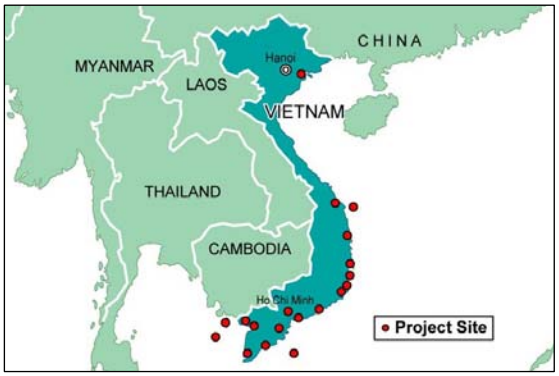
Vietnam

Coastal Communication System Project in the Southern Part of Vietnam

Evaluator: Vietnam-Japan Joint Evaluation Team 2008[1]
On-site Survey: November 2008

1. Project Profile



Project Site

Ho Chi Minh City Coastal Radio Station

1.1 Background

In the country of Vietnam, which has a 3,200 km coastline, marine transport plays a large role in both domestic transportation and international trade. The securing of safe and efficient marine transportation is an important issue.

The coastal radios which were in use prior to this project were manufactured by China and Russia in the 1950s and 1960s, and they were extremely antiquated. The International Maritime Organization (IMO)[2], of which Vietnam is a member, required its members to introduce the Global Maritime Distress and Safety System (GMDSS)[3] by February 1999, based on the 1988 revisions of the SOLAS Convention (International Convention for the Safety of Life at Sea). However, as Vietnam did not possess the facilities to support GMDSS, measures taken by the country were inadequate for observing the provisions of the SOLAS Convention and complying with the regulations of the SAR Convention (International Convention on Maritime Search and Rescue).

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[1] The Vietnam-Japan Joint Evaluation Team 2008 consisted of three Working Groups each of which evaluated different projects. This project was evaluated by the Coastal Communication Group joined by the following members: Mr. Pham Minh Tuan, Ms. Ha Thu Huyen, Ms. Hoang Thu Ha, Mr. Nguyen Tien Hoang (VISHIPEL); Ms. Nguyen Thanh Hang, Mr. Nguyen Ngoc Hai (Ministry of Transport); Mr. Do Xuan Hai (Ministry of Planning and Investment), Ms. Nguyen Thu Huong (Transport Development and Strategy Institute); Mr. Mai The Cuong (National Consultant); and Mr. Keishi Miyazaki (OPMAC, Japanese Consultant).

[2] IMO is a specialized agency of the United Nations with 168 member states and three associate members. The IMO promotes cooperation among governments and the shipping industry to improve maritime safety and to prevent marine pollution. Vietnam has been an IMO member state since 1984.

[3] A new ship distress safety communications system launched in February 1992. Use of satellite telecommunications and digital telecommunications technology enables ships in distress in any ocean area to engage in distress, emergency, or safety communications with shore search and rescue agencies and other ships in the vicinity and to rapidly and reliably make rescue requests. In addition to distress, emergency, and safety communications, this system enables more a reliable reception of maritime safety information (navigation warnings and meteorological warnings, etc.) through an automatic radio reception system.

1.2 Objectives

The objectives of the project were to ensure the safety of ship navigation on international and domestic sea routes and prompt response to maritime accidents by the establishment of the Global Maritime Distress and Safety System (GMDSS: specified by the 1988 amendments to the 1976 SOLAS Convention) in the southern part of Vietnam, thereby contributing to the promotion of the shipping and fishing industries.

Logical Framework Applied for Ex-Post Evaluation

Goal	Promotion of shipping and fishing industries
Purpose	1. To ensure the safety of ship navigation on international and domestic sea routes 2. To enable prompt response to maritime accidents in the southern part of Vietnam
Outcomes	1. Measures for compliance with international conventions 2. Expansion of communication area 3. Increase in the amount of communication 4. Trends in maritime accidents 5. Capacity development of operators, engineers, technicians and managers of radio stations
Outputs	1. Installation of maritime radio communication equipment 2. Consulting services
Inputs	Total cost: 2,285 million Yen (Japanese ODA loan: 1,866 million Yen, GOV portion: 419 million Yen)

1.3 Borrower/Executing Agency

Borrower: Government of Socialist Republic of Vietnam

Executing Agency: Vietnam National Maritime Bureau (VINAMARINE), Ministry of Transport (MOT)

1.4 Outline of Loan Agreement

Loan Amount / Disbursed Amount	1,866 million Yen / 1,490 million Yen
Date of Exchange of Notes / Date of Loan Agreement	29 March 2000 29 March 2000
Terms and Conditions - Interest Rate - Repayment Period (Grace Period) - Procurement	 1.8% p.a. 30 years (10 years) General Untied
Final Disbursement Date	26 January 2007
Main Contractor	Mitsui & Co., Ltd. (Japan)
Consulting Services	KDDI Engineering and Consulting, Inc. (Japan)
Feasibility Study	1995 by VINAMARINE, Government of Vietnam

2. Results of Evaluation

2.1 Relevance (Rating: a)

This project was highly relevant to Vietnam's national policies and development needs as

well as to international conventions at the time of both appraisal and ex-post evaluation. Therefore, the relevance of this project is very high.

2.1.1 Consistency with Vietnamese Development Policies and International Conventions

Transport sector development, including maritime sector development, was a priority in Vietnam's Socio-Economic Development Plans in both the project appraisal and the ex-post evaluation periods.

At the time of project appraisal, Vietnam, as a member state of the International Maritime Organization (IMO), was required to introduce GMDSS by February 1999 based on the 1988 SOLAS Convention[4]. Also, IMO recommended that Vietnam improve Search and Rescue (SAR) capacities to meet the requirements of the SAR Convention[5]. Therefore, the introduction of GMDSS was an international obligation for Vietnam. Even now, Vietnam is still responsible for practicing the requirement of the SOLAS Convention as a signatory state, including the operation of GMDSS[6].

2.1.2 Consistency with Needs

A great need for modernization of the coastal communication system in Vietnam was seen through the maritime transport safety issue, as well as in the light of increasing maritime transport demands both at appraisal and ex-post evaluation.

Since maritime transport plays an important role in both domestic transport and international trade in Vietnam, which has a 3,200km coastline from north to south, the coastal communication system[7] was an important part of the infrastructure for the safe and effective operation of maritime traffic and communication.

At the time of project appraisal, the coastal communication system in Vietnam was

[4] SOLAS Convention is the most important treaty protecting the safety of commercial ships. The first version of the treaty was passed in 1914 in response to the sinking of the RMS Titanic. Since then, SOLAS was renewed in 1929, 1948, 1960 and 1974 with a number of amendments. In particular, amendments in 1988, based on amendments of International Radio Regulations in 1987, replaced Morse code with the Global Maritime Distress Safety System (GMDSS) and came into force on 1 February 1992.

[5] SAR Convention was established in 1979 aimed at developing an international SAR plan, so that, no matter where an accident occurs, the rescue of persons in distress at sea will be coordinated by a SAR organization and, when necessary, by cooperation between neighboring SAR organizations. IMO member states are encouraged to enter into SAR agreements with neighboring states involving the establishment of SAR regions, the pooling of facilities, establishment of common procedures, training and liaison visits. The Vietnamese Government had not signed the SAR Convention at the time of appraisal but IMO recommended Vietnam to meet the requirements. At present, Vietnam has been a member of SAR Convention since April 2007.

[6] The Vietnamese government plans to improve the coastal communication system in the future to meet the amendment of SOLAS Convention 1997 with actions such as: (i) investment and installation of the Automatic Identification System (AIS) Shore Based Station System; (ii) investment and installation of the Application Service Provider, Communication Service Provider and LRIT Data Centre which are components of the Long range Identification and Tracking System (LRIT); (iii) upgrading the Vietnam Coastal Communication System in order to serve Disaster warnings for motor vessels operating at sea (according to Decision No. 137 of the Prime Minister).

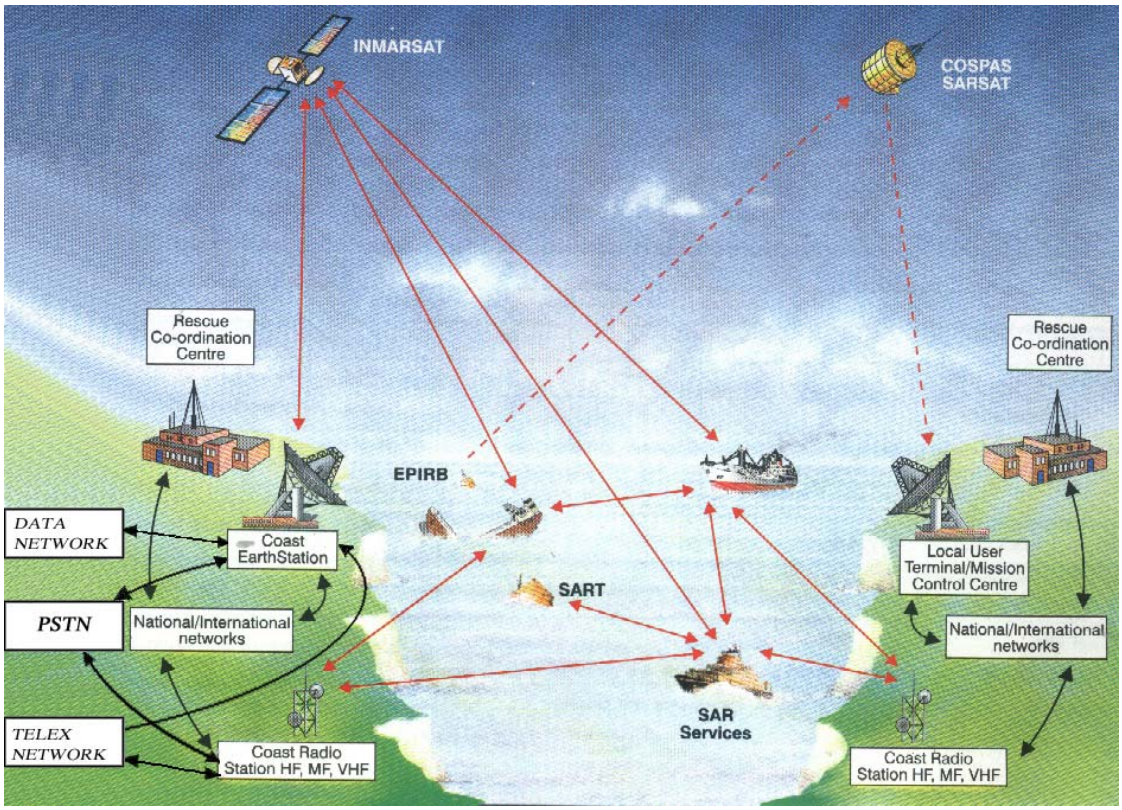
[7] The main roles of the coastal communication system are: (i) serving maritime distress, safety and rescue activities; (ii) transmitting weather forecasts and maritime safety information; (iii) providing routine communication, ship to ship and ship to shore, for the support of the maritime transport industry and the fishing industry.

extremely antiquated since its radio systems were manufactured in 1950s-1960s using a Morse code system and MF radio telephone. Therefore, the existing coastal communication system needed to be modernized to secure the safety of maritime transport according to international maritime safety standards.

At the time of ex-post evaluation, the role of the coastal communication system in maritime safety had become more important in Vietnam due to the expansion of maritime traffic transport volume thanks to recent economic development. For example, the volume of cargo at port expanded about 1.6 times from 114 million tons in 2003 to 181 million tons in 2007 and the number of ships/vessels (excluding fishing boats) in and out of ports increased 1.2 times from 71,933 in 2003 to 88,619 in 2007[8].

This project is the second phase of the "Coastal Communication System Project (1996-2001)" which was implemented through a Japanese ODA loan project to assist the coastal communications system in the northern part of Vietnam, from Da Nang northward. Regarding assistance for the coastal communications system in the southern part of Vietnam, initially it was planned that this would be implemented by the U.K. government, but subsequently the project became a Japanese ODA loan project. After the completion of both the "North" and "South" coastal communication projects, full capacity and function of GMDSS would be established throughout the country.

Figure 1: Global Maritime Distress and Safety System (GMDSS)

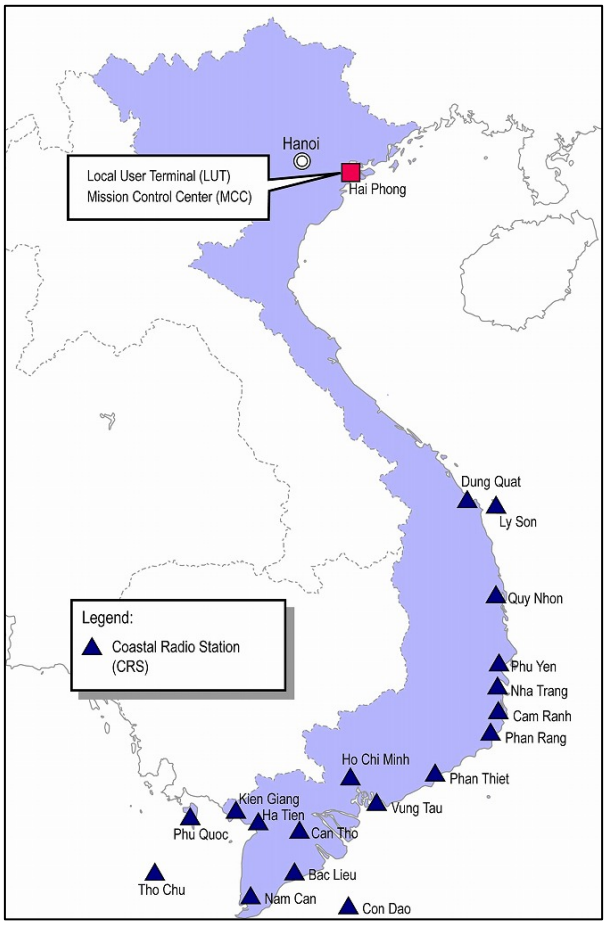


[8] This data was collected from 23 major commercial ports in Vietnam under the administration of VINAMARINE. Fishing ports were excluded.

2.2 Efficiency (Rating: b)

While the planned output was realized and the actual project cost was lower than planned, the project period for the output originally planned exceeded the plan by 62%. Therefore, the evaluation for efficiency is moderate.

Figure 2: Map of Project Sites



2.2.1 Output

The originally planned output, including installation of maritime radio communication equipment for one first class station, two second class stations, three third class stations, 12 forth class stations (except for a location change of two forth class stations), and Local User Terminal (LUT) / Mission Control Centre (MCC) station at Hai Phong, were completed as planned. However, the work volume of the consulting services slightly increased, by 1.5 M/M, with 39.5 M/M in the plan and an actual 41 M/M.

During implementation, procurement of the Automatic Identification System (AIS)[9] was proposed by PMU-GMDSS[10] as an additional project scope in order to meet the requirement of the 1974 amendment of the SOLAS Convention. At the same time, training for AIS was implemented in advance through JICA technical cooperation. This proposal was accepted by JICA (JBIC at the time), but in the end, the procurement of AIS did not materialize as the tender was unsuccessful[11]. This resulted in an additional consulting service of 1.5 M/M.

Also, additional equipment such lightning protectors, electro magnetic interference equipment and graphic plotters were installed to project facilities in order to enhance the capacity, effectiveness and safety of equipment systems[12] by using the residual project

[9] Automatic Identification System (AIS) is an information and communications system that utilizes maritime VHF frequencies to send and receive data including the ship's identity, type, position, course, speed, navigational status and other safety-related information both between suitably equipped vessels and between suitable equipped vessels and shore stations. The SOLAS Convention requires AIS to be fitted aboard all ships of 300 gross tonnage and upwards engaged on international voyages, cargo ships of 500 gross tonnage and upwards not engaged on international voyages and all passenger ships irrespective of size.

[10] The Project Management Unit for GMDSS under VINAMARINE was in charge of the implementation of the Coastal Communication System Project in the northern and southern parts of Vietnam.

[11] No bidder met the BD requirement and re-tender could not be carried out before the Loan Agreement expired on 26 January 2007.

[12] After operation of the CRS, installed by the Coastal Communication System Project (1996-2001 in the northern part of Vietnam, commenced, many CRSwere often affected by lightning. Based upon this experience, the lightning protectors and electro magnetic interference equipment were added to the project

budget. The training for staff at Coastal Radio Stations (CRS) was also conducted by consultants and contractors during the implementation stage of the project (Table 1).

Table 1: Comparison of Planned and Actual Project Output

	Plan	Actual
1) First Class Station (NAVTEX[13], MF, HF, VHF)	1 station at HCMC	Same as planned
2) Second Class Station (MF, HF, VHF)	2 stations at Vung Tau and Nha Trang	Same as planned
3) Third Class Station (MF, HF, VHF)	3 stations at Kien Giang, Can Tho, Qui Nhon	Same as planned
4) Forth Class Station (Automatic Station) (VHF)	12 stations at Bac Lieu, Cam Ranh, Con Dao, Dung Quat, Ha Tien, Ly Son, Nam Can, Phan Thiet, Phu Quoc, Phu Quy, Quang Ngai, Tho Chu	12 stations • Phu Quy was relocated to Phan Rang • Quang Ngai was relocated to Phu Yen
5) LUT[14] / MCC[15]	At Hai Phong	Same as planned
6) Additional Equipment	-	• Lightning protector: 15 units • Electro Magnetic Interference (EMI) equipment: 2 units • Graphic Plotter: 3 units
7) Training of CRStaff	No target was set.	• Operator: 43 persons • Technician: 46 persons • Manager: 30 persons
8) Consulting Service	Total: 39.5 M/M	Total: 41 M/M

Note: LUT: Local User Terminal, MCC: Mission Control Centre, NAVTEX: Navigation Telex, MF: Medium Frequency Wave, HF: High Frequency Wave, VHF: Very High Frequency Wave

2.2.2 Project Period

The planned duration of project implementation was 37 months (3 years and one month) from March 2000 to March 2003. However, the actual duration needed complete the originally planned output was 66 months (5 years and 6 months) from March 2000 to August 2005, or 178% of the plan. If the duration for additional AIS procurement[16] is included, the actual project duration was 81 months (6 years and 9 months) from March 2000 to December 2006, or 219% of the plan (Table 2).

scope.

[13] NAVTEX (Navigational Telex) is an international automated medium frequency direct-printing service for the delivery of navigational and meteorological warnings and forecasts as well as urgent marine safety information to ships.

[14] Local User Terminal (LUT) is a satellite data processing centre, part of the Cospas-Sarsat international satellite system for Search and Rescue, which receives distress signal alerts from distress radio-beacons via the Cospas-Sarsat satellite. Distress radio beacons or emergency beacons are tracking transmitters which aid in the detection and location of boats, aircraft, and people in distress. The distress signal alerts received at LUT are sent to MCC.

[15] Mission Control Center (MCC) is a center for receiving and distributing distress signal alerts from distress radio-beacons. The functions of MCC are: (i) to collect, store and sort data from LUTs and other MCCs, (ii) to provide international and national data exchange within the Cospas-Sarsat System, and (iii) to distribute alert and location data to associated Joint Rescue Coordination Centers (RCCs) or SAR Points of Contact (SPOCs).

[16] The actual duration spent for AIS procurement was 25 months from December 2004 to December 2006.

Reason for this delay are: (i) a prolonged period for surveying the locations of CRS and preparing tender documents which was due to the complicated characteristics of the project, including the scattered locations of CRS, (ii) a prolonged period for approving the technical design, (iii) a prolonged period for approving the bidding documents and evaluation results, (iv) delay cause by the location change of two fourth class stations, and (v) an additional period spent on AIS equipment procurement.

Table 2: Comparison of Planned and Actual Project Period

Plan	Actual
January 2000-March 2003 * 3 years & one month *(note) From signing of Loan Agreement to issuing of project completion certificate.*	**<Project duration for original scope>** March 2000 - August 2005 * 5 years & 6 moths (=178%) **<Project duration including additional AIS procurement>** March 2000 - December 2006 * 6 years & 9 month (=219%)

2.2.3 Project Cost

The actual project cost was 1,728 million JPY, compared with a planned cost of 2,285 million JPY, which was 75.5% of the planned project cost (Table 3). This gap was mainly due to cost savings as a result of competitive bidding. As already explained, AIS equipment was to be procured using the residual project budget, but eventually this was not realized.

Table 3: Comparison of Planned and Actual Project Cost

	Plan (Million JPY)				Actual (Million JPY)			
	Foreign	**Local**	**Total**	**JICA Loan**	**Foreign**	**Local**	**Total**	**JICA Loan**
1. Installation of equipment	1,579	0	1,579	1,579	1,303.6	83.1	1,386.7	1,386.7
2. Construction of CRS (including land acquisition)	0	363	363	0	0	238.1	238.1	0
3. Contingency	158	36	194	158	0	0	0	0
4. Consulting services	123	6	129	129	98.3	5.0	103.3	103.3
5. Tax and duties	0	20	20	0	0	0	0	0
Total	1,860	425	2,285	1,866	1,401.9	326.2	1,728.1	1,490

LUT at Hai Phong

MCC at Hai Phong

HCMC Receiving St.

2.3 Effectiveness (Rating: a)

The implementation of the project realized the expected outcome. Therefore, the effectiveness of the project can be considered high.

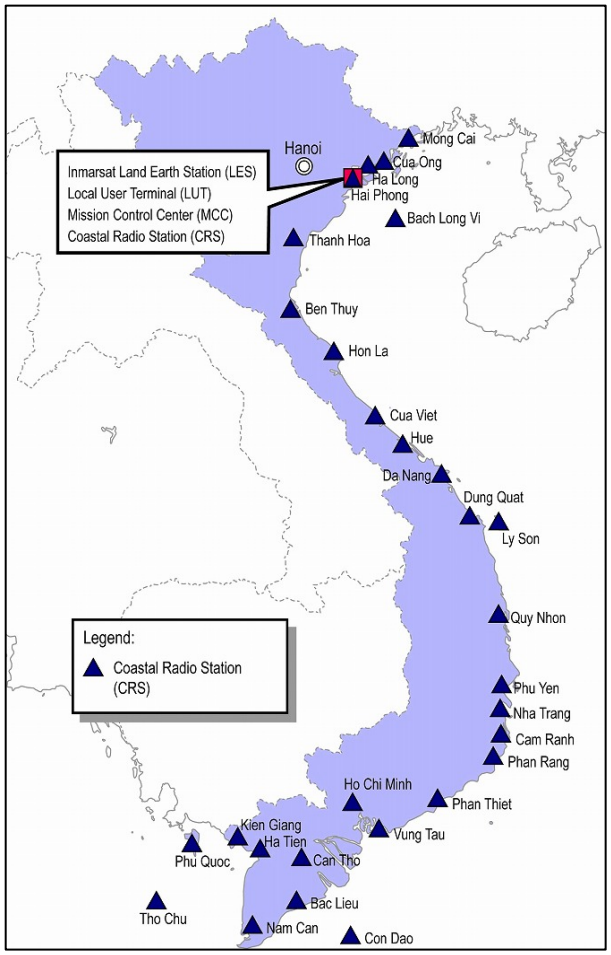
2.3.1 Measures for Compliance with International Conventions

Vietnam is able to observe the provisions of the SOLAS convention and the regulations of SAR Convention thanks to the output of this project including (i) the installation of radio stations for GMDSS in the southern part of Vietnam and (ii) the installation of a Local User Terminal (LUT) and Mission Control Center (MCC) In addition, output of the Coastal Communication System Project (the first phase of this project) included (iii) the installation of radio stations for GMDSS in the northern part of Vietnam and (iv) the installation of satellite telecommunications facilities.

2.3.2 Expansion of Communication Area

By the completion of this project, together with the fist phase of the project in the northern part of Vietnam, all Sea Areas of A1[17], A2[18], A3[19] were covered by radio communication and satellite communication modes. That is, following project completion, VISHIPEL enables communication with large ships in the open sea in almost all ocean areas and with small ships (fishing boats) in inshore areas (approx. 100 km to 200 km from shore depending on meteorological conditions).

Figure 3: Map of North and South Coastal Communication Project



Note: 11 CRS in the north of Vietnam and the satellite telecommunications facilities (INMARSAT-LES) at Hai Phong, Information Monitoring Center in Hanoi were provided by Coastal Communication System Project (1996-2001).

[17] Sea area A1 is an area within the radiotelephone coverage of at least one VHF coast station in which continuous digital selective calling (Ch.70/156.525Mc.) alerting and radiotelephony services are available. Such an area may extend typically 20 nautical miles (37 km) to 30 nautical miles (56 km) from the Coast Station.

[18] Sea area A2 is an area excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC (2187.5 kHz) alerting and radiotelephony services are available. For planning purposes this area typically extends to up to 100 nautical miles (190 km) offshore, but may exclude any A1 designated areas. In practice, satisfactory coverage may often be achieved out to around 400 nautical miles (740 km) offshore.

[19] Sea area A3 is an area, excluding sea areas A1 and A2, within the coverage of an INMARSAT geostationary satellite in which continuous alerting is available. This area lies between about latitude 76 Degree NORTH and SOUTH, but excludes A1 and/or A2 designated areas.

2.3.3 Increase in the Amount of Communication

(1) Number of Communications through CRS

Since project completion, the number of communications transmitted through the Vietnam Coastal Communication System has grown annually. The amount of information such as navigational warnings, search and rescue information, meteorological forecasts and weather forecasts provided by VISHIPEL has nearly doubled between 2003 and 2007 (Table 4).

Table 4: Number of Information provided by VISHIPEL

Type of Information	2003	2004	2005	2006	2007
Navigational warnings	13,361	14,524	11,.831	11,518	25,723
Search and rescue information	6,577	8,961	11,147	5,562	10,682
Meteorological forecasts *	5,889	6,316	7,457	6,078	5,295
Weather forecasts **				8,439	10,386

Source: VISHIPEL

Note: * Meteorological forecast reports are information warnings related to cyclones, typhoons, storms, tropical low pressures, etc.

** Weather forecast reports are the daily marine weather forecast.

Table 4 covers only the amount of information from VISHIPEL to the users, but the number of communications through CRS has also increased. As advanced coastal communication systems such as GMDSS and satelite telecommunication became available in Vietnam after the project, more ships in Vietnam have been equiped with the radio communication equipment and facilities. For instance, the number of registered ships[20], which are mainly commercial ships, in Vietnam has increased steadily (1,271 ships in 2007 in comparison with 1,107 ships in 2006). Out of 1,271 ships, 466 ships (37% of registered ships in 2007) were equipped with GMDSS equipment. In addition, the amount of relevant radio communication equipment registered in VISHIPEL and installed in ships, including fishing boats, numbered 1,320 for radio equipment and 1,598 for Inmarsat equipment in 2007. As the number of coastal radio service users increased, the volume and frequency of communications thorough CRS expanded.

According to the results of the beneficiary survey of shipping companies, many of the shipping companies interviewed perceived the following project effects relating to the increase in the amount communication: (i) improved communications between ship and shore (shipping company, family, etc.), and ship to ship, in terms of coverage area and quality of information, (ii) the ability to update weather forecasts everyday, (iii) improved access to methodological and a variety of information as well as reliability of information. Also the results of a focus group interview with fishermen in Nha Trang and Phan Thiet show that they had noted improved convenience and frequency in communication with family, other fishing boats and the coast after the project. At the same time, it is recognized that many fishermen experienced routine interruptions of communication[21] or

[20] Number of registered fishing boat is excluded. According to the estimation of the Ministry of Agriculture and Rural Development (MARD), the total number of fishing boats in Vietnam may be over 100,000, but the actual number of fishing boats in Vietnam is uncertain due to lack of accurate information.

[21] The main reasons are: Phan Thiet radio has a limited communication capacity because it is a fourth class station with one channel for routine communication. In addition, the fishing boats normally try to contact

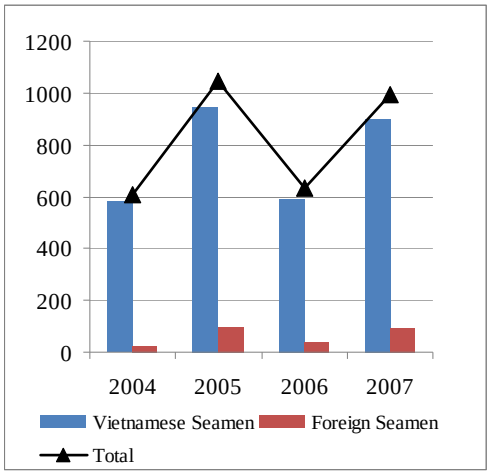
low quality transmission[22] during peak hours, especially in the morning when many fishing boats are in operation at sea. This phenomenon is particularly seen in the southern coastal area where many fishermen live. There is a demand from fishermen to improve the capacity of CRS in order to deal with the above issue.

(2) Number of Maritime Facilities and Seamen Assisted by CRS

The number of maritime facilities assisted by the CRS system has dramatically increased since COSPAS-SARSAT Local User Terminal/Mission Control Center (LUT/MCC) at Hai Phong came into full operation in 2007. These increased more than 10 times from 362 in 2006 to 3,454 in 2007 (Figure 4). Likewise, the number of seamen who were assisted by the CRS system also increased between 2004 and 2007 as shown in Figure 5.

According to the Vietnam National Search and Rescue Committee (VINASARCOM), the number of SAR activities cases in Vietnam were 171 (2003), 150 (2004), 298 (2005), 271 (2006), and 197 (2007)[23].

Figure 4: Number of Seamen Assisted by the CRS system from 2004 to 2007

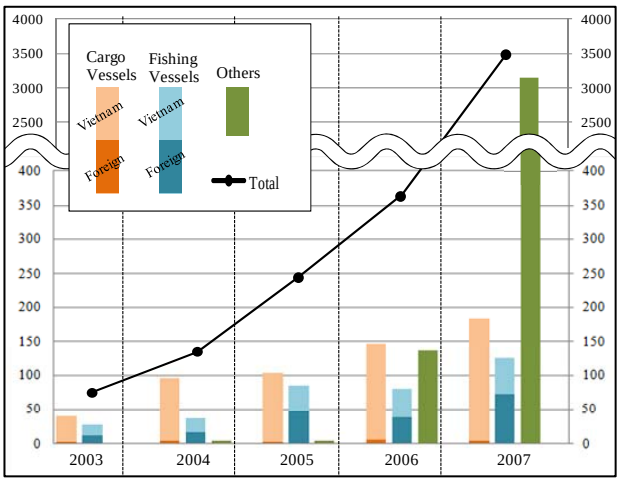


Source: VISHIPEL

Note:

1) Others includes tugboats, oil drillings, and passenger vessels, etc.
2) Assistance includes provision of emergency and rescue instructions, guidance to escape routes during bad weather, and medical instructions, etc.
3) The number of "Others" in 2007 has the same explanation as for "Other accidents" in 2007 at the item 2.3.4 below.

Figure 5: Number of Maritime Facilities Assisted by the CRS system from 2003 to 2007



Source: VISHIPEL

Note: Assistance includes provision of emergency and rescue instructions, guidance to escape routes during bad weather, and medical instructions, etc.

their local radio station in order to save costs.

[22] The main reason is that the quality of radio waves MF/HF/VHF depends on: (i) weather conditions and topography; and (ii) harmful interference from power sources, industry, etc. On the other hand, the capacity of communication equipment on fishing boats is limited.

[23] According to statistical data provided by VINASARCOM, the number of rescued persons in Vietnam was 951 (2003), 1,211 (2004), 1,937 (2005), 1,920 (2006), 2,449 (2007).

2.3.4 Trends in Maritime Accidents[24]

The number of maritime accidents recorded by VISHIPEL has increased. Possible reasons for this trend include: (i) more alerts received on all kinds of modes of communications and frequencies after the modernization of the Vietnam Coastal Communication System through the introduction of GMDSS, and (ii) the increase in the volume of sea transport and fishing activities due to recent marine economic development in Vietnam. According to related agencies, most maritime accidents are associated with fishing boats (Table 5).

There is an outstanding difference in the number of "Other accidents" in 2007 and before, with the number of other accidents sharply increasing from 164 in 2006 to 3,205 in 2007, an increase of more than five times. Other accidents means accidents for which the reason cannot be easily defined. According to VISHIPEL, the reason for this may be that after LUT/MCC station was officially launched in 2007, VISHIPEL received distress alerts from the COSPAS-SARSAT system on 121.5 MHz, 243 MHz and 406 MHz frequencies. However, most of them on 121.5 MHz, 243 MHz were unidentified. It is assumed that these unidentified distress alerts were mostly sent from EPIRB[25] (Emergency Position Indication Radio Beacon) by error or mistake.

Table 5: Number of Maritime Accidents Recorded by VISHIPEL from 2001 to 2007

Type of Accident	2001	2005	2006	2007
1. Disabled and Drift	16	56	50	70
2. Floating	5	17	15	13
3. Listing, in Danger of Capsizing	14	0	0	3
4. Sinking		14	13	18
5. Fire/Explosion	0	2	0	3
6. Grounding	2	4	4	3
7. Abandoning Ship	0	0	0	2
8. Man Over Board	5	4	16	15
9. Piracy/Armed Robbery Attack	6	4	0	1
10. Distress	0	9	11	19
11. Collision	0	11	4	15
12. False Alert *	0	45	46	50
Sub-total	48	166	159	212
13. Other Accidents **	5	22	164	3,205
Total	53	188	323	3,417

Source: VISHIPEL

Note: * False Alert is the cases where false alert was confirmed through direct communication between VISHIPEL and the respective vessels.

** Other accidents are the cases where the reason for the accident can not be defined as listed in the type of accidents from no. 1 to no. 12 above.

However, in Vietnam, many small and medium-sized ships and vessels, in particular the majority of the fishing boats, do not have the GMDSS equipment due to lack of money[26],

[24] There is discrepancy in the number of maritime accidents between the data of VISHIPEL and VINASARCOM. According to VINASARCOM, the number of maritime accidents in Vietnam was: 715 (2003), 602 (2004), 752 (2005), 1,150 (2006), 1,139 (2007). In this repot, the data from VISHIPEL is used.

[25] EPIRB (Emergency Position Indication Radio Beacon) is a tracking transmitter interface with the Cospas-Sarsat system, which aids in the detection and location of boats, aircraft, and people in distress. In fact, it is reported that most of distress alerts are dispatched from EPIRB by error.

[26] Most fishermen in Vietnam are poor and can not afford to buy the expensive GMDSS equipment. This problem is not unique to Vietnam, but is common throughout the world. Regarding this issue, the Ministry of

and can not send distress alerts through the satellite communication system. Therefore, it is estimated that the actual number of maritime accidents exceeds the offically recorded number of accidents in Table 5.

2.3.5 Capacity Development of Operators, Engineers, Technicians and Managers of CRS

As shown in Table 1, the total 119 VISHIPEL staff received technical training overseas and in Vietnam from consultants and contractors during project implementation in order to enhance staff capacity and to acquire new technology introduced by the project (Table 6). In addition, training and re-training for VISHIPEL was held frequently in order to enhance the system stable. According to VISHIPEL, thanks to such training activities, the capacity of operators, engineers, technicians and managers of the CRS has been developed remarkably.

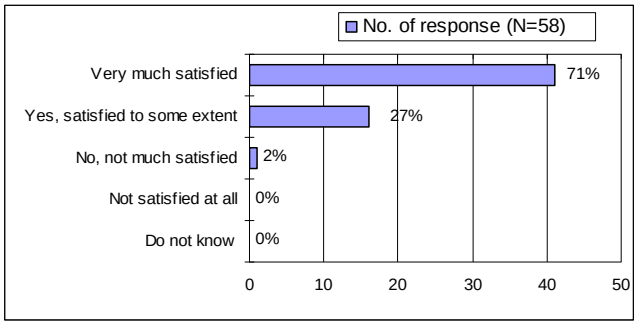
Table 6: Output of Capacity Development by the Project

Training Contents	Trainee	Overseas Training	Training in Vietnam
LUT/MCC/GMDSS	Operator	2	41
LUT/MCC/MF/HF/VHF Radio Equipment /Power System	Technician	5	41
LUT/MCC/GMDSS/Multiple Radio Link Subsystem	Manager	1	29
Total		8	111

Source: VISHIPEL

2.3.6 Satisfaction of beneficiaries

Figure 6: Satisfaction level of beneficiaries



Note: Out of 58 responses, 37 are from fishermen and 21 are from the shipping companies.

According to the results of the satisfaction survey of fishermen and shipping companies, 71% of respondents (41 respondents) rated "Very much satisfied" and 27% of respondents (16 respondents) answered "Yes, satisfied to some extent." The satisfaction level of fishermen was very high with 89% of fishermen responding "Very much satisfied" Overall, 98% of fishermen and shipping companies surveyed were satisfied with the improvement in CRS services, which suggests that the project met the beneficiaries' needs (Figure 6).

2.4 Impact

2.4.1 Improvement of Search and Rescue Activities

SAR activities for maritime accidents by the related authorities improved. According to results of interviews with the related authorities[27] directly involved in SAR activities, the

Agriculture and Rural Development (MARD), which is in charge of fishing industries in Vietnam, has been implementing a project with foreign donors to provide 60,000 units of Sing Side Band (SSB) communication equipment to fishermen free of charge. However, the communication capacity of SSB equipment is limited.

[27] Agencies and organizations interviewed were VINAMARINE, VISHIPEL, the Vietnam Maritime Rescue Coordination Center (VMRCC), the Vietnam National Search and Rescue Committee (VINASARCOM), Hai

majority of the interviewed stakeholders perceived a positive impact on strengthening SAR activities in Vietnam. After the introduction of the GMDSS system, it became easier and faster to receive distress alarms and find the location of ships in accidents via VISHIPEL. However, considering the entire system of SAR and the institutional setup for SAR in Vietnam, other factors apart from the capacity of coastal communication were also important in improving SAR activities.

In general, SAR activities in Vietnam proceed along the following steps: (i) When VISHIPEL (via Coastal Radio Stations) receives a distress alarm and emergency call from a ship, the location of the ship is identified and the necessary information is transferred to the Vietnam Maritime Rescue Coordination Center (VMRCC) and the Vietnam National Search and Rescue Committee (VINASARCOM); VISHIPEL provides guidance and instructions to the ship, (ii) VMRCC dispatches their rescue ships to the distress point as well as jointly conducting rescue activities with the related agencies, (iii) VINASARCOM coordinates with related agencies such as the Ministry of Defense, the Ministry of Agriculture and Rural Development (MARD), provincial governments, the port authorities, etc. and supports SAR activities.

Several issues and constraints were, however, pointed to by the stakeholders. These are (a) the lack of telecommunication capacity of fishing boats: many fishing boats are not equipped with the relevant telecommunication facilities; (b) the difficulty in integration of telecommunication protocol among all types of vessels; (c) the limited capacity of rescue facilities and human resources in VMRCC; (d) the limited coordination capacity in the existing SAR system. A necessity for the capacity development of SAR activities in Vietnam was also recognized by the shipping companies interviewed.

Items (a) and (b) are very difficult issues, not only in Vietnam, but also in developed countries like the United States and Japan. On the other hand, items (c) and (d) regarding institutional capacity, need to be strengthened in order that the full benefit of GMDSS may be enjoyed.

The stakeholders interviewed claimed that a budget shortage for VMRCC led to a lack of qualified rescue crew members as well as a lack of rescue facilities and equipment including rescue vessels and helicopters at VMRCC. Also it is recognized that the current SAR coordination system does not function effectively because of a complicated coordination procedure and lack of concrete implementation regulations and guidelines for coordination amongst the related ministries and agencies of SAR.

Regarding issues such as weak Vietnamese institutional capacity in SAR, JICA (JBIC at the time) conducted a study on the organizational improvement of maritime safety through SAR activities in 2004, and based upon their recommendation, VINAMARINE prepared an action plan to strengthen SAR institutional capacity in Vietnam. However,

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Phong Maritime Administration, Nha Trang Maritime Administration, Ho Chi Minh City Maritime Administration, the Ministry of Agriculture and Rural Development (MARD), Khanh Hoa Province Peoples Committee and Binh Thuan Province Peoples Committee.

due to budget shortage, implementation of the action plan is still very slow.

Nha Trang CRS (2nd class)

Phan Rang CRS (4th class)

Phan Thiet CRS (4th class)

2.4.2 Promotion of Shipping and Fishing Industries

The project contributed to the promotion of the shipping and fishing industries in Vietnam. Passenger volume, cargo volume and the number of ships at port have expanded. For example, passenger volume increased 2.6 times from 2003 to 2007, cargo volume increased 1.6 times, and the number of ships in and out of ports increased 1.2 times during the same period (Table 7). These positive changes are mainly caused by economic growth and the active development of major commercial ports in Vietnam such as Hai Phong Port, Cai Lan Port, Da Nang Port, and Saigon Port during the last decade. At the same time, it can also be said that the modernization of the coastal communication system has supported the establishment of favorable conditions for investment in and development of the maritime sector in Vietnam.

Table 7: Volume of cargo, passenger, and number of ships at port in Vietnam

	2003	2004	2005	2006	2007
Volume of Passenger (persons)	132,241	120,343	132,377	233,416	349,997
Volume of Cargo (1,000 tons)	114,198	127,699	139,161	154,498	181,117
No. of Ships in and out of port (number)	71,933	74,527	56,893	61,291	88,619

Source: VINAMARINE

Note: The data for volume of passenger, volume of cargo and volume of ships is collected from 23 ports in Vietnam under the administration of VINAMARINE. Fishing ports are excluded.

This is supported by the results of interviews with beneficiaries and stakeholders: The following observations and opinions were expressed by interviewees: (i) the project created favorable conditions for domestic and international investors and exploited maritime economic business; (ii) fishing boats could go farther and have improved access to market information and potential fishing areas; (iii) improved maritime communication capacity and safety/security status of ships and fishing boats supported the development of the industry. The project also supported the promotion of the fishing business and industries.

In addition, the improvement of the coastal communication system has had a positive psychological/mental impact on fishermen and crew members in that they feel safer and more secure on board because of improved communication between ships and shore,

including their families and companies.

Box 1: Summary of Beneficiary Survey

As a part of data collection, a beneficiary survey for the users of CRS was conducted through Focus Group Discussions with fishermen and Semi-Structured Interviews (SSI) with shipping companies.

1. Results of Focus Group Discussions with Fishermen in Nha Trang and Phan Thiet

1) Time and place

- 9 November, 2008 at Xuong Huan Commune, Nha Trang City, Khanh Hoa Province
- 12 November, 2008, Phu Hai Commune, Phan Thiet Province

2) Participants

- Xuong Huan Commune, Nha Trang: 21 participants (19 male and 2 female)
- Phu Hai Commune, Phan Thiet: 16 participants (16 male)
- Total 37 participants (35 male and 2 female)

3) Discussion on the question: "How did the project change your life?"

The number after each comment is the number of votes given by participants (each participant had three votes and were asked to allocate their votes to the "changes" that they thought most important).

Top Six "Changes" that Participants Consider Most Important

	(n=37)	Nha Trang	Phan Thiet	Total
1	Communication is interrupted or with low quality of transmission during peak hours especially in the morning time.	12	18	30
2	Improved convenience and frequency in communication with family, other fishing boats and the coast.	8	14	22
3	Improved access to up-dated weather information.	19	3	22
4	Improved safety for fishermen.	12	8	20
5	Ability to send emergency signals immediately.	10	0	10
6	Easier to direct sales of fish due to improved access to information of market and other ships.	0	2	2

FG at Nha Trang

FG at Phan Thiet

Fishing boats at Phan Thiet

2. Semi-Structured Interview (SSI) with Shipping Companies

1) Time and place

- 25 September – 14 November 2008
- Hanoi, Hai Phong, Nha Trang, HCMC

2) Interviewees

- Total 21 interviewees from 15 companies

3) Main findings

- All shipping companies interviewed have GMDSS equipment for their ships.
- No shipping companies interviewed have experienced maritime distress cases in the Vietnam area.
- Major project benefits recognized by the interviewees are: (i) improvement of communication speed, quality, frequency, and accessibility between the ship and land as well as ship to ship, (ii) expansion of communication areas, (iii) diversity of means of communication such as satellite telephone, fax, e-mail, etc., (iv) improvement of reliability of information, and (v) diversity of information including meteorological information.
- At the same time, the following suggestions were made to VISHIPEL: (i) that updating and strengthening the coastal radio system and service be continued, (ii) that cheaper service fees be provided, (iii) that more information on weather and dangerous areas be provided, and (iv) that SAR capacity in Vietnam be strengthened.

Shipping Company in Nha Trang

Shipping Company in HCMC

Tugboat Company in HCMC

2.4.3 Impact on the Natural Environment

Since the major components of the project were the construction of coastal communication stations and the installation of facilities and equipment, and since the nature of the service is to provide information and communication between ships and shore through radio and satellite systems, no negative environmental impact was identified.

2.4.4 Impact on the Social Environment

The actual acquired land was 87,833 m^2 against the 81,450 m^2 initially planned and 25 households were resettled. The reason for the increase in land area was mainly the additional land acquisition at the Nha Trang, Cam Ranh, Nam Can, Phan Thiet, Phan Rang, and Phu Yen stations. According to VISHIPEL, the whole compensation and land acquisition process was implemented according to decisions of provincial committees and following state general regulations. No pending issues remain.

2.5 Sustainability (Rating: a)

No major problem has been observed in the capacity of the executing agency nor in its operation and maintenance system, therefore, the sustainability of this project is high.

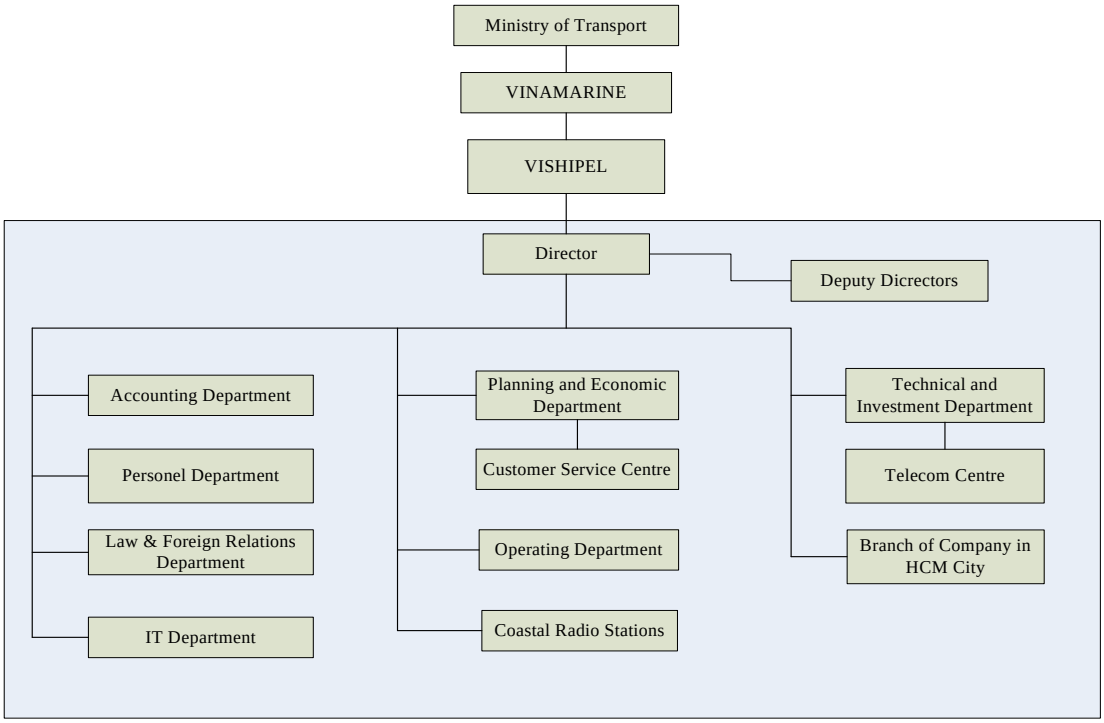
2.5.1 Executing Agency and Operation and Maintenance Agencies

No particular problems are seen in the organizational structure of the O&M agency. The operation and management of a coastal radio system including 29 Coastal Radio Stations, the Hai Phong Inmarsat Land Earth Station, the Hai Phong COSPAS-SARSAT Local User Terminal/Mission Control Center (LUT/MCC) and the Information Monitor Centre in Hanoi is the responsibility of the Vietnam Maritime Communication and Electronics

Company (VISHIPEL), which is a state-owned enterprise under the Vietnam Maritime Administration (VINAMARINE), and the Ministry of Transport (MOT). The organizational chart of VISHIPEL is shown in Figure 7.

Whilst the Technical and Investment Department takes full responsibility for managing

Figure 7: Organizational Chart of VISHIPEL



and supporting all technical activities of the coastal communication system and maintenance activities, the Operation Department takes full responsibility for managing and supporting all operation activities of the coastal communication system including the training of staff. Under the direction and supervision of these departments in the Hai Phong headquarters, each coastal radio station is in charge of O&M of the equipment and facilities on site. Basically, coastal radio stations in operatation 24 hours a day in 3-4 shifts. The allocation of O&M staff at each coastal radio station is shown in Table 8

Table 8: Allocation O&M staff at each Coastal Radio Stations (CRS)

Class	Location of CRS under this project	Operator	Technician	Administrator (Director, Manager, Chief of staff)
1st class	Ho Chi Minh	26	31	20
2md class	Vung Tau	19	27	17
	Nha Trang	19	29	17
3rd class	Kien Giang, Can Tho, Qui Nhon	8	3	6
4th class	Bac Lieu, Cam Ranh, Con Dao, Dung Quat, Ha Tien, Nam Can, Phan Thiet, Phu Quoc, Phan Rang, Phu Yen, Tho Chu, Ly Son	5	2	2

2.5.2 O&M Technical Capacity

No particular problems are seen in the O&M capacity of VISHIPEL. Since the

introduction of GMDSS in the first phase of this project, the "Coastal Communication System Project (1996-2001)", VISHIPEL has expanded their staff numbers and carried out retraining of human resources as well as the recruitment of new employers with a good knowledge of communication in order to meet the requirements for the operation and maintenance of the new system. Each member of staff must receive training according to their job description and duties, including the following training courses: (i) training on work safety regulations for new employees, (ii) training for the General Operators Certificate for the Global Maritime Distress and Safety System (GMDSS) for new employees, (iii) training on the operation, installation, maintenance and repair of equipment of the CRS system for new employees, (iv) advanced training for managers, chiefs of staff, etc. of CRS. VISHIPEL has conducted training courses for GMDSS in addition to the training provided by the consultant and contractor under this project as already explained in "2.3.5 Capacity development of operators, engineers, technicians and managers of the radio stations". Up to November 2008, 364 staff had received training. (Table 9).

Table 9: Number of Staff Trained by VISHIPEL to November 2008

Training Content	Trainee	Number
LUT/MCC/GMDSS	Operator	148
LUT/MCC/MF/HF/VHF Radio Equipment/Power System	Technician	120
LUT/MCC/GMDSS/Multiple Radio Link Subsystem	Management	96

In addition to the above, JICA dispatched an expert to VINAMARINE from September 2000 to August 2003 to support the operation and maintenance of CRS for GMDSS and SAR. The JICA expert worked on technology transfer through On-the Job-Training (OJT) for the staff of CRS[28] and on technical advice for the formulation of communication systems for GMDSS and the formulation of SAR systems, including the preparation of GMDSS operation and maintenance manuals for CRS. This JICA technical assistance supported the capacity development of VISHIPEL for the O&M of GMDSS.

VISHIPEL built up experience in GMDSS through its operation in the northern part of Vietnam following the completion of the phase one project in 2001, also through various sorts of training by consultants and manufactures of the project as well as the JICA expert, and now the new system is stably operated and maintained.

2.5.3 Financial Status of O&M

The O&M budget provided by the government is sufficient. In general, the scope of work of VISHIPEL is classified into non-commercial services, such as public communication services for SAR and the provision of weather information, and commercial services such as paid communication services including telephone, fax, and e-mail services, etc. for ships and companies, and the sales of maritime communication equipment. With the role of CRS as a public utility, the O&M budget for CRS is funded by the Vietnamese government each year. For example, 51,986 million VND in 2006 and 38,597 million VND in 2007 were allocated to VISHIPEL as the annual O&M budget by the government.

[28] 168 staff at 12 CRS in the northern part of Vietnam benefitted from OJT.

According to VHSHIPEL, the annual budget from the government is sufficient for all operation and maintenance activities.

2.5.4 O&M Status

Project facilities are maintained in a good condition. VISHIPEL conducts routine and periodic maintenance according to the maintenance manuals and guidelines, as explained in Table 10.

Table 10: Routine and Periodic Maintenance Activities of VISHIPEL

	Type of maintenance activities	Main contents
a)	Once every week	• Clean and dry surface of the equipment by cleaner tools • Scan virus for computer system
b)	Once every month	• Run the self-test program to check parameters • Check and maintain the cooling system of the equipment
c)	Once every 3 months or 6 months	• -Clean and dry circuit boards connectors, contactors, switches inside • Check and adjust signal level of equipment at check points • Check and replace the dud electronic parts with new ones
d)	Once every year	• Use lubricant, paint, and clean tools to maintain the antenna, tower and ground system

3. Conclusion, Lessons Learned and Recommendations

3.1 Conclusion

From the findings described above, this project can be evaluated as highly satisfactory (Overall rating is A).

3.2 Lessons Learned

(1) Investment Preparation and Design Stage:

- During the implementation stage, there was a location change of the facilities. In order to avoid modification of the project design during the implementation stage, close coordination among the related authorities during the preparation stage should be strengthened.

- A combination of infrastructure development and training packages for the new technology and systems was key in promoting the effective operation and sustainability of the project. This approach would be appropriate for other infrastructure development projects, particularly when new technology and systems are introduced into the projects.

(2) Implementation Stage:

- One of the factors for the delay in the implementation schedule was associated with the unfamiliarity on the part of the related agencies of the administrative procedures of JBIC/JICA and GOV, and limited coordination among the related agencies. The related functional agencies should understand the implementation procedures required by JBIC/JICA and GOV and there should be close coordination among the related agencies/ organizations in order to ensure the progress of the project as

scheduled.

- The establishment of O&M manuals as well as management regulations which were supported by JICA experts played an important role in ensuring the CRS system remained functional and stable. This approach was a successful example of the combination of a Japanese ODA scheme including an ODA loan and technical cooperation, which would be applicable for other infrastructure development projects.

(3) Others:

- The recruitment of VISHIPEL staff with a good knowledge of communication contributed to the success of the training courses and the operation of the project facilities after project completion. When the project brings new technology and systems or expands the scope of business, the executing agency should have a good strategy for staffing for the good operation of project facilities.

3.3 Recommendations

(To MOT and VINAMARINES)

- It is necessary to strengthen the coastal radio system capacity through the expansion of the capacity of the existing radio stations, including the expansion of bandwidth, in order to avoid congestion in routine communication during peak hours for fishing boats. This is especially necessary in the morning time in provinces that have a big number of fishing boats.
- In order to meet the new requirements of the international conventions and their amendments to which Vietnam subscribes, it is necessary to establish other systems for maritime safety based on the CRS system, such as AIS (Automatic Identification System); LRIT (Long Range Identification Tracking system); etc.. In addition, this action would also contribute to better effectiveness of the GMDSS project.

(To Government of Vietnam)

- It is necessary to improve the SAR coordination capacity among the related agencies through establishing detailed and practical guidelines to improve implementation.

(To MARD and Provincial People’s Committees)

- It is necessary to promote maritime safety education for fishermen and to improve the coastal communication equipment and systems of fishing boats in order to improve the maritime safety of such boats.

Comparison of Original and Actual Scope

Item	Plan	Actual
1. Outputs 1) Installation of maritime radio communication equipment		
a. First class station (NAVTEX, MF, HF, VHF)	1 station at HCMC	Same as planned
b. Second class station (MF, HF, VHF)	2 stations at Vung Tau and Nha Trang	Same as planned
c. Third class station (MF, HF, VHF)	3 stations at Kien Giang, Can Tho, Qui Nhon	Same as planned
d. Forth class station (VHF)	12 stations at Bac Lieu, Cam Ranh, Con Dao, Dung Quat, Ha Tien, Ly Son, Nam Can, Phan Thiet, Phu Quoc, Phu Quy, Quang Ngai, Tho Chu	12 stations - Phu Quy was relocated to Phan Rang - Quang Ngai was relocated to Phu Yen
e. Local User Terminal (LUT) and Mission Control Centre (MCC)	At Hai Phong	Same as planned
f. Additional equipment	n.a.	-Lightning protector: 1 for HCM CRS, 1 for Vung Tau CRS, 1 for Nha Trang CRS, 3 for 3rd class CRS, 8 for 4th class CRS, 1 for LUT/MCC; -Electro Magnetic Interference (EMI) equipment: 1 for HCMC CRS, 1 for LUT/MCC; -Graphic Plotter: 3 for LUT/MCC
2) Training of CRS staff	n.a.	-Operator: 43 persons -Technician: 46 persons -Manager: 30 persons
3) Consulting service	Total: 39.5 M/M	Total: 41 M/M (39.5 M/M for realization of the original scope and 1.5 M/M for tender assistance for AIS equipment).
2. Project Period	March 2000-March 2003 (3 years and one month)	<For original scope> March 2000 - August 2005 (5 years and 6 moths) <Incl. additional AIS procurement> March 2000 - December 2006 (6 years and 9 month)
3. Project Cost Foreign Currency Local Currency Total ODA Loan Portion Exchange Rate	 1,860 Million Yen 425 Million Yen (42,500 Million VND) 2,285 Million Yen 1,866 Million Yen 1 VND= 0.01Yen (As of October 1999)	 1,402 Million Yen 326 Million Yen (32,600 Million VND) 1,728 Million Yen 1,490 Million Yen 1 VND= 0.01Yen