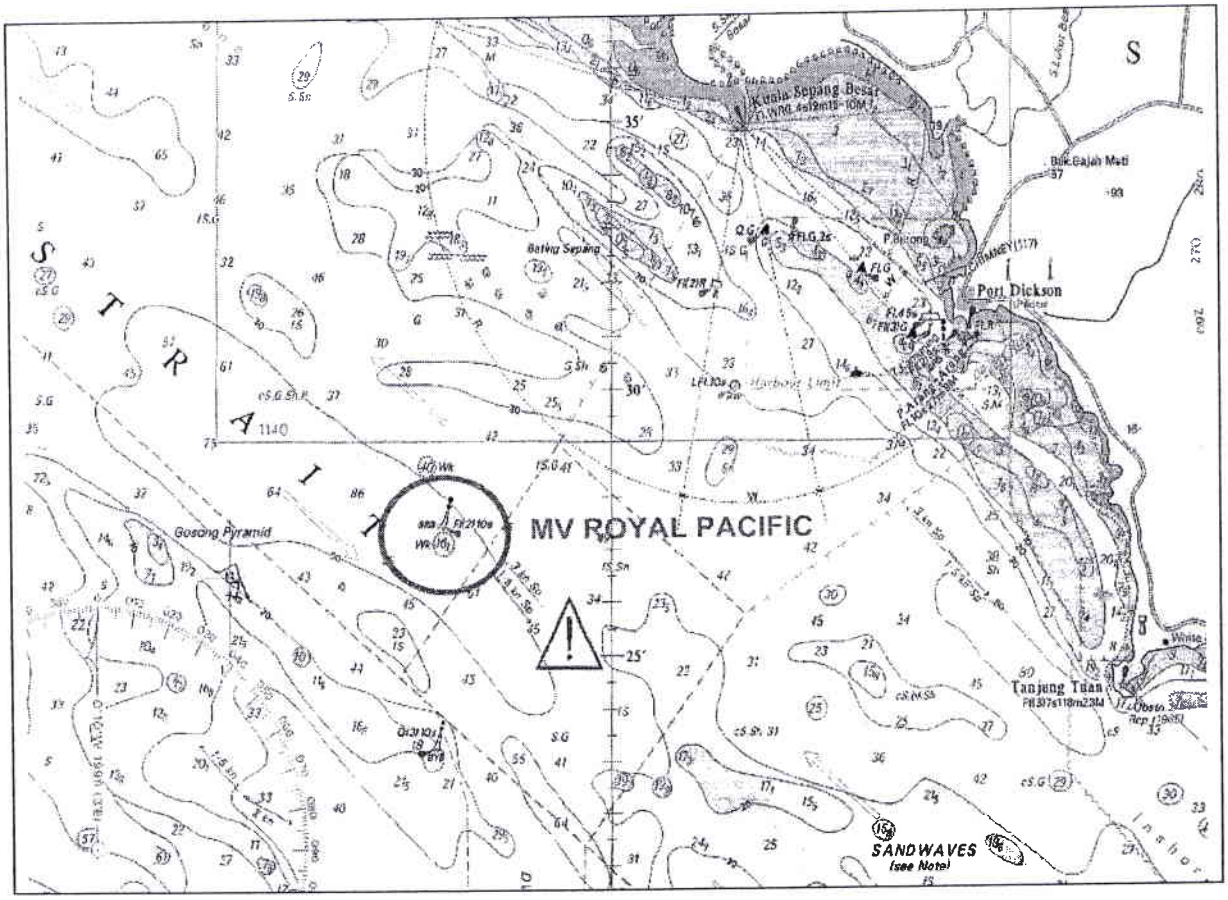
A common HNS Databank, established at the focal point of each littoral State will include information on the list of materials classified as HNS, the physical and chemical properties of the materials as well as the appropriate response procedures. Each littoral State will be responsible to update the information in the databank as well as updating each other. The HNS Databank will enable quick identification of substance involved in an HNS spill to enable appropriate procedures.

.2 Formulation of SOP for Joint HNS Spill Combat

The SOP for Joint HNS Spills Combat will be modelled after the existing SOP for Joint Oil Spill Combat in the Straits of Malacca and Singapore. Littoral States will benefit in term of a common action plan and procedures in combating HNS spills as well as from the anticipated joint exercise that will be regularly conducted under the SOP.

APPENDIX 4

LOCATION OF THE WRECK ROYAL PACIFIC



.3 HNS Response centres

For a start seven (7) critical locations along the West Coast of Peninsular Malaysia and Singapore facing the Straits have been identified for the establishment of the HNS Response centres. They are Penang, Lumut, Port Klang, Port Dickson, Tanjung Pelepas, Singapore and Batam. These locations are shown in the chart set out in the appendix. At each of these centres common specification equipment will be purchased and put in place. In future other locations for three littoral States will be established after relevant assessment has been performed.

.4 Capacity Building

The capacity building programme should include regional and national levels training and exercises. National level training will allow for the testing and improving inter-agency co-operation and co-ordination. Whereas joint exercises between the three littoral States will put to test communication and response strategy underlined in the SOP for Joint HNS Spill Combat.

6 Resources required

6.1 The resources required are for the:

.1 Development and establishment of common HNS databank at each littoral State;

.2 Development of a common SOP for HNS spill response;

.3 Establishment of HNS Response centres;

.4 Purchase of equipment for the HNS Response centres;

.5 Start-up of awareness and training programmes including joint exercises and national level exercises.

7 Estimated cost

7.1 The estimated cost for the project is expected to be in the region of USD 3.5 million.

8 Proposed schedule

8.1 The expected duration for the project is two (2) years with the proposed schedule as follows:

.1 Establishment of a common HNS databank – eight (8) months;

.2 The formulation of SOP for the Joint HNS Spill Combat – twelve (12) months;

.3 Assessment and purchase of equipment – eight (8) months;

.4 Establishment of national HNS Response centres – ten (10) months; and

.5 Training – eighteen (18) months

9 Possible co-operation area

9.1 One or more user States may participate and co-operate in the project through the following:

.1 Development of a common electronic based HNS databank including the provision of computers;

.2 Development of SOP for the Joint HNS Spill Combat;

.3 Providing Funding for the setting up of national HNS Response centres including maintenance for a pre-determined period; and

.4 Training and capacity building in HNS.

10 Project Implementation

10.1 The three littoral States shall co-operate through the agreed mechanism for the implementation of the project. However, each littoral State shall be responsible for the implementation of the project within its own area of jurisdiction.

10.2 The proposed implementation agencies from the littoral States are:

.1 Directorate General of Sea Transportation, Ministry for Transportation, Indonesia;

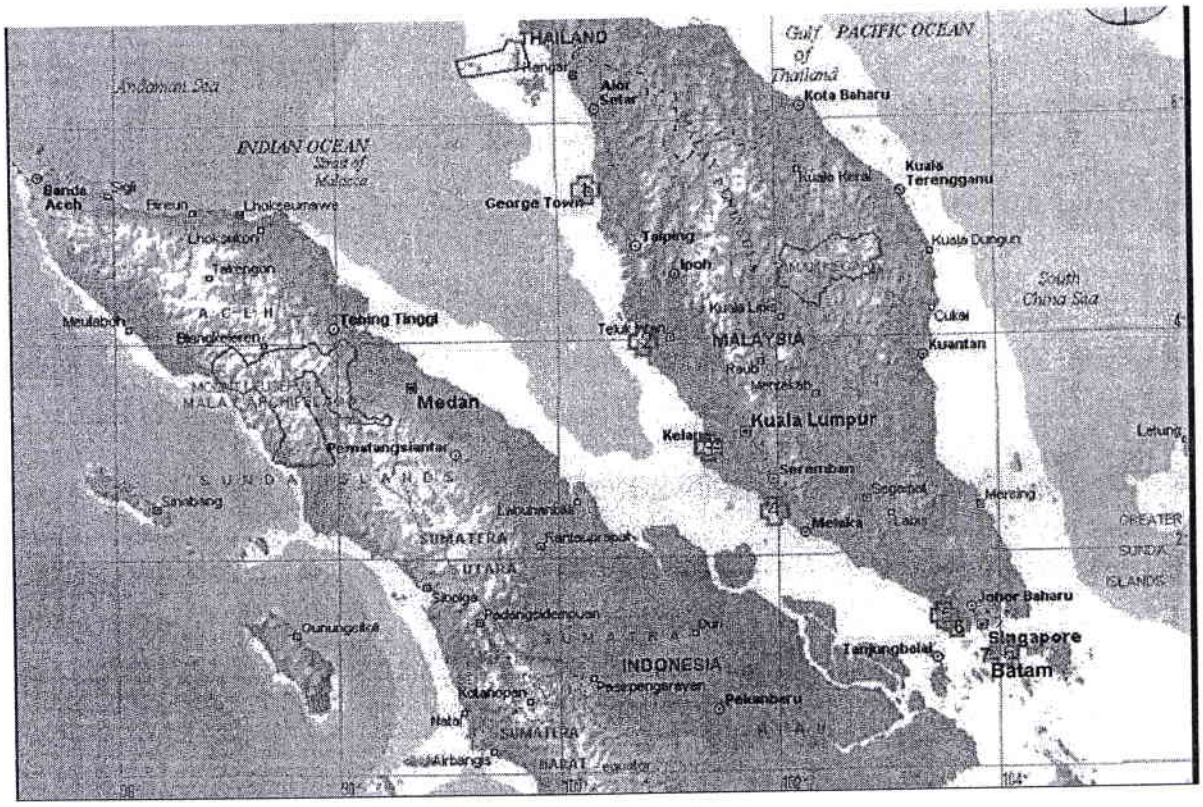
.2 Maritime and Port Authority, Singapore; and

.3 Marine Department, Malaysia.

APPENDIX

PROPOSED LOCATIONS OF HNS RESPONSE CENTRES IN THE STRAITS OF MALACCA AND SINGAPORE

(1) Penang; (2) Lumut; (3) Port Klang; (4) Port Dickson; (5) Tanjung Pelepas; (6) Singapore; and (8) Batam.



PROJECT 3

DEMONSTRATION PROJECT OF CLASS B AUTOMATIC IDENTIFICATIONSYSTEM TRANSPONDER ON SMALL SHIPS

1 Objective

1.1 The objective of the project is to enhance the safety of navigation within the Traffic Separation Scheme (TSS) in the Straits of Malacca and Singapore (the Straits) mainly in relation to: (1) preventing collisions particularly between small ships and bigger ocean-going ships; and (2) the safety of life at sea.

2 Current situation

2.1 There are numerous small ships of less than 300 gross tonnage (GT) such as cargo ships, tugs, etc navigating in the Straits that are not subject to SOLAS regulation V/19 and are not required to be fitted with an Automatic Identification System (AIS). Radars are also not very effective in detecting small ships. In the Singapore Strait, for example there is on average 100 daily ship movements of less than 300 GT.

2.2 Ships using the Straits had provided feedback that on occasions, they had to take actions to avoid small ships that were already very close to them, particularly in the night and in poor visibility conditions. This was because small ships were not detected by their radars until they were very close. Similarly, these small ships were not usually detected by Vessel Traffic Service (VTS) radars.

2.3 Currently, as per the carriage requirements in SOLAS regulation V/19, relevant ships are fitted with AIS transponder units. AIS is a ship and shore-based data broadcast system, operating in the VHF maritime band. Its characteristics and capability make it a tool for enhancing situational awareness, thereby contributing to the safety of navigation and efficiency of shipping traffic management.

2.4 An AIS unit is a VHF radio transceiver capable of sending information such as station identity, position, course, speed, length, ship type to other ships and shore stations such as a VTS centre. The purpose is to positively identify ships, provide additional information in order to assist collision avoidance, and assist in ship tracking. It also aims to simplify and promote the exchange of information automatically, thereby reducing verbal communication.

2.5 There are two types of AIS units. These are termed Class A and Class B units:

.1 Class A ship-borne mobile units are required to be carried on board those ships to which SOLAS regulation V/19 applies and need to meet the performance standards[1]

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[1] Recommendation on Performance Standards for Universal Automatic Identification System (AIS) is set out in annex 3 to Resolution MSC.74 (69) on Adoption of New and Amended Performance Standards.

adopted by the International Maritime Organization. All such ships were to have AIS transponder fitted by 31 December 2004.

.2 Class B units are designed to operate harmoniously with Class A units on the VHF data link but provide less functionality than Class A units. They may be used on craft not subject to SOLAS. SOLAS Contracting Governments can require the carriage of Class B units as part of their domestic requirements.

3 Need for the project

3.1 If ships less than 300 GT are equipped with Class B AIS transponders, their presence and identities can be easily seen by ships navigating in the Straits and by the VTS centre. This additional information will enhance situation awareness for shipmasters and contribute to better informed decision-making on navigation. It is thus proposed that a trial implementation be carried out to test the operations of the Class B AIS transponders on small ships in the Straits, especially in congested areas. The trial may also include the participation of user States' ships for the purpose of obtaining their feedback on the information and benefits of Class B AIS transponders.

4 Potential benefits

4.1 The objective of the project is to enhance navigational safety for the users of the Straits. The potential benefits are:

.1 Ships of user States will have positive identification of smaller ships equipped with Class B AIS transponders and the capability to monitor their movements. This will help shipmasters make well-informed decisions on safe navigation.

.2 During rain showers, smaller ships are unlikely to be detected by radars and they are obscured by the rain clutters. The smaller ships equipped with Class B AIS transponders will show up in the rain clutters as AIS targets, thus enabling shipmasters to have a more complete traffic picture.

.3 The availability of information on small craft would enable VTS centres to better manage traffic and assist shipmasters to navigate safely through the provision of essential traffic information.

.4 The masters of the smaller ships will also have information of other ships on their AIS screens to help them navigate safely. This will contribute to the overall safety for all users of the Straits.

4.2 The information transmitted by Class B AIS transponders may be a useful input for the on going Marine Electronic Highway Demonstration Project for the Straits of Malacca and Singapore (the MEH project). The provision of Class B AIS transponders information together with the MEH project information would provide a more complete traffic situation of the Straits, which would serve to enhance navigational safety in the Straits. In addition, after the completion of this project, the equipment would be considered for utilization under the MEH project.

5 Scope of project

5.1 The scope of the project includes the following:

.1 Phase 1 - Project Design

This would involve the conceptualisation and design of the demonstration project which would involve refining and outlining the project's objectives, processes and parameters.

.2 Phase 2 - Supply, installation and testing of a Class B AIS system

This would involve working with a potential Class B AIS transponder supplier on the following:

.1 Supply of 30 Class B AIS transponders (10 for each littoral State)[2];

.2 Installation of transponders on trial ships;

.3 Installation of infrastructure such as servers and monitoring terminals; and

.4 Testing of Class B AIS System.

Existing AIS base stations could be used to receive the Class B AIS transponder signals. Infrastructure such as servers and monitoring terminals could then be set up at the littoral States, and linked to the existing AIS Base Stations to monitor and track the movements of the small ships installed with the Class B AIS transponders. The AIS Base Stations installed under the MEH project could also be used to monitor and track the ships equipped with the Class B AIS transponders.

.3 Phase 3 – Operational trial (including education to the small ships community)

Upon completion of Phase 1, an operational trial would be conducted to promote the voluntary carriage of Class B AIS transponder by small ships. The purpose is to assess the economic and technical viability of using the AIS Class B system for ships of less than 300GT in the Straits.

6 Expected outcomes of the project

6.1 The expected outcomes of the trial are the following:

.1 To establish whether the signals from Class B AIS transponders can be received by Class A AIS transponders and vice versa at all times.

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[2] The numbers required may actually be reduced as littoral States may be able to procure a number of transponders independently.

.2 To establish whether the AIS Base Stations can receive the signals from Class B AIS transponders at all times.

.3 To evaluate the performance of Class B AIS transponders in congested areas.

.4 To familiarise the littoral States with the capabilities and limitations of Class B AIS transponders.

.5 To enable the littoral States to evaluate the usefulness of Class B AIS transponders.

6.2 The small ships community will be introduced to the functions, applications and benefits of the Class B AIS transponders. The littoral States will organize seminars and workshops to promote awareness of the use of Class B AIS transponders on small ships. This would enhance the safety of navigation in the Straits.

6.3 The littoral States will participate in the project. Each country will identify suitable small ships operating in an appropriate location(s) to be installed with the Class B AIS transponders.

7 Resources required and Indicative cost estimates

7.1 The estimated resources and corresponding estimated cost of the project are shown below:

Resources	Estimated Cost (USD)
Project design consultancy, logistics and documentation	30,000
30 Class B AIS transponders[3]	45,000
3 Sets of hardware (e.g. servers, monitoring stations, monitoring terminals etc.) and software[4]	
Organizing seminars and workshops to small ships community (e.g. providing venue and/or experts to conduct the seminars/workshops)	15,000
Sub-Total	90,000
Contingency	9,000
Total	99,000

7.2 There is no maintenance cost as this is a demonstration project.

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3 The numbers required may actually be reduced as littoral States may be able to procure a number of transponders independently.

4 For the shore-based hardware listed, Malaysia is in the process of upgrading its existing shore-based monitoring stations to receive AIS Class B signals, while Singapore would be procuring on its own the required hardware listed above. The hardware for Indonesia will be provided for under the MEH project.

8 Proposed schedule

8.1 Phase 1 of the project which includes the design of the demonstration project and installation of ship borne and shore AIS equipment is expected to take approximately 6 months. After Phase 1 is completed, a one-year operational trial will be carried out.

9 Possible areas of co-operation

9.1 One or several user States and/or industry can participate in or contribute to the project through one or all of the following component:

.1 Sponsoring of AIS equipment / loan of AIS equipment for a period of 18 months;

.2 Providing expertise in conceptualising, designing and managing the demonstration project, including providing technical experts to assist in conducting the outreach seminars/workshops for the small ships' community; and

.3 Funding for components of the project or the whole project as outlined in paragraph 7.1

10 Project implementation

10.1 An open tender will be called for the implementation of the project if the contribution from user State and/or industry is in monetary term. Alternatively, the project can be implemented by the equipment/system supplier that is sponsored by a user State and/or industry.

10.2 The littoral States shall co-operate through an agreed mechanism for the implementation of the project. However, each littoral State shall be responsible for the implementation of the project within its own area of jurisdiction.

PROJECT 4

SETTING UP A TIDE, CURRENT AND WIND MEASUREMENT SYSTEM FOR THE STRAITS OF MALACCA AND SINGAPORE TO ENHANCE NAVIGATIONAL SAFETY AND MARINE ENVIRONMENT PROTECTION

1 Objective

1.1 The objective of the project is to enhance the navigational safety and marine environment protection in the Straits of Malacca and Singapore (the Straits) through the continuous collection and processing of tide, current and wind data in the Straits.

2 Current situation

2.1 Currently, tide, current and wind conditions in the Straits are monitored by the individual littoral States through its respective monitoring stations. These are important data for enhancement of navigational safety and marine environmental protection in the Straits. Tidal knowledge, for example is an important link to safe navigation since variations due to gravitational forcing can cause fluctuations of water level both in the coastal waters and open seas. Providing ships with real time tidal variation information can assist ships to avoid shallow waters with sufficient keel clearance. Similarly, accurate knowledge of tide, current and wind will facilitate a more effective response to a pollution incident/accident in the Straits and hence limit the potential damage, especially given the narrow confines of the Straits.

2.2 Therefore, it is important the tidal, current and wind data information received from the littoral States are utilized fully for the enhancement of navigational safety and marine environment protection and, for that purpose, the process of sharing the data should best be established through a co-operative mechanism.

3 Need for the project

3.1 By utilizing currently available and proposed additional monitoring stations along the Straits particularly between One Fathom Bank to Horsburgh Lighthouse, such data will be collected and processed. With the use of modelling techniques, the data will be used to aid passage planning and to predict the fate and trajectory of oil, chemical or other hazardous and noxious substance (HNS) spill so as to enhance navigational safety and marine environment protection in the Straits.

4 Potential benefits

4.1 Readily available and reliable tidal, current and wind information are important to navigational safety and environment protection as follows:

.1 The information will be particularly helpful to shipmasters of deep drafted ships transiting the Straits by taking advantage of the tidal, current and wind information to ensure adequate under-keel-clearance and to maintain safe distance from navigational

dangers. In essence, the information would facilitate the shipmasters in the decision making process to pre-empt as well as avoid any possible incidents;

.2 The information will be used for effective search and rescue (SAR) modelling to assist in SAR operations. This would be achieved through better accuracy in the results of model prediction so that the limited and valuable resources will be more effectively deployed;

.3 The information will enhance the prediction of oil, chemical, or other HNS spill modelling in the event of such spills. By accurately modelling the spilled oil or other pollution, the clean up operations will be more effective and damage to the marine environment minimised;

.4 The information will be used in conjunction with hydrodynamic modelling to assist shipping lines to maximize economic benefits such as saving fuel and improve ship schedule by using the information to voyage planning.

4.2 This project will also complement the Marine Electronic Highway Demonstration Project for the Straits of Malacca and Singapore (the MEH project) whereby the tide, wind and current information collected will be useful and relevant to provide a more comprehensive coverage of the Straits.

4.3 The data collected as a result of this project, as well as the information from the HNS Databank and Class B AIS transponder information, will enable a more comprehensive understanding of the navigational and environmental situation in the Straits.

5 Scope of project

5.1 The scope of this project complements that of the MEH project and includes the design, supply, installation and commissioning of a system of tide, current and wind monitoring stations. The system includes six Acoustic Doppler Current Profilers (ADCP), six tide stations, six wind stations and the application of an Information Delivery System (IDS). The proposed locations for the tide, ADCP and wind stations will be advised by the MEH experts after they have carried out a tidal analysis study.

5.2 The data from the stations will be transmitted to three shore-based stations; one station will be located in each of the littoral States. An agreed upon mechanism such as the IDS will interface with and receive the data from the shore-based stations. It will then allow the users access to the information as authorized by the littoral States. The littoral States shall co-operate through an agreed mechanism on the protocol (e.g. through the Internet) to deliver the data to the users.

5.3 A preliminary statement of needs on the technical requirements to implement the project is attached at appendix. This preliminary statement of needs is only indicative and is subject to changes according to the actual implementation processes.

6 Resources required and indicative cost estimates

6.1 The resources required and the cost estimates are shown below:

Stage 1

Initial capital for the installation of the equipment

Item	Description	Estimated Cost (USD)	Notes
1	Six wind stations	112,000	1
2	Six tide stations	116,000	1
3	Six ADCP stations	476,000	1
	Sub-total	704,000	
4	Contingency	70,400	
	Total	774,400	

Notes

1 Cost estimates include all hardware and software for the transmission of the data.

Stage 2

Cost for first year upon commission of new stations and maintenance of existing stations

Item	Description	Estimated Cost (USD)	Notes
1	Information Delivery System	60,000	1
2	Maintenance of new and existing stations	40,000	
	Sub-total	100,000	
3	Contingency	10,000	
	Total	110,000	

Notes

1 The IDS service includes the establishment of the three shore based stations. The cost is for one year of IDS service starting from the commissioning of the stations.

Stage 3

Cost for subsequent annual maintenance
(Second to fourth year of operation)

Item	Description	Estimated Cost (USD)	Notes
1	Information Delivery System	60,000	1
2	Maintenance of stations	150,000	
	Sub-total	210,000	
3	Contingency	21,000	
	Total for annual maintenance	231,000	
	Total for 2nd to 4th year of maintenance *(3 years x USD 231,000 per year)*	693,000	1
	Total for the first four years of maintenance and commissioning cost *(USD 693,000 + USD 110,000)*	803,000	

Notes

1 Review of maintenance and participating user States to be made at end of fourth year of operation.

6.2 The initial start-up capital cost for the project is estimated to be USD 774,400. The total maintenance cost for the first four years of operation is estimated to be USD 803,000. Overall, the total project cost is USD 1,577,000. A review of the maintenance of the system and of the continued participation of user States or users can be conducted at the end of the fourth year of operation.

7 Proposed schedule

7.1 The project from preparation of specifications, calling of tenders and installation and commissioning of equipment will take two years. The tenders will be opened to all companies local, regional or international. Thereafter, this project will run for four years, with a review of the system by the littoral States and the participating user States or users at the end of the fourth year.

8 Possible areas of co-operation

8.1 One or several user States and/or industry can participate in or contribute to the project through one or all the following:

.1 Sponsoring of the required equipment;

.2 Providing experts to assist the littoral States in the project;

.3 Funding for the capital expenditure component of the project; and

.4 Funding for the maintenance of the project.

9 Project implementation

9.1 The littoral States shall co-operate through an agreed mechanism for the implementation of the project. However, each littoral State shall be responsible for the implementation of the project within its own area of jurisdiction.

APPENDIX

PRELIMINARY STATEMENT OF NEEDS FOR SETTING UP A TIDE, CURRENT AND WIND MEASUREMENT SYSTEM FOR THE STRAITS OF MALACCA AND SINGAPORE TO ENHANCE NAVIGATIONAL SAFETY AND MARINE ENVIRONMENT PROTECTION

Objective

1 The objective of the project is to enhance the navigational safety in the Traffic Separation Scheme (TSS) and protect marine environment in the Straits of Malacca and Singapore Straits (the Straits) through continuous collection and processing of tide, current and wind data in the Straits and provision of these data to the users of the Straits.

Scope of project

2 The scope of this project includes:

.1 the design, supply, installation, commissioning and maintaining tide, current and wind monitoring stations including data acquisition and processing, storage and transmission hardware and software; and

.2 the design, commissioning and maintaining of a data delivery system that could collect the data from the monitoring station and deliver to the user.

3 The monitoring stations include six Acoustic Doppler Current Profiler (ADCP) stations, six tide stations and six wind stations. The proposed locations for the tide, ADCP and wind stations shall be located between One Fathom Bank and Horsburgh Lighthouse.

4 The data from the offshore stations shall be transmitted to three shore-based stations (one station located in each of the littoral States). The Information Delivery System (IDS) shall interface with and receive the data from the shore-based stations. It shall then allow access to the information by the authorised users.

5 It is envisaged that, in consultation with the contributing user States, a contractor would be chosen through a public tender to operate and implement this project.

Project components

6 The project has three components.

First component: Design, supply, installation and commissioning of a current, wind and tide monitoring system

7 The field monitoring system to be installed shall be capable of high reliability and long service life if placed in severe conditions. The contractor shall bear all the cost for the design, supply, installation, commissioning and maintenance of the entire system including hardware and software. It shall meet the following requirements:

(a) Equipment mounting and housing

8 The contractor shall propose suitable structure(s) for the mounting and housing of the sensors. They should be designed and installed to withstand the conditions. If data loggers, power supply system, transmission system, etc are used, such equipment shall be housed for protection against weather and possible vandalism, theft, etc.

(b) Current sensors

9 The ADCP or current sensors shall be bottom-mounted type at an appropriate frequency depending on the depth. Preference will be given to four transducer systems that will provide a data quality indicator. The online equipment package shall also record pressure in addition to current speed and current direction. Equipment shall record each 1 m depth bins from the surface of the transducers or the blind zone to the water surface with data stored every 10 minutes and transmitted, at regular 10 minutes intervals to the shore stations. The blind zone of the transducer shall not be larger than 1 m. Data acquisition, storage and transmission hardware and software shall be included to transmit the tidal current into the three shore-based receiving stations (part of the acquisition, storage and transmission hardware and software).

10 An IDS shall interface with, receive and store the tidal current data from any one of the three shore based-stations. The ADCP shall have an internal storage storing a minimum of two months data as a backup.

11 The data acquisition, storage and transmission hardware and software shall be able to handle data transmission once per 10 minutes and 24 hours per day. The ADCP and the data acquisition, storage and transmission hardware and software shall be serviced on regular basis to ensure the function of the whole system.

12 The tidal current direction and velocity at 10 minutes interval for each cell shall be presented in the three shore stations and IDS both for the latest data and historical data. The format shall preferably be:

Year	Month	Date	Time (HH:MM:SS)	Speed(m/s)	Direction
2008	10	12	12:10:00	1.20	153

(c) Tide gauges

13 The tide gauges shall be designed to measure sea levels with an accuracy of 2 mm. The contractor shall propose the type of tide gauges to be used. Similar to the tidal current sensor, the tide gauges shall record the sea surface elevation with an average frequency of 10 minutes and transmitted at regular 10 minutes intervals to the shore stations. The sea surface level shall be based on the chart datum of the nearest tide station. Data acquisition, storage and transmission hardware and software shall be included to transmit the tide level into the three shore-based receiving stations (part of the acquisition, storage and transmission hardware and software).

14 An IDS shall interface with, receive and store the tide level data in the shore based-stations. The tide gauges shall have an internal storage of minimum two months data as a backup. The tide gauges and the data acquisition, storage and transmission hardware and software shall be serviced on regular basis to ensure the function of the whole system.

15 Tide level at 10 minutes interval shall be presented in the three shore stations and IDS both for the latest data and historical data. The format shall preferably be:

Year	Month	Date	Time (HH:MM:SS)	Tide level (m)
2008	10	12	12:10:00	1.705

(d) Wind monitoring sensor

16 The wind monitoring sensor shall be installed on land and mounted on a sturdy structure that could withstand the rugged environment. The sensor consists of a high performance, rugged wind sensor with corrosion-resistant construction ideal for offshore / marine use. The data shall be stored in a data storage unit and transmitted, at regular 10 minutes intervals to the shore stations. Data acquisition, storage and transmission hardware and software shall be included to transmit the wind into the three shore-based receiving stations (part of the acquisition, storage and transmission hardware and software).

17 An IDS shall interface with, receive and store the wind speed and direction data in the shore based-stations and allow the users to access the data. The wind monitoring sensors shall have an internal storage of minimum two months data as a backup. The wind monitoring sensor and the data acquisition, storage and transmission hardware and software shall be serviced on regular basis to ensure the function of the whole system.

18 The wind data shall be presented in the IDS both for the latest data and historical data. The format shall preferably be

Year	Month	Date	time (HH:MM:SS	Speed(m/s)	Direction
2008	10	12	12:10:00	100	153

(e) Data acquisition, storage and transmission hardware and software

19 Data from the current, tide and wind sensors at sea / land shall be transferred, sorted in the three shore stations via a reliable and cost effective means. Contractor shall bear all the cost for the design, supply commissioning and maintenance of the data acquisition, storage and transmission hardware and software. Data communications between master stations and the IDS shall be via a reliable and cost effective means.

20 The Contractor shall provide all necessary hardware and communication software for cost effective and reliable communicating with the equipment and for transmitting data to the three master stations.

21 The Contractor shall be responsible for installing the communication equipment and communication charges.

(f) Other hardware(s) and software(s)

22 Besides the current, tide and wind sensors and computers including all the software and accessories, the entire system shall include any other supporting devices, structures, hardware,

software, etc. to continuously collect, transmit and process the tide, current and wind data with high accuracy and reliability.

Second component: Design, supply, installation and commissioning of an IDS

23 The IDS shall interface with and receive the data from the three shore-based stations (one each in Indonesia, Malaysia and Singapore). The IDS shall allow access to the information by the authorized users.

24 The IDS shall enable the acquisition of a continuous stream of tidal current, tide level and wind data into each shore based station. The IDS shall be capable of interfacing with wide area networked communications infrastructure for both the push and pull of information to authorized users. The IDS shall be capable of displaying time series data that adds value to the operations of shipping and environmental protection (e.g. interpolation between tidal and wind measurements to create wind fields and tidal heights displayed against an Electronic Chart or GIS map). In addition the IDS shall provide the ability to select and download tidal and wind field data in standard formats that may be integrated for other applications (e.g. data broking).

Third component: Maintenance

25 The Contractor shall include a comprehensive maintenance proposal in its tender submission for the client's consideration and acceptance to ensure a high reliability and functionality of the entire system. The maintenance proposal shall include all costs, for example, labour, replacement of parts / entire equipment, transport (for example, boat and crew), etc.

26 In the event that any station / equipment are unable to transmit its data to the shore based stations and / or IDS for more than six hours or an agreeable period, an investigation must be carried out to ascertain the cause of the disruption. If the data transmission is affected and cannot be restored within the next six hours or agreed period, a boat trip to that station must be arranged to ascertain the problem(s) and rectify them. The shore based stations, IDS, monitoring stations / equipment must be repaired / replaced / restored to enable full transmission of data within the next 48 hours or agreed period.

First year maintenance

27 The entire tide, current and wind measurement system (including IDS) shall be inclusive of one year defects liability period (1st year of operation) starting from the date of commissioning of the entire system and the maintenance of the existing stations. The one year defects liability period includes a comprehensive maintenance which is inclusive of labour costs, spare parts, transportation, etc.

Second to fourth year maintenance

28 The subsequent annual comprehensive maintenance costs (including service and parts) for the system (including IDS).

PROJECT 5

REPLACEMENT AND MAINTENANCE OF AIDS TO NAVIGATION IN THE STRAITS OF MALACCA AND SINGAPORE

1 Objective

1.1 The objective of this project is to replace and maintain critical aids to navigation in the Straits of Malacca and Singapore (Straits), which are missing, damaged or beyond economic repair, to ensure continued safe navigation for ships transiting through the Strait.

2 Current Status

2.1 There are a total of 51 principal aids to navigation installed in the Straits to assist ships to navigate safely through the Traffic Separation Scheme (TSS). The list and locations of these principal aids to navigation is set out in appendix 1 and 2.

2.2 A survey conducted by the Malacca Strait Council has identified that several aids to navigation along the Straits have physically deteriorated and/or are missing. Along the line and for the purpose of this project, littoral States have further identified and selected 22 aids to navigation which are missing, damaged or beyond repair and which require replacement and continuous maintenance. These aids to navigation are critical for the safe navigation of ships in the Straits, particularly within the TSS. The list and condition of the 22 aids to navigation in question is set out in appendix 3.

3 Need for the project

3.1 The maintenance of aids to navigation in the Straits is a continuous process to provide reliable navigational assistance to ships transiting the Straits. For the last 30 years Japan through the Malacca Strait Council provided vital assistance in providing and maintaining aids to navigation. The value of Japan's contribution until now (September 2007) has been estimated to exceed USD 130 million.

3.2 The continuing and increasing use of the Straits for international navigation makes it more crucial for the aids to navigation to be in excellent condition. In addition, most of the aids to navigation installed have a life span of between 10 to 20 years depending on the type of aids installed and a number of them have already reached or surpassed their design life span.

4 Potential benefits

4.1 The proposed project is crucial for ensuring the safe passage of ships in the Straits. In particular the continuous maintenance of the aids to navigation will provide assurance to deep draught ships using the TSS. In the long run this project will be vital for the Straits to continue to

be safe and open to international shipping. The continued safety of the Straits will in turn reduce the number of shipping incidents that may be detrimental to the marine environment.

5 Scope of project.

5.1 The project will require the replacement and maintenance of the identified aids to navigation that are missing, damaged and beyond their economic use or have surpassed their design life span and due for replacement. This will include the installation of new light beacons and new light buoy and their continued maintenance including a lighthouse. The selected aids to navigation which need to be replaced and maintained within a 10 years period consist of 18 light beacons, 1 lighthouse and 1 light buoy. In addition, there are 2 lighthouses which required only scheduled maintenance during this period. Hence there are a total of 22 aids to navigation selected for this project.

5.2 It is anticipated that the scope of the new aids to navigation should include the installation of automatic identification system (AIS) and aids to navigation transponder on the new light beacons. This will allow these aids to navigation to be integrated with electronic navigation charts and also with the ongoing Marine Electronic Highway demonstration project for the Straits of Malacca and Singapore that is implemented by the International Maritime Organization in co-operation with the littoral States.

6 Resources required

6.1 Resources and funding will be required to conduct detailed survey of the location and condition of the aids to navigation, preparing the design, construction and installation, training of personnel and continuous maintenance of the aids to navigation.

7 Estimated cost

7.1 The project identified 22 aids to navigation to be included within the proposed project period. The estimated cost for the project component ranges from USD 1,838,000 to USD 3,626,000 annually with the total cost over the proposed project period of 10 years estimated to be USD 28,156,000. The cost component will generally cover the cost of design, constructing and installing new light beacons and light buoy as well as scheduled maintenance. The detail breakdown of the project cost is set out in appendix 4.

8 Proposed schedule

8.1 The work schedule will include site survey, designing, tendering, construction, installation and commissioning and the schedule maintenance of the aids to navigation. The total project period is scheduled for 10 years.

8.2 It is proposed that the implementation of project should give priority to aids to navigation that are now missing, damaged and beyond their economic use or have surpassed their design life span or in bad condition.

9 Possible areas of co-operation

9.1 One or more user State or other interested stakeholders may co-operate and provide assistance in the form of:

.1 Contribution of funds for the replacement and maintenance of aids to navigation; and/or

.2 Contribution in-kind by directly replacing the selected aids to navigation and providing a scheduled maintenance service for those maintenance services for those aids.

9.2 In this regard the modality used and implemented successfully by the Malacca Straits Council may provide a useful model to emulate.

10 Project implementation

10.1 The littoral States shall co-operate through the agreed mechanism for the implementation of the project. However, each littoral State shall be responsible for the implementation of the project within its own area of jurisdiction.

List of appendices and abbreviations

List of appendices

Appendix 1	List of Principal Aids to Navigation in the Straits of Malacca and Singapore
Appendix 2	Locations of Principal Aids to Navigation in the Straits of Malacca and Singapore
Appendix 3	List and condition of selected Aids to Navigation in the Straits of Malacca and Singapore
Appendix 4	Tentative plan and breakdown of cost for replacement and maintenance of principal Aids to Navigation in the Straits of Malacca and Singapore (for a 10 year period)

List of abbreviations

OFB	One Fathom Bank
RLB	Resilient Light Beacon
LBn	Light Beacon
LBy	Light Buoy
LH	Lighthouse
AtoN	Aids to Navigation

APPENDIX 1

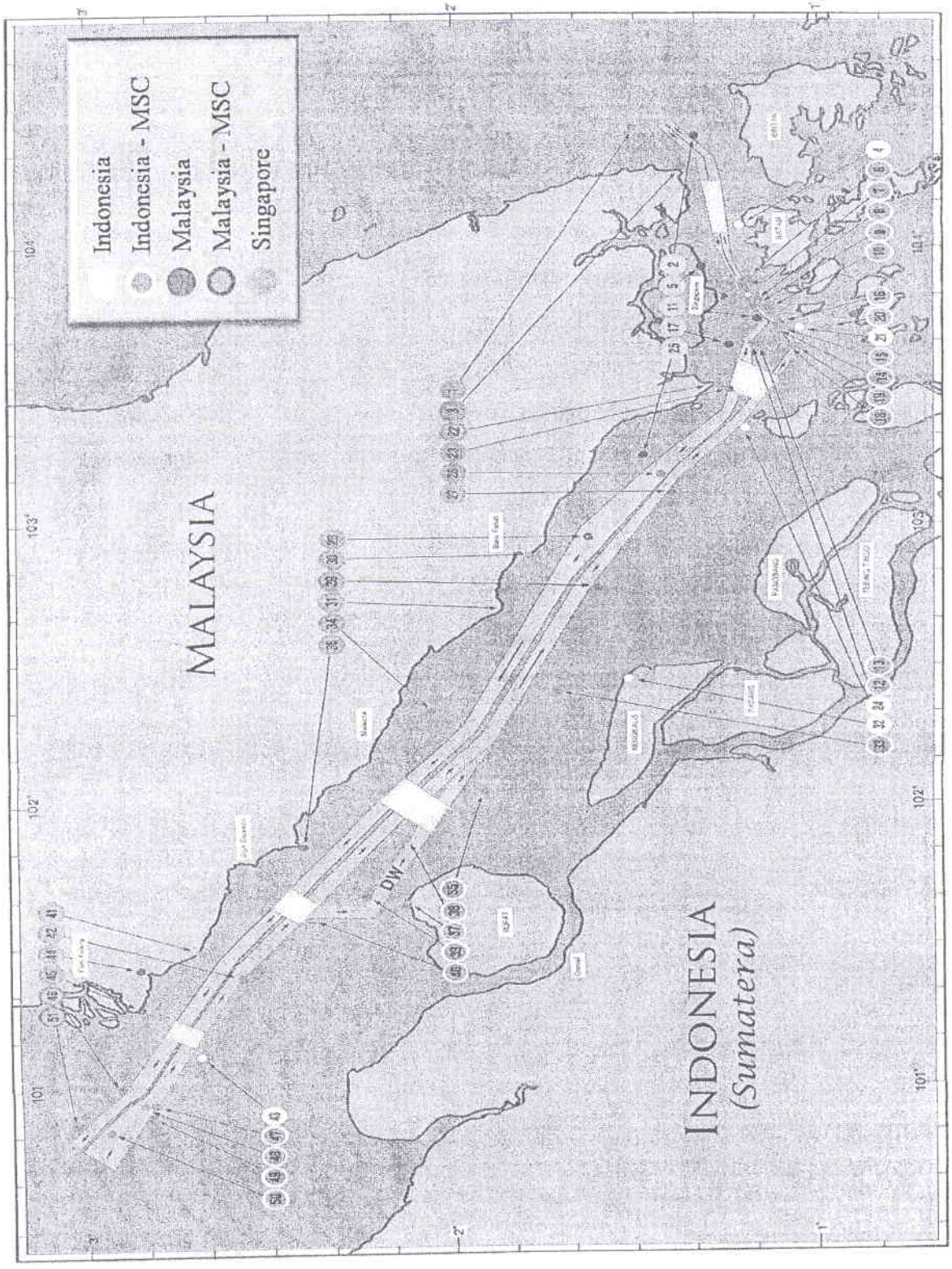
LIST OF PRINCIPAL AIDS TO NAVIGATION
IN THE STRAITS OF MALACCA AND SINGAPORE

Ref. No.	Name and type	Racon	Maintained by
1	Tompok Utara Light Beacon	O	Malaysia
2	Horshburgh Lighthouse	O	Singapore
3	Pu. Mungging Light Beacon	O	Malaysia
4	Pu. Nongsa Lighthouse	-	Indonesia
5	Bedok Lighthouse	-	Singapore
6	Batu Berhanti Light Beacon	O	Indonesia
7	Batu Berhanti Light Buoy	-	Indonesia
8	Buffalo Rock Light Beacon	O	Indonesia
9	Buffalo Rock Light Buoy	-	Indonesia
10	Helen Mars Light Beacon	O	Indonesia
11	Raffles Lighthouse	-	Singapore
12	Nipa Resilient Light Beacon	-	Indonesia
13	Nipa Light Beacon	O	Indonesia
14	Takong Lighthouse	-	Indonesia
15	Takong Resilient Light Beacon	O	Indonesia
16	Takong Light Buoy	-	Indonesia
17	Sultan Shoal Lighthouse	O	Singapore
18	Durian (N) Light Buoy	O	Indonesia
19	Durian (S) Light Buoy	-	Indonesia
20	Jangkat Lighthouse	-	Indonesia
21	Pu. Cula Light Beacon	-	Indonesia
22	Tg. Piai Light Beacon	O	Malaysia
23	Piai Light Buoy	-	Malaysia
24	Pu. Iyu Kecil Light Beacon	-	Indonesia
25	Pu. Pisang Lighthouse	-	Singapore
26	Mudah Selatan Light Beacon	O	Malaysia
27	Panjang Selatan Light Beacon	-	Malaysia

Ref. No.	Name and type	Racon	Maintained by
28	Mudah Utara Light Beacon	-	Malaysia
29	Panjang Utara Light Beacon	-	Malaysia
30	Batu Segenting Lighthouse	-	Malaysia
31	Tg. Tohor Lighthouse	-	Malaysia
32	Tg. Parit Lighthouse	-	Indonesia
33	Bengkalis Resilient Light Beacon	O	Indonesia
34	Pu. Undan Lighthouse	-	Malaysia
35	Rob Roy Bank Light Beacon	O	Indonesia
36	Raleigh Shoal Light Beacon	O	Indonesia
37	Tg. Medang Lighthouse	-	Indonesia
38	Cape Rachado Lighthouse	-	Malaysia
39	Off Tg. Medang Lighthouse	-	Indonesia
40	Pyramid Shoal Light Buoy	-	Indonesia
41	Tg. Gabang Light Beacon	-	Malaysia
42	Sepat Resilient Light Beacon	O	Malaysia
43	Gosong Pasir Light Buoy	-	Indonesia
44	Bt. Jugra Lighthouse	-	Malaysia
45	Tg. Rhu Light Beacon	-	Malaysia
46	One Fanthom Bank Lighthouse	O	Malaysia
47	OFB Resilient Light Beacon (S)	O	Indonesia
48	OFB Resilient Light Beacon (N)	-	Indonesia
49	OFB Resilient Light Beacon (SW)	-	Indonesia
50	OFB Light Buoy	-	Indonesia
51	OFB Resilient Light Beacon	O	Malaysia

APPENDIX 2

LOCATIONS OF PRINCIPAL AIDS TO NAVIGATION
IN THE STRAITS OF MALACCA AND SINGAPORE



APPENDIX 3

LIST AND CONDITION OF
SELECTED AIDS TO NAVIGATION
IN THE STRAITS OF MALACCA AND SINGAPORE

No.	Name and type	Ref. No.	Maintain by	Design life (Year)	Installation date (mm-yyyy)	Termination of design life (mm-yyyy)	Condition
1	OFB RLB	51	Malaysia	15	12-1986	12-2001	Missing in 2006 Priority for early replacement
2	Tg. Sepat RLB	42	Malaysia	15	03-1988	03-2003	Subject to structural survey Priority to be replaced
3	Tg. Tohor LBn	31	Malaysia	20	12-1983	12-2003	Subject to structural survey Priority to be replaced
4	Tg. Piai LBn	22	Malaysia	20	11-1986	11-2006	Subject to structural survey Priority to be replaced
5	Pu. Mungging LBn	3	Malaysia	20	12-1994	12-2014	Good condition but required scheduled maintenance
6	Tg. Gabang LBn	41	Malaysia	20	09-2001	09-2021	Good condition but required scheduled maintenance
7	Bt. Segenting LH	30	Malaysia	50	04-1998	04-2028	Good condition but required scheduled maintenance
8	Batu Berhanti LBy	7	Indonesia	10	n/a	-	Missing in 2007 Priority for early replacement
9	OFB RLB (SW)	49	Indonesia	15	12-1988	12-2003	Overdue Subject to structural survey Priority to be replaced

No.	Name and type	Ref. No.	Maintain by	Design life (Year)	Installation date (mm-yyyy)	Termination of design life (mm-yyyy)	Condition
10	Nipa RLB	12	Indonesia	15	03-1988	03-2003	Overdue Subject to structural survey Priority to be replaced
11	Takong RLB	15	Indonesia	15	12-1995	12-2010	Good condition but required scheduled maintenance
12	Rob Roy LBn	35	Indonesia	20	07-1990	07-2010	Good condition but required scheduled maintenance
13	Raleigh Shoal LBn	36	Indonesia	20	07-1990	07-2010	Good condition but required scheduled maintenance
14	Buffalo Rock LBn	8	Indonesia	20	08-1992	08-2012	Good condition but required scheduled maintenance
15	Helen Mars LBn	10	Indonesia	20	08-1992	08-2012	Good condition but required scheduled maintenance
16	OFB RLB (S)	47	Indonesia	15	12-1997	12-2012	Good condition but required scheduled maintenance
17	OFB RLB (N)	48	Indonesia	15	10-1998	10-2013	Good condition but required scheduled maintenance
18	Batu Berhanti LBn	6	Indonesia	20	01-1994	01-2014	Good condition but required scheduled maintenance
19	Bengkalis RLB	33	Indonesia	15	12-1999	12-2014	Good condition but required scheduled maintenance

No.	Name and type	Ref. No.	Maintain by	Design life (Year)	Installation date (mm-yyyy)	Termination of design life (mm-yyyy)	Condition
20	Nipa LBn	13	Indonesia	20	12-1996	12-2016	Good condition but required scheduled maintenance
21	Jangkat LH	20	Indonesia	50	04-1971	04-2021	Good condition but required scheduled maintenance
22	Tg. Medang LH	37	Indonesia	50	05-1973	05-2023	Good condition but required scheduled maintenance

Note:
The reference numbers (Ref. No.) are given in appendix 1

APPENDIX 4

TENTATIVE PLAN AND BREAKDOWN OF COST
FOR REPLACEMENT AND MAINTENANCE OF PRINCIPAL AIDS TO NAVIGATION
IN THE STRAITS OF MALACCA AND SINGAPORE
(for a 10 years period)

Total estimated cost: USD 28,156,000

Costing (USD)	**2007 (Year 1)**	**2008 (Year 2)**	**2009 (Year 3)**	**2010 (Year 4)**	**2011 (Year 5)**	**2012 (Year 6)**	**2013 (Year 7)**	**2014 (Year 8)**	**2015 (Year 9)**	**2016 (Year 10)**
Replacement of Resilient Light Beacons, Light Beacons and Light Buoys	1,448,000 OFB RLB (M-51) Batu Berhenti LBy* (I-7)	2,776,000 OFB RLB (I-49) Nipa RLB (I-12)	2,776,000 Sepat RLB (M-42) Tg. Tohor LBn (M-31)	2,776,000 Tg. Piai LBn (M-22) Takong RLB (I-15)	2,776,000 Rob Roy Bank LBn (I-35) Raleigh Shoal LBn (I-36)	2,776,000 Buffalo Rock LBn (I-08) Helen Mars LBn (I-10)	1,388,000 OFB RLB (S) (I-47)	2,776,000 OFB RLB (N) (I-48) Batu Berhanti LBn (I-06)	2,776,000 Pu. Mungging LBn (M-03) Bengkalis RLB (I-33)	1,388,000 Nipa LBn (I-13)
Maintenance of 20 AtoNs	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000
Additional specific need			400.000 Bukit Segenting LH** (M-30)							
Total (USD)	**1,898.000**	**3,226.000**	**3,626.000**	**3,226.000**	**3,226.000**	**3,226.000**	**1,838,000**	**3,226.000**	**3,226.000**	**1.838.000**

Notes: * The costing for the 5 meters diameter Batu Berhenti LBy is USD 60,000; ** Bukit Segenting LH is due for major maintenance