

ANNEX

1.	MINUTES OF THE MEETINGS	A-1-1
	1-1. At Explanation of Inception Report	A-1-1
	1-2. At Explanation of Interim Report	A-1-6
	1-3. At Explanation of Draft Final Report	A-1-11
2.	OPERATION AND MAINTENANCE RECORD OF THE EXISTING RESEARCH VESSELS	A-2-1
	2-1. Operation Records	A-2-1
	2-2. Current Condition of Existing Research Vessels	A-2-3
	2-3. Relevant Infrastructure	A-2-9
3.	SURVEY DESIGN AND NAVIGATION PLAN	A-3-1
	3-1. Current Survey Design	A-3-1
	3-2. Survey Design and Navigation Plan for New Research Vessel	A-3-2
	3-3. Survey Design and Navigation Plan for the Existing Research Vessels	A-3-3
4.	PRELIMINARY DESIGN AND SPECIFICATIONS	A-4-1
	4-1. Preliminary Design	A-4-1
	4-2. Comparison of Specifications	A-4-11
5.	CONSULTING SERVICES	A-5-1
	5-1. Work Schedule	A-5-1
	5-2. Breakdown of Consulting Fee	A-5-3
6.	PROJECT COST AND OPERATION & MAINTENANCE COST	A-6-1
	6-1. Breakdown of Construction Cost (in case of construction in Japan)	A-6-1
	6-2. Disbursement and Repayment Schedule	A-6-18
	6-3. Operation and Maintenance Cost	A-6-24
7.	TECHNICAL ASSISTANCE (T/A)	A-7-1
8.	ESTIMATED BENEFITS AND ECONOMIC ANALYSIS	A-8-1
	8-1. Estimated Benefits	A-8-1
	8-2. EIRR	A-8-12
	8-3. Sensitivity Analysis	A-8-15
	8-4. Socio-Economic Impact Analysis	A-8-24
9.	OUTLINE OF STEP LOAN PROJECT IN NEIGHBORING COUNTRY (FOR REFERENCE ONLY)	A-9-1
10.	LIST OF PERSONS MET BY THE SURVEY TEAM	A-10-1
11.	LSIT OF SURVEY TEAM MEMBERS	A-11-1

ANNEX 1. MINUTES OF THE MEETINGS

1-1. At Explanation of Inception Report

MINUTES OF THE MEETINGS
ON
INCEPTION REPORT
FOR
PREPARATORY SURVEY
ON
THE FISHERY RESEARCH VESSEL PROJECT
IN
THE KINGDOM OF MOROCCO

In accordance with the Minutes of Meeting (M/M) for the above survey signed on October 27, 2011, the JICA Preparatory Survey Team headed by Mr. Hiroshi Fukao (hereinafter referred to as "the Japanese side") explained and discussed the contents of the Inception Report (IC/R) with the National Institute for Fisheries Research (INRH) of the Ministry of Agriculture and Marine Fisheries (MAPM) and relevant agencies concerned of the Kingdom of Morocco, on September 4 and 6, 2012.

The list of attendants is attached in Annex 1.

Salient issues discussed and agreed upon by both sides are shown in the pages attached hereto.

Casablanca, September 6, 2012



Mr. Mustapha FAIK
Director General
National Institute for Fisheries Research
(INRH),
Ministry of Agriculture and Marine Fisheries.
Kingdom of Morocco



Mr. Hiroshi FUKAO
Team Leader
JICA Survey Team

1. The Japanese side submitted 6 copies (in French) and 2 copies (in English) of the Inception Report on "Preparatory Survey on the Fishery Research Vessel Project in the Kingdom of Morocco" and explained to the Moroccan side on September 4, 2012.

2. The following are the main issues discussed and agreed on by both sides in relation to the Inception Report.

2.1 Both sides basically agreed on the approaches, methods and procedures of the Survey as described in the said Report.

2.2 The first field survey in Morocco has been commenced on September 3, 2012 and will be conducted until October 17, 2012 (for 45 days). The results of the Survey will be outlined in the Interim Report and explained to the Moroccan side at the second field survey, which is scheduled to conduct in the late November 2012.

2.3 Logistic matters

(1) Regular meeting

The Japanese side proposed to the Moroccan side to hold a regular meeting to discuss on the progress of the Survey and to formulate the project concept and scope. The Moroccan side agreed to hold the said meeting. Next regular meeting is scheduled on September 18, 2012 at INRH.

(2) Counterpart

The Moroccan side agreed to appoint counterparts to attend on the weekly meeting mentioned in the above and the contact persons at each agency concerned to assist the Survey Team in collecting data and information and exchange of project ideas. The list of counterparts and contact persons will be presented to the Japanese side.

(3) Survey permits

The Moroccan side agreed to make arrangements for obtaining necessary permits from agencies/organizations concerned for conduct of field surveys, as requested by the Survey Team.

(4) Arrangement of separate meetings

The Moroccan side will arrange the separate meetings with the relevant departments/divisions of INRH and other agencies/organizations concerned for the Survey Team.

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2.4 Political approach

The Director General of INRH suggested that the Project will be formulated based on technical and socio-economic aspects in principle, but should be also promoted through the political approach on the top level authorities. In this regard, the INRH will coordinate different agencies concerned of Ministry of Agriculture and Marine Fisheries (MAPM), Ministry of Economy and Finance (MEF), Ministry of Foreign Affairs (MAE) and Ministry of High Education and Scientific Research (MESRS) so that the best plan will be smoothly selected by the Moroccan side among the several option plans which will be proposed by the Survey Team.

2.5 Technical matters

The following are major technical comments from the Moroccan site.

(1) Regional based survey and research

Although the eco-system survey projects by foreign cooperation in the North-west African water will be terminated in short period, there is a scientific demand to continue such a regional based survey and research. In this regard, the proposed research vessel should be designed to use for this purpose with the leadership of Morocco.

(2) Demand for eco-system survey for aquaculture development

There is the increasing demand for aquaculture by both government and private sectors in Morocco in recent years. However, the eco-system survey which data can be used for aquaculture development is not able to be conducted by the existing research vessels. In this context, the proposed research vessel should be also be used for this purpose.

(3) Deployment System of Research Vessels

The INRH plans to deploy the proposed research vessel for multi-purpose use for stock assessment survey of both pelagic and demersal fisheries resource as well as marine eco-system survey. Although one of the existing vessel "Charif Al Idrissi" has been operated more than 25 years, INRH will deploy 3 research vessels including this vessel for several years after the proposed vessel is constructed. When the "Charif Al Idrissi" reaches to the time to be abandoned, the required survey will be conducted with 2 research vessels, namely, "Al Amir Moulay Abdallah" and the proposed new vessel.

(4) Coastal Research Vessel

The INRH is also planning to reinforce its fleet for conducting survey in the coastal shallow water (less than 15m in depth) in the future, since the both existing and proposed research vessels cannot cover such shallow water.

(5) Target Survey Zone

The target zone for survey to be conducted by the proposed research vessel will be mainly the Moroccan water, but will be expanded depending on demands for regional eco-system survey which has been conducted by foreign research vessels but will be terminated in short period.

(6) Target Survey Depth

The existing research vessels cannot cover the depth more than 500m due to the limited capacity, while INRH plans to conduct deep-sea shrimp stock assessment survey and the fish larva circulation model analysis up to the depth of 1,500m. Appropriate survey depth should be further examined based on the INRH's technical capability and economic viability.

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List of Participants

INRH

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|-------------------------|---|
| 1. Mr. Mustapha FAIK | Director General |
| 2. Ms. Souad KIFANI | Secretary General |
| 3. Mr. Abdelmalek FARAJ | Chef de Dept. Ressources Halieutique |
| 4. Mr. Omar ETTAHIRI | Chef de Dept. Oceanographie et Aquaculture |
| 5. Mr. Ali AFERYAO | Chef de Div. Logist, Apro et Gestion des Navire |
| 6. Mr. Mohamed AMRANJ | Chef de Administratif, Financier et Comptable |
| 7. Dr. Naoki TOJO | JICA Expert (Ecosystem & Monitoring) |

JICA

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|----------------------|-----------------------------------|
| 1. Ms. Yuko MORIKAWA | Adjointe au Représentant Résident |
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Study Team

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|---------------------------|-------------------------|
| 1. Mr. Hiroshi FUKAO | Team Leader |
| 2. Mr. Yoshiki KONDO | Member |
| 3. Mr. Masaaki SHIBATA | Member |
| 4. Mr. Hideki TSUBATA | Member |
| 5. Mr. Hideyuki WATANABE | Member |
| 6. Mr. Abdelfattah RIACHE | Interpreter/Coordinator |
| 7. Mr. Aziz SASSI | Interpreter |

1-2. At Explanation of Interim Report

Page 1 of 5

**MINUTES OF THE MEETINGS
ON
INTERIM REPORT
FOR
PREPARATORY SURVEY
ON
THE FISHERY RESEARCH VESSEL PROJECT
IN
THE KINGDOM OF MOROCCO**

In accordance with the Inception Report for the above survey, the JICA Preparatory Survey Team headed by Mr. Hiroshi Fukao (hereinafter referred to as “the Japanese side”) has carried out the 1st field survey during September 3 to October 17, 2012 in collaboration with the National Institute for Fisheries Research (INRH) of the Ministry of Agriculture and Marine Fisheries (MAPM) and relevant agencies concerned of the Kingdom of Morocco (hereinafter referred to as “the Moroccan side”). As a result of the 1st field survey in Morocco and the 1st post survey analysis in Japan, the Japanese side elaborated the Interim Report, and explained and discussed on the outline of the Interim Report to the Moroccan side, on November 19 - 23, 2012.

The list of attendants is attached in Annex 1.

Salient issues discussed and agreed upon by both sides are shown in the pages attached hereto.

Casablanca, November 27, 2012



Mr. Mustapha FAIK
Director General
National Institute for Fisheries Research (INRH)
Ministry of Agriculture and Marine Fisheries
The Kingdom of Morocco



Mr. Hiroshi FUKAO
Team Leader
JICA Survey Team

1. The Japanese side submitted 6 copies (in French), 2 copies (in English) and those electronic data of the Interim Report on “Preparatory Survey on the Fishery Research Vessel Project in the Kingdom of Morocco” and explained to the Moroccan side on November 19 - 21, 2012.
2. The following are the main issues discussed and agreed on by both sides in relation to the outline of the Interim Report.
 - 2.1 The Moroccan side basically agreed on the contents of the Interim Report, and promised to carefully examine the said report and submit the written comments to the Japanese side before December 8, 2012.
 - 2.2 The 2nd field survey in Morocco has been commenced on November 17, 2012 and will be conducted until December 1, 2012 (for 15 days including travel days). The results of the survey will be further analyzed in Japan and elaborated in the Draft Final Report (DF/R). The DF/R will be submitted and explained to the Moroccan side at the 3rd field survey, which is scheduled to conduct during January 16 – 30, 2013.

2.3 Technical matters

The following are major technical comments from the Moroccan side.

(1) Linkage with “Plan Halieutis”

The Moroccan side requested the Japanese side to more emphasize the linkage between the “Plan Halieutis” and the proposed new research vessel, analyzing how and to what extent the proposed vessel will contribute to realize the “Plan Halieutis”.

(2) Concept of Project Benefits

The Moroccan side basically understood and agreed to the concept of project economic benefits estimated by the Japanese side. In addition to the economic analysis based on three scenario, the Moroccan side requested the Japanese side to make the impact analysis (to what extent socio-economic damages would be brought), if one of the most important fish species in Morocco (sardine, octopus or shrimp) was collapse, which might be occurred in case of “without Project”.

The Moroccan side suggested that the economic benefit estimated from the development of deepsea fisheries resources is not scientifically acceptable due to the limited data. Both parties agreed to eliminate this benefit from economic analysis.

In addition, the following three aspects should be highlighted as the important project effects:

- Ecosystem approach, in conformity with the strategies of the “Plan Halieutis”.
- Contribution in the regional cooperation to raise the influence of Morocco.
- Collaboration with universities through joint survey in the field of marine environment.

(3) International code/convention to be examined



The Japanese side explained the following international code / convention, and the proposed new research vessel will have to be the larger if it is necessary to follow therewith.

a) SPS 2008 (Code of safety for special purpose ships) - IMO

In this code, the vessel should be designed not to damage stability, even any compartment (sub-division) is filled with water. This code is applicable to more than 500 gross tonnage special purpose ships with more than 12 special passengers (researchers), but not a compulsory rules and standards.

b) MLC 2006 (Maritime Labor Convention) – ILO (to be effective on 20 August 2013)

It is stipulated in this convention that sleeping rooms shall be situated above the load line, if it is necessary to follow this convention. However, Morocco does not ratify to this convention for the time being. This Convention shall be applied to all vessels except those categorized into “Fishing Vessels” (Fishery research vessels are categorized into “Fishing Vessels” in Morocco).

The Moroccan side confirmed that the proposed new fisheries research vessel does not need to follow both of the above code and convention, and that this matter should be remarked in the DF/R, knowing as a reference that no fisheries research vessels in Japan (“which” deleted) follow the above code and convention for the time being since all the fisheries research vessels in Japan have the number of researchers onboard not more than 12 persons and are categorized into “Fishing Vessels” respectively.

(4) Scientific equipment options

The Japanese side explained that the proposed scientific sonar “Simrad ME70” is still under development of techniques on data treatment (methodology of calibration, TS determination and so on) in the world. There are many issues to be solved and/or developed before data can be used at level of scientific assurance for stock assessment, so that it will be heavy burden for INRH to make “Simrad ME70” effective to the practically scientific level. In this context, the Japanese side strongly recommended to introduce “Furuno FSV-30R” as an option instead of “Simrad ME70” in terms of not only the easiness in usage but also in price (Approx. 160 millions Yen would be able to reduce if “Furuno FSV-30R” was selected). The Moroccan side requested the Japanese side to provide with some scientific references on the matter for his further examination, and the Japanese side promised to try to provide such references.

Since there is a possibility that the issues on operation of ME70 would be solved by the time of the project implementation, both parties agreed that ME70 would be remained in the project design for the time being, and would be reexamined the appropriateness of ME70 so as to make final decision at the stage of detailed design (preparation of tender documents).

(5) Organizations for project implementation

The Moroccan side confirmed that the following organizational system would be applied for implementation of the Project.

1) Borrower : Ministry of Economy and Finance (MEF)



- 2) Implementing agency : MAPM (for administrative matters) and INRH (technical matters)
- 3) O&M agency (owner) : INRH

(6) Technical Assistance (T/A)

Both sides discussed on necessary components and scope of a Yen-loan attached technical assistance (T/A) to be provided in connection with the Project. The Moroccan side insisted that the proposed T/A should be concentrated to technical transfer on operation and maintenance of the new research vessel including all the equipment. The research activities on analysis and evaluation of fisheries resources and ecosystem will be studied at the final evaluation of the current Technical Cooperation Project (Capacity Development of Fisheries Resource Monitoring for Sustainable Management of Small Pelagic Resources in the Kingdom of Morocco) by JICA.

Both sides reached to mutual understanding on the following outline:

- 1) Objectives: Capacity building for operation and maintenance of the new research vessel
- 2) Fields of expertise:
 - a) Operation and management of research vessel (Chief advisor)
 - b) Navigation / Fishing technique (pelagic and deep sea trawl in particular)
 - c) Mechanical engineering (main and aux. engines, refrigeration machinery, etc.)
 - d) Scientific equipment (Sedigraph and FlowCam in particular)
 - e) Acoustic apparatus (Sonar, Multi-beam echo-sounder, and ADCP in particular)
- 3) Period: 3 years
(including 1 year before the arrival and 2 years after the arrival of the new research vessel)



Annex-I

List of Participants

INRH

- | | |
|-------------------------|--|
| 1. Mr. Mustapha FAIK | Director General |
| 2. Dr. Abdelmalek FARAJ | Chef de Dept. Ressources Halieutique |
| 3. Dr. Omar ETTAHIRI | Chef de Dept. Oceanographie et Aquaculture |
| 4. Dr. Najib CHAROUKI | Chef de URD Diagnostic et Etat d'Exploitation
des ressources |
| 5. Mr. Ali AFERYAD | Chef Division d Approvisionnement, Logistique, et
Gestion des Navires |
| 6. Mr. Driss BENZAZZI | Chef Service Gestion des Navires |
| 7. Mr. Ali BENHRA | Chef de Laboratoire d'Ecotoxicologie |
| 8. Dr. Naoki TOJO | JICA Expert (Ecosystem & Monitoring) |

Study Team

- | | |
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| 1. Mr. Hiroshi FUKAO | Team Leader |
| 2. Mr. Kazunori UWATOKO | Co-Team Leader |
| 3. Mr. Yoshiki KONDO | Member |
| 4. Mr. Hideki TSUBATA | Member |
| 5. Mr. Abdelfattah RIACHE | Interpreter/Coordinator |



1-3. At Explanation of Draft Final Report

Page 1 of 5

**MINUTES OF THE MEETINGS
ON
DRAFT FINAL REPORT
FOR
PREPARATORY SURVEY
ON
THE FISHERY RESEARCH VESSEL PROJECT
IN
THE KINGDOM OF MOROCCO**

This Minutes of Meetings is prepared and signed between the JICA Preparatory Survey Team headed by Mr. Hiroshi Fukao (hereinafter referred to as "the Survey Team") and the relevant agencies concerned of the Kingdom of Morocco (hereinafter referred to as "the Moroccan side") including the Ministry of Economy and Finance (MEF), the Ministry of Agriculture and Marine Fisheries (MAPM) and the National Institute for Fisheries Research (INRH), to confirm the results of a series of discussions made during the 3rd field survey. The Survey Team explained and discussed on the outline of the Draft Final Report to the Moroccan side, on January 18, 21 and 28, 2013.

The list of attendants is attached in Annex 1.

Salient issues discussed and agreed upon by both sides are shown in the pages attached hereto.

Casablanca, February 6, 2013



Mr. Moha BICHA
Chef de la Division Asie, Afrique et Amérique
Direction of Budget
Ministry of Economy and Finance (MEF)



Mr. Abdelouahed BENABBOU
Directeur de la Coopération et des Affaires
Juridiques
Direction of Cooperation and Legal Affairs
Department of Marine Fisheries (DPM)
Ministry of Agriculture and Marine Fisheries
(MAPM)



Mr. Mustapha FAIK
Director General
National Institute for Fisheries Research (INRH)
Ministry of Agriculture and Marine Fisheries
The Kingdom of Morocco



Mr. Hiroshi FUKAO
Team Leader
JICA Preparatory Survey Team

Ministry of Agriculture and Marine Fisheries
The Kingdom of Morocco

1. The Survey Team submitted the following numbers of copies and those electronic data of the Draft Final Report on "Preparatory Survey on the Fishery Research Vessel Project in the Kingdom of Morocco" and explained to the Moroccan side on January 18 and 21, 2013.
 - For MEF : 4 copies (French) and 1 copy of electronic data
 - For MAPM : 4 copies (French) and 1 copy of electronic data
 - For INRH : 8 copies (French), 2 copies (English) and 1 copy of electronic data
2. The following are the main issues discussed and agreed on by both sides in relation to the outline of the Draft Final Report.

2.1 The Moroccan side basically agreed on the contents of the Draft Final Report, and promised to carefully examine the said report and submit the written comments to the Survey Team before February 8, 2013.

2.2 The 3rd field survey in Morocco has been conducted from January 16, 2013 to January 30, 2013 (for 15 days including travel days). The results of the survey will be further analyzed in Japan and elaborated in the Final Report (F/R). The F/R will be officially delivered to the Moroccan side through the JICA Morocco Office by the end of April 2013. To expedite the evaluation work by the Moroccan side as requested, the Survey Team will be able to send the electronic file of the Final Report prior to official delivery subject to approval by JICA.

2.3 Project Implementation System

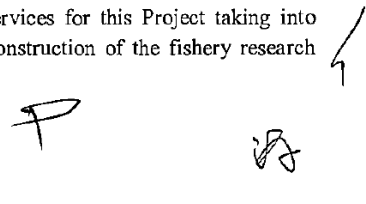
This point is still under discussion by the Moroccan side, and is to be finally confirmed later, after the receipt of the F/R from the Survey Team. The Moroccan side suggested to the Survey Team to consider the following two options:

	Option 1	Option 2
Borrower	INRH	MEF
Implementing Agency	INRH	INRH / DPM
Operation and Maintenance Agency	INRH	INRH
Ownership of the Vessel	INRH	INRH

The Moroccan side also suggested that it is indispensable to make INRH as the Owner of the Vessel unless otherwise the Vessel cannot be operated and maintained by INRH according to the Moroccan law. The Survey Team requested INRH to provide the past experiences on loan management with other donors or private banks, and on procurement of ships or other large equipment/facility, so as to justify the INRH's capability of project management, and INRH promised to provide such information.

2.4 Consulting Services

The Moroccan side understood the necessity of consulting services for this Project taking into account the specific technologies needed for designing and construction of the fishery research



vessel as well as ensuring smooth implementation of the Project.

The Survey Team explained that the consulting services to be covered by grant under Step loan would be only for assistance in preparation of PQ documents and tender documents including technical specifications, and all the consulting services after PQ announcement would be covered by loan portion. The Moroccan side understood this matter.

2.5 Project Cost

The MEF suggested that it is extremely desirable to reduce the cost of this operation so as to explain more advantages of the STEP loan to the Minister of MEF and finally to get special approval by the head of government. In this regard, the Moroccan side asked the Survey Team the possibility to cover by grant for the training of officers and crew at shipyard as well as during transport of the Vessel from shipyard to Morocco. The Survey Team answered that it is rather difficult to make a decision since the terms of reference of the consultants to be used under the loan and the consultants for Technical Assistance are not yet determined in detail at this stage, and it would be reconsidered by JICA with the clarification of terms of reference of consultants.

The MEF also suggested that the commitment charge (0.1%) should not be charged for this project, since it seems not fair that the Moroccan side is charged, in case that Japanese or foreign company causes delay. The MEF added that the Project is implemented in the framework of ODA and also under friendship between Morocco and Japan, but not on commercial basis. JICA Morocco Office explained to the Moroccan side the indispensability of payment of commitment charge. However, the Moroccan side mentioned that it would be hardly acceptable for the time being.

The Survey Team explained that the Project Cost described in the DF/R was modified as a result of recalculation using the JICA cost estimation software, considering the JICA standard rates of price escalation, consultant's remuneration and so on. The Moroccan side understood this matter.

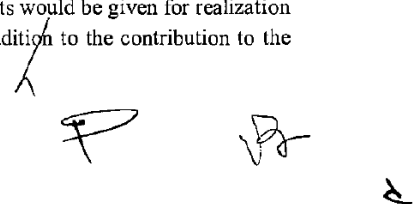
2.6 Technical Assistance

INRH is planning to set up the independent technical unit (Business Unit) inside of INRH in 2014 by reorganizing the existing division of research vessel operation and maintenance, so as to be able to reinforce the technical capability and to provide technical service more flexibly and more largely to fisheries technologies aspects. In this regard, the INRH wished to expand the period of the Technical Assistance attached to the Project so as to cover the training of staff of Business Unit soonest after its establishment. According to the INRH, the concept of Business Unit will be also applied to the existing Aquaculture Special Center in M'diq, Fishery Products Valorization Special Center in Agadir and Fish Pathology Laboratory in Tanger. The Survey Team will examine the possibility and discuss with JICA headquarters on the matter and inform to the INRH before the submission of Final Report.

2.7 Project Effects

2.7.1 Contribution to "Plan Halieutis"

INRH suggested that it is important to include in the F/R what inputs would be given for realization of the "Plan Halieutis" by the operation of proposed Vessel, in addition to the contribution to the outputs of "Plan Halieutis" which have already given on the DF/R.



2.7.2 Additional analysis on economic loss

INRH suggested that it should be analyzed in the F/R that how much cost is needed if INRH has to charter the similar vessel in case that the Project is not implemented, so as to justify the advantage of procurement of the proposed Vessel.

2.7.3 Indicators for Operation and Effects

The Survey Team suggested each indicator for operation should be carefully designed to the level, which could be actually achieved. Based on the survey and navigation plan revised by INRH, the Survey Team will examine and finalize the indicators for operation to the practical level.

2.7.4 Expected Benefits

The Survey Team made the rapid interview survey to some of owners of coastal purse seiners in Agadir and El Jadida, to collect data and information necessary for quantification of economic benefit related to the reduction of fuel cost, which is expected by providing the information on fishing ground through the analysis of survey data collected by a new research vessel. The Survey Team will try to estimate such benefit within the collected information, and the result will be reflected to the F/R.

2.7.5 Economic Analysis

The Survey Team explained that the estimated EIRR would be also recalculated according to the change of Project Cost, but would not much affect to the result of economic analysis.

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List of Participants

INRH

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|--------------------------|--|
| 1. Mr. Mustapha FAIK | Director General |
| 2. Dr. Abdelmalek FARAJ | Chef de Dept. Ressources Halieutique |
| 3. Mr Mounir ITAOUI | Chef de Dept. Appui à la Recherche |
| 4. Dr. Omar ETTAHIRI | Chef URD Oceanographie |
| 5. Dr. Najib CHAROUKI | Chef de URD Diagnostic et Etat d'Exploitation
des ressources |
| 6. Mr. Ali AFERYAD | Chef Division d Approvisionnement, Logistique, et
Gestion des Navires |
| 7. Mr. Mohamed AMARANI | Chef Division Administrative, Financière et Comptable |
| 8. Mr. Ali BENHRA | Chef de Laboratoire d'Ecotoxicologie |
| 9. Mr. Abdelatif BOUMAAZ | Chef de Labo Prospection des Ressources Demersales |
| 10. Dr. Naoki TOJO | JICA Expert (Ecosystem & Monitoring) |

DPM

- | | |
|-------------------------|---|
| 1. Mr. Youssef OUATI | Head of Cooperation Division |
| 2. Mr. Aomar BOURHIM | Homologue expert JICA of Cooperation Division |
| 3. Mr. Atsushi ISHIKAWA | JICA Expert |

MEF

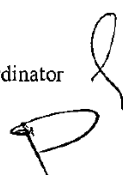
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|------------------------------|---|
| 1. Mr. Moha BICHA | Chef de Division Asie, Afrique et Amériques |
| 2. Mr. Mohamed LEMGHARI | Chef de Service Asie, Afrique et Amériques |
| 3. Mr. Abdelouahab BELMADANI | Chef de Service de Dept. des Pêches Maritimes |

JICA Morocco Office

- | | |
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| 1. Mr. Eihiko OBATA | Représentant Résident |
| 2. Ms. Kimiyo YAMAURA | Chargée de programmes de prêts APD |
| 3. Ms. Siham MALKI | Program Officer |

Survey Team

- | | |
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| 1. Mr. Hiroshi FUKAO | Team Leader |
| 2. Mr. Yoshiki KONDO | Member |
| 3. Mr. Hideki TSUBATA | Member |
| 4. Mr. Abdelfattah RIACHE | Interpreter/Coordinator |



ANNEX 2. OPERATION AND MAINTENANCE RECORD OF THE EXISTING RESEARCH VESSELS

2-1. Operation Records

(1) "R/V AL AMIR MOULAY ABDALLAH"

Year	Survey Period (start~finish)	Date	Survey Zone	Pelagic	Oceanography	Demersal
2001						
2002						
2003						
2004						
2005						
2006						
2007						
2008						
2009	29/12/2008	08/01/2009	11	Tarfaya ~ Safi		
	24/01/2009	04/02/2009	12	Fnideq ~ Oued Laou		
	21/02/2009	02/03/2009	10	Cap Ghir ~ Cap Juby, Canary		
	07/03/2009	21/03/2009	15	25° N~23° N, Atlantic Center		
	18/04/2009	25/04/2009	8	Cap Ghir ~ Cap Juby, Canary		
	28/04/2009	07/05/2009	10	Cap Ghir ~ Tifnit		
	21/05/2009	08/06/2009	19	Bojdour ~ Lagouira		
	14/06/2009	18/06/2009	5	Cap Ghir ~ Cap Juby, Canary		
	30/06/2009	30/07/2009	31	Cap Cantin ~ Cap Bojdour		
	29/09/2009	15/10/2009	17	Bojdour ~ Lagouira		
	24/10/2009	28/10/2009	5	Cap Ghir ~ Cap Juby		
	29/10/2009	13/11/2009	16	Cap Bojdour ~ Lagouira		
	14/11/2009	26/11/2009	13	Cap Blanc ~ Cap Bojdour		
	09/12/2009	30/12/2009	22	Dakhla ~ Cap Cantin		
		total	194			
2010	19/03/2010	05/04/2010	18	Cap Bojdour ~ Cap Barbas		
	12/04/2010	20/04/2010	9	Cap Ghir ~ Cap Juby, Las		
	19/05/2010	01/06/2010	14	Cap Cantin ~ Cap Bojadour		
	03/06/2010	20/06/2010	18	Cap Bojadour ~ Cap Blanc		
	22/06/2010	28/06/2010	7	Cap Ghir ~ Cap Juby, Las		
	28/08/2010	04/09/2010	8	Cap Ghir ~ Cap Juby		
	08/09/2010	09/09/2010	2	Agadir zone		
	30/10/2010	13/11/2010	15	Tanger ~ Sidi Ifni		
	24/11/2010	30/12/2010	37	Cap Cantin ~ Cap Blanc		
		total	128			
2011	12/01/2011	24/01/2011	13	Fnideq ~ Jabha, Atlantic North		
	10/02/2011	15/02/2011	6	Agadir bay		
	03/03/2011	06/04/2011	35	Cap Cantin ~ Cap Bojadour Cap Bojadour ~ Cap Blanc		
	19/05/2011	03/06/2011	16	Cap Cantin ~ Cap Bojadour		
	05/06/2011	11/06/2011	7	Jadiada ~ Safi zone		
	23/06/2011	10/07/2011	18	Cap Bojadour ~ Cap Blanc		
	18/07/2011	25/07/2011	8	Fnideq ~ Jabha		
	27/07/2011	03/08/2011	8	Mediterranean sea		
	05/10/2011	09/10/2011	5	Agadir bay		
	18/10/2011	20/10/2011	3	Agadir bay		
	18/11/2011	28/11/2011	11	Saida ~ Sebta		
	30/11/2011	06/12/2011	7	Cap Spartel ~ Cap Cantin		
17/12/2011	21/01/2012	36	Cap Bojadour ~ Cap Blanc			
		total	173			

(2) "R/V CHARIF AL IDRISIAL"

Year	Survey Period (start~finish)		Day	Survey Zone	Pelagic	Oceanography	Demersal (depth/times)
2006	Nov.						20~100m/90times
	Dec.						20~1000m/125times
2007	Feb.~Mar.						20~1000m/125times
	Apr.~May						20~1000m/90times
	Jun.~Jul.						20~1000m/125times
	Sep.~Oct.						20~100m/90times
	Oct.~Nov.						20~100m/90times
	Nov.~Dec.						20~100m/90times
2008	May~Jun.						20~100m/90times
	Sep.~Oct.						20~100m/50times
	Oct.~Nov.						20~100m/90times
2009	19/02/2009	05/03/2009	15	Lagouira ~ Dakhla			20~100m/100times
	06/03/2009	12/03/2009	7	Dakhla			
	13/03/2009	23/03/2009	11	Dakhla ~ Boujdour			
		total	33				
2010	29/04/2010	10/05/2010	12	Tanger ~ Tan Tan			20~1000m/56times
	16/05/2010	0/06/2010	24	Cap Bojadour ~ Cap Blanc			20~100m/95times
	08/06/2010	28/06/2010	21	Saidia ~ Sebta			20~800m/84times
	08/07/2010	31/07/2010	24	Atlantic North			20~1000m/82times
	01/09/2010	21/09/2010	21	Martil		Physics Survey	20~100m/70times
	25/10/2010	14/11/2010	21	Cap Bojadour ~ Cap Blanc			20~100m/90times
	25/11/2010	18/12/2010	24	Cap Bojadour ~ Cap Blanc			20~100m/90times
	total	147					
2011	10/01/2011	10/01/2011	1	Agadir bay			
	01/02/2011	13/02/2011	13	Cap Spartel ~ Sidi Ifni			20~1000m/84times
	20/03/2011	09/04/2011	21	Cap Bojadour ~ Cap Blanc			20~100m/90times
	20/04/2011	01/05/2011	12	Tanger ~ Sidi Ifni			20~1000m/84times
	05/05/2011	25/05/2011	21	Tan Tan ~ Tanger		Physics Survey	
	03/06/2011	24/06/2011	22	Bojadour ~ Cap Blanc			20~100m/95times
	05/08/2011	22/08/2011	18	Tanger ~ Sidi Ifni			20~1000m/90times
	24/09/2011	21/10/2011	28	Bojadour ~ Lagouira			20~200m/120times
	16/11/2011	02/12/2011	17	Tanger ~ Sidi Ifni			20~1000m/90times
	03/12/2011	07/12/2011	5	Sebta ~ Saida			20~800m/63times
	total	158					
2012	Mar.						20~1000m/100times
	Mar.~Apr.						20~800m/63times
	Apr.~May						20~100m/120times
	May~Jun.					Physics Survey	
	Jun.~Jul.						20~800m/63times
	Jun.~Jul.						20~1000m/102times

2-2. Current Condition of Existing Research Vessels

(1) "R/V ALAMIR MOULAY ABDALLAH"

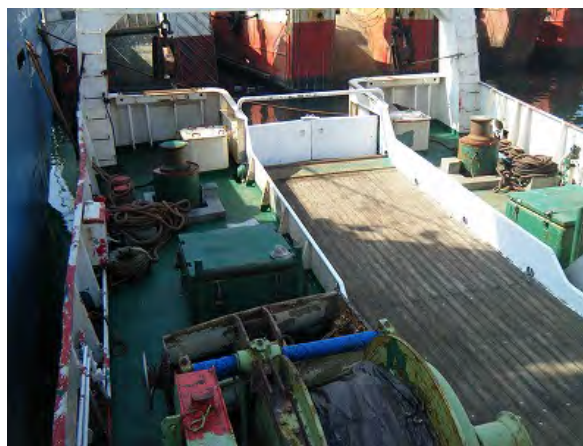
<○ : No problem, △ : Necessary to develop, × : Unavailable>

Item	Qty	Specification	Cond.	Remarks
Windlass	1	Hyd. 24.5kN×12m/min	○	
Capstan	2	Hyd. 14.7kN×20m/min	△	Need to develop a drum
Steering Gear	1	Electro-hyd. 24.7kN-m, 2.2kW	○	
Trawl Winch	2	Hyd. φ20mm×2000m 34.7kN×80m/min	△	
Net Winch	1	Hyd. 5.0m ³ , 34.3kN×45m/min	○	
Line/net Hauler	1	Hyd. 4.9kN×80m/min	△	Need to develop a drum
Deck Crane	1	EFFER25000-3S, SWL 2.0tf	○	
Oceanographic Winch	1	TURUMI-SEIKI, Hyd. φ6.0mm×500m(SUS), 7.8kN×50m/min	△	Need to develop a cable
CTD Winch	1	TURUMI-SEIKI, Hyd. φ6.0mm×500m(armored) 7.8kN×50m/min	○	
A-Gallows	1	Hyd. SWL5.9kN	○	
Hyd. Pump Unit for Trawl Winch	2	Main engine driven, 215lit/min	○	
Hyd. Pump Unit for Deck Machinery	1	Electric 37kW, 57lit/min	○	
Air-conditioning Unit	1	Compressor 11kW, Fan 3.7kW	○	
Mechanical Fan	3	0.4kW, 0.4kW, 0.2kW	△	Need to develop a venti.
Work Boat	1	Achilles, rubber/FRP, 4.2m×25PS outboard	○	
Scientific Fish Finder	1	SIMRAD EK-60 38kHz/120kHz Analyzer BI-500	○	
ADCP	1	Sunwest SW2000-115, 115kHz, depth 500m	×	
CTD	1	SeaBird SBE-911plus	○	
Ichtyometer	1	Digital, 0~50cm	○	
Weight scale	1	Electric, 0~6000g	○	
Main Engine	1	Yanmar 6N21A-UN, 1000PS×800rpm	○	
Reduction Gear	1	Yanmar RGC160K, Gear ratio 2.79	○	
Propeller/ Propeller Shaft	1	CPP, dia.2100mm Shaft dia.170mm	○	
Main generator Engine	2	Yanmar 6HAL2-N, 156PS×1500rpm	○	
Main Air Comp.	1	SANWA S8A, 5.5kW	○	
Aux. Air Comp.	1	SANWA S5AR, 5PS diesel	○	
Mech. Fan For E/R	2	3.7kW	△	Need to develop a vent.
Fresh Water Gen.	1	SASAKURA VA-30, 4 t /day	○	

Step-up Gear	1	KAWASAKI SGC56M-47、 280PS	○	
Ref. Machine	1	DAIKIN RKS-8F、5.5kW	○	
Search Light	1	Xenon 2kW	×	
Projector	12	500W	△	Some failure
Auto-pilot	1	TOKIMEC PR-2202-SL-025S	○	
Fish Finder	1	FURUNO FE1282、recording	×	
Scanning Sonar	1	FURUNO CSH-53	×	



R/V“AMA” Exposed Deck Bow Part



R/V“AMA” Exposed Deck Aft Part



R/V“AMA” Acoustic Laboratory



R/V “AMA”Acoustic Doppler Current Profiler



R/V“AMA”OGWφ6.0mm×500m(SUS)



R/V“AMA”CTD W.φ6.0mm×500m(armored)



R/V "AMA" Port side Trawl Winch



R/V "AMA" Starboard Trawl Winch



R/V "AMA" Wet Laboratory



R/V "AMA" Main Engine 736kW



R/V "AMA" Main Air Compressor



R/V "AMA" Underneath of Engine Room

(2) "R/V CHARIF AL IDRISIAL"

Item	Maker	Presence or absence of replacement	Maintenance and development status	Remarks
Radar	Scanmar	replacement	No problem	
Scanbas	Scanmar	replacement	No problem	
Speed Log	ANTHEA, BEN	replacement	No problem	
Speed Log	Sperry Marine	replacement	No problem	
EPIRB	RESCURE	replacement	No problem	
GMDSS Radio	SAILOR	replacement	No problem	
Fish Finder		Original	No problem	
Magnetic Compass		Original	No problem	
VHF Radio	SAILOR	replacement	No problem	
Public Addresser	SOREMAR	replacement	No problem	
Winch Cont. Stand		Original	No problem	
GPS		Original	No problem	
Course Plotter		replacement	No problem	With ECDIS
Galley Equipment		replacement	No problem	Some original
Mess Room Ref.	SAMSUNG	replacement	No problem	
Mess Room TV set	SAMSUNG	replacement	No problem	
Sewage Treatment		Original	Necessary to develop	
Main Engine	ABC	replacement	No problem	ANGLO-BELGIAN -CORP.
Step-up Gear		Original	No problem	
Main Gen. Engine	NIIGATA	Original	No problem	2 sets
Bilge Pump		Original	No problem	Replace e-motor
FO Purifier	Alfalaval	replacement	No problem	
Main Air Comp. Aux. Air Comp.	ABC	Original	No problem	Replacement with the main engine
M/E Fresh Water Cooler	Alfalaval	replacement	No problem	
Fresh Water Generator		replacement	No problem	2t/day
Ref. machine		Original	No problem	
Main Switchboard		Original	No problem	
Air Vessel		Original	No problem	Replacement with the main engine
Oceanographic W. Windlass		Original	Unavailable	
		Original	Necessary to develop	
Net Winch		Original	No problem	
Warp Winch		Original	No problem	
Life Raft	SEA-SAFE	replacement	No problem	
E/R Machine tool		Original	No problem	
Hull		Original	Necessary to develop	



R/V "CAI" Port Side Bow View



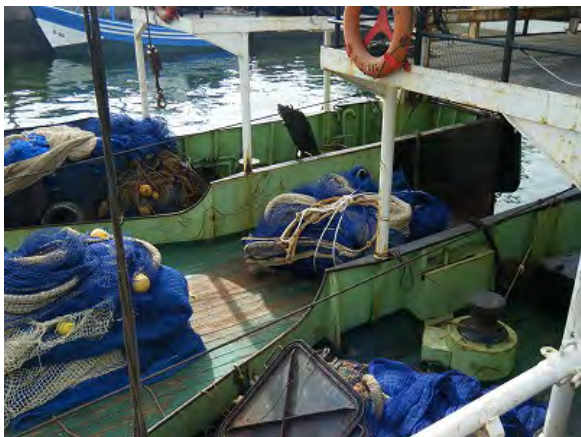
R/V "CAI" Stern Part



R/V "CAI" Port Side Fore Draft Mark



R/V "CAI" Mid-ship Net Winch



R/V "CAI" Stern Part



R/V "CAI" Oceanographic Winch



R/V "CAI" Wheelhouse



R/V "CAI" Chief Scientist Cabin



R/V "CAI" Galley Equipment (replacement)



R/V "CAI" Main Engine (replacement)



R/V "CAI" Pumps underneath E/R Floor



R/V "CAI" Aux. Machinery in E/R

2-3. Relevant Infrastructure

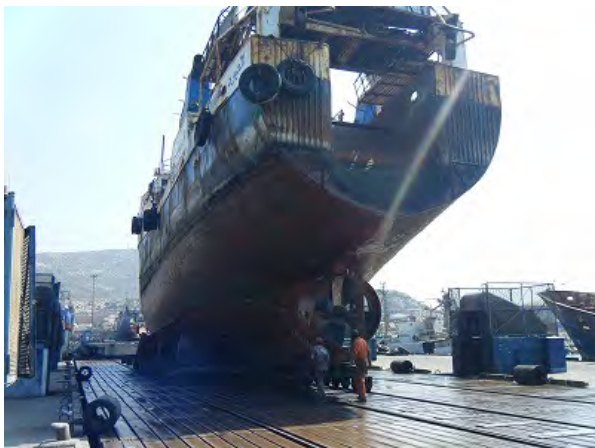
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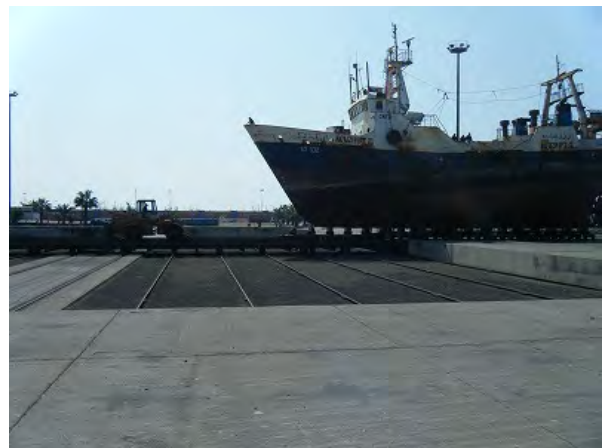
Fishing Vessel under construction at Shipyard



Synchro-Lift



Fishing vessel dry-up by Synchro-Lift



Moving in the Dockyard



Moored the wharf T/V“AL HASSANI”



Side by side R/V“AMA”

< Casablanca Port >



Fishing Port, R/V "CAI" Fore Draft 2.30m



Chantiers & Ateliers du Maroc (CAM)



Commercial port, Container Yard



Commercial port, Wharf

< Tanger Port >



Fishing Port, under Construction,



Fishing Port, Conceptual Drawing

ANNEX 3. SURVEY DESIGN AND NAVIGATION PLAN

3-1. Current Survey Design

Survey Zone	Mediterranean	Atlantique Nord	Atlantique Centre	Atlantique Sud	Total
	Saidia - Ceuta	Tanger - Safi	Safi - Cap Bojador	Cap Bojador - Cap Blanc	
Coastal Line (mile)	197	305	520	390	
	190	270	495	165+204(Dakhla-Blanc)	
A. Pelagics & Oceanography					
Ave. distance (D=20-500m) (mile)	12	30	30	45	117
No. of survey transects (vertical to coast)	49	30	53	36	168
No. of survey stations	35	50	80	80	245
Total survey distance (mile)	785	1,205	2,110	2,010	6,110
Required survey hours (hours)					
1) Acoustic survey	79	121	211	201	611
2) Mid-trawl sampling	35	50	80	80	245
3) Oceanographic survey	23	23	35	35	115
Required No. of survey days (days)	11.3	16.1	27.2	26.3	80.9
TOTAL Required No. of survey days (days)	14.1	18.1	29.2	29.5	90.8
B. Demersals					
Ave. distance (D=20-1,500m) (mile)	25	40	35	55	155
No. of survey stations (10x10miles)	65	105	*	120	290
Total survey distance (mile)	1,728	2,448	*	3,312	7,488
Required survey hours (hours)					
1) Trawling	144	204	*	276	624
2) Cruise	144	204	*	276	624
Required No. of survey days (days)	12.0	17.0	*	23.0	52.0
TOTAL Required No. of survey days (days)	13.9	20.7		30.6	65.2
Nav. days from Agadir to Saidia	2.8				9.9
Repos at Tanger / Laâyoune		2.0	2.0		
Nav. days from Cap Blanc to Agadir				3.2	
Nav. Days from Casa to Saidia	1.9				13.2
Repos at Tanger / Dakhla		2.0		0.5	
Nav. Days from Tangier to Larache & Ifni to Casa		1.7			
Nav. Days from Casa to Tarfaya & Lagouira to Casa				7.1	
Technical assumptions:					
1. Survey hours per day	: 12 hours /day (day time)				
2. Survey speed					
1) For cruise	: 10 knot				
2) For acoustic survey	: 10 knot				
3) For surface & mid-trawling	: 4 knot				
4) For bottom trawling	: 3 knot				
5) Oceanographic survey	: 0 knot (at fixed point)				
3. Survey time					
1) Acoustic survey	Along transects at speed of 10 knot.				
2) Surface & mid-trawling	1 hour/time at every survey station.				
3) Oceanographic survey	0.5 hours/time at every survey station: CTD (30 min.)				
4) Bottom trawling	1,5 hour/time at every survey station.				

3-2. Survey Design and Navigation Plan for New Research Vessel

SCENARIO NEW VESSEL (SPRING)												
Survey Item	No. of operation						Duration of survey (hours)					
	Atl. South (Cap Blanc~Cap Boulder)	Atl. Centre (Cap Boulder~Cap Carotin)	Atl. North (Cap Carotin~Cap Spartel)	Méd (Cap Spartel~Saïdia)	Total		Atl. South (Cap Blanc~Cap Boulder)	Atl. Centre (Cap Boulder~Cap Carotin)	Atl. North (Cap Carotin~Cap Spartel)	Méd (Cap Spartel~Saïdia)	Total	
No. of survey transects	13	17	10	14	54		80	53	30	17	179	
Demersal trawl	53	35	20	11	119		32	38	40	82	192	
CTD / rosette	19	22	17	5	63		48	55	43	13	158	
Bongo / multinet	186	204	132	162	683		66	75	48	60	248	
Sediment (benne/carottier)	65	85	50	70	270		33	43	25	35	135	
Pelagic trawl	33	43	25	35	135		16	21	13	18	68	
Semi-pelagic trawl	13	17	10	14	54		13	17	10	14	54	
Multi-beam scan (sea bottom)	7	9	5	7	27		3	4	3	4	14	
Acoustic survey distance (mile)	19	22	17	5	63		19	22	17	5	63	
Inter-transects (mile)	1276	1336	874	773	4259		128	134	87	77	426	
							18.2	19.2	13.1	13.5	64.0	
											61.1	
SCENARIO NEW VESSEL (AUTUMN)												
Survey Item	No. of operation						Duration of survey (hours)					
	Atl. South (Cap Blanc~Cap Boulder)	Atl. Centre (Cap Boulder~Cap Carotin)	Atl. North (Cap Carotin~Cap Spartel)	Méd (Cap Spartel~Saïdia)	Total		Atl. South (Cap Blanc~Cap Boulder)	Atl. Centre (Cap Boulder~Cap Carotin)	Atl. North (Cap Carotin~Cap Spartel)	Méd (Cap Spartel~Saïdia)	Total	
No. of survey transects	35	52	30	49	166		40	26	15	8	89	
Demersal trawl	27	18	10	6	60		16	19	20	14	69	
CTD / rosette	8	10	7	3	32		24	24	21	6	79	
Bongo / multinet	145	165	100	105	515		50	50	41	37	178	
Sediment (benne/carottier)	65	85	50	70	270		33	43	25	35	135	
Pelagic trawl	33	43	25	35	135		16	21	13	18	68	
Semi-pelagic trawl	80	80	50	35	245		80	80	50	35	245	
Multi-beam scan (sea bottom)	12	13	7	5	36		6	6	3	2	18	
Acoustic survey distance (mile)	9.5	11	8.5	2.5	32		10	11	9	3	32	
Inter-transects (mile)	2087	2516	1228	692	6523		209	252	123	69	652	
	435	794	392	214	1834		23.3	25.8	13.9	9.5	72.6	
											89.7	

Calculation of night work (new vessel in autumn)

	2/3 of CTD		1/2 of inter-transect		2/3 of Sediment		Demersal		Total hours of night work		Remaining hours at night	
	Atl.Sud	Atl.Nord	Atl.Sud	Atl.Nord	Atl.Sud	Atl.Nord	Atl.Sud	Atl.Nord	Semi-pelagic	Multi-beam scanning	Total hours of night work	Remaining hours at night
Pelagic 1 times/day	23	26	22	20	11	8	80	73	6	10	8.8	3.2
Demersal	33	33	40	40	14	14	80	80	6	11	9.0	3.0
Sediment	14	14	17	17	8	8	56	56	3	9	11.1	0.9
Multi-beam scan	10	10	23	23	12	12	28	28	2	3	11.8	0.2
Acoustic	73	73	118	118	45	45	237	237	18	32	41	7

Note: The remaining hours at night in Mediterranean is short, but there is no problem since the interval of transects and stations are closed.

3-3. Survey Design and Navigation Plan for the Existing Research Vessels

(1) R/V AMA

SCENARIO AL AMIR (SPRING)												
Survey Item	No. of operation				Total	Duration of survey (hours)				Total		
	Atl. South (Cap. Blanc~Cap. Boujidor)	Atl. Centre (Cap. Boujidor~Cap. Carotin)	Atl. North (Cap. Carotin~Cap. Spartel)	Méd (Cap. Spartel~Saïda)		Atl. South (Cap. Blanc~Cap. Boujidor)	Atl. Centre (Cap. Boujidor~Cap. Carotin)	Atl. North (Cap. Carotin~Cap. Spartel)	Méd (Cap. Spartel~Saïda)			
No. of survey transects	35	52	30	49	166	0	0	0	0	0	0	0
Demersal trawl	0	0	0	0	0	0	0	0	0	0	0	0
CTD / rosette	132	148	90	91	461	50	34	41	37	28	178	108
Bongo / multinet	52	68	40	56	216	26	0	0	0	0	0	0
Sediment (berne/carottier)	0	0	0	0	0	0	0	0	0	0	0	0
Pelagic trawl	80	80	50	35	245	80	80	50	35	69	245	245
Semi-pelagic trawl	0	0	0	0	0	0	0	0	0	0	0	0
Multi-beam scan (sea bottom)	0	0	0	0	0	0	0	0	0	0	0	0
Acoustic survey distance (mile)	2087	2516	1228	692	6523	209	252	123	69	652	652	652
Inter-transects (mile)	435	794	392	214	1834	23.7	26.2	14.3	9.8	23.8	23.8	23.8
												31.1

SCENARIO AL AMIR (AUTUMN) (limited up to 200 m)												
Survey Item	No. of operation				Total	Duration of survey (hours)				Total		
	Atl. South (Cap. Blanc~Cap. Boujidor)	Atl. Centre (Cap. Boujidor~Cap. Carotin)	Atl. North (Cap. Carotin~Cap. Spartel)	Méd (Cap. Spartel~Saïda)		Atl. South (Cap. Blanc~Cap. Boujidor)	Atl. Centre (Cap. Boujidor~Cap. Carotin)	Atl. North (Cap. Carotin~Cap. Spartel)	Méd (Cap. Spartel~Saïda)			
No. of survey transects	120	25	55	30	230	180	38	83	45	345	345	345
Demersal trawl	0	0	0	0	0	0	0	0	0	0	0	0
CTD / rosette	20	8	15	5	48	10	4	8	2	24	24	24
Bongo / multinet	0	0	0	0	0	0	0	0	0	0	0	0
Sediment (berne/carottier)	0	0	0	0	0	0	0	0	0	0	0	0
Pelagic trawl	0	0	0	0	0	0	0	0	0	0	0	0
Semi-pelagic trawl	0	0	0	0	0	0	0	0	0	0	0	0
Multi-beam scan (sea bottom)	0	0	0	0	0	0	0	0	0	0	0	0
Acoustic survey distance (mile)	1200	250	550	300	2300	120	25	55	30	230	230	230
						20.7	4.4	9.7	5.2	30.8	30.8	30.8
												57.8

Calculation of night work (Al Amir in spring)						
	Pelagic 1 time/day	1/2 of CTD	1/2 of Bongo	1/2 of inter-transect	Total hours of night work	Remaining hours at night
Atl.Sud	24	25	13	22	3.5	2.6
Atl.Centre	26	25	17	40	4.1	2.6
Atl.Nord	14	21	10	20	4.5	3.1
Méd	10	18	14	11	5.4	4.3
Total	74	89	54	92	18	13

BASIC ASSUMPTIONS:

Survey Item	1.5 (0 - 200m)	Durée (heure) (200 - 800m)	2.5 (800 - 1,500m)
Demersal trawl	1.5 (0 - 200m)	2 (200 - 800m)	2.5 (800 - 1,500m)
CTD / rosette	0.5 (at fixed points)	0.3 (at pelagic trawl points)	
Bongo /multinet	0.5		
Sediment	0.5		
Pelagic trawl	1		
Semi-pelagic trawl	0.5		
Multi-beam scanning (sea bottom)	1		
Vessel speed during survey	10		
Portion of CTD/bongo during night	0.5 (New vessel Autumn)	0.7 (AMA Spring)	
Portion of pelagic trawl during night	0.3		
Portion of inter-transect survey during night	0.5		
Portion of acoustic survey per day	0.5		
Average distance between stations (demersal survey)		10	
No. of hours for demersal survey per day		15	

Departure / Entry to ports	Agadir-Saïdia Safi-Agadir-Safi Boujdir - Laayoune - Boujdir Laagouira - Agadir Total	AMA (spring) & new vessel (spring & autumn)	AMA /HAS (autumn)
Stopover	Nador	2.5	2.5
	Tanger	1	1
	Agadir	4	0
	Laayoune	2	3
	Dakhla	2	6.5
Total	10	11	

Costal length (miles)	Water stratum 0-200m	Water stratum 200-500m
197	1341	2979
Saïdia - Ceuta		
Tanger - Safi	8431	5343
Safi - Cap Bojador	6429	3762
Cap Bojador - Cap Blanc	14824	3441

(2) RV CAI

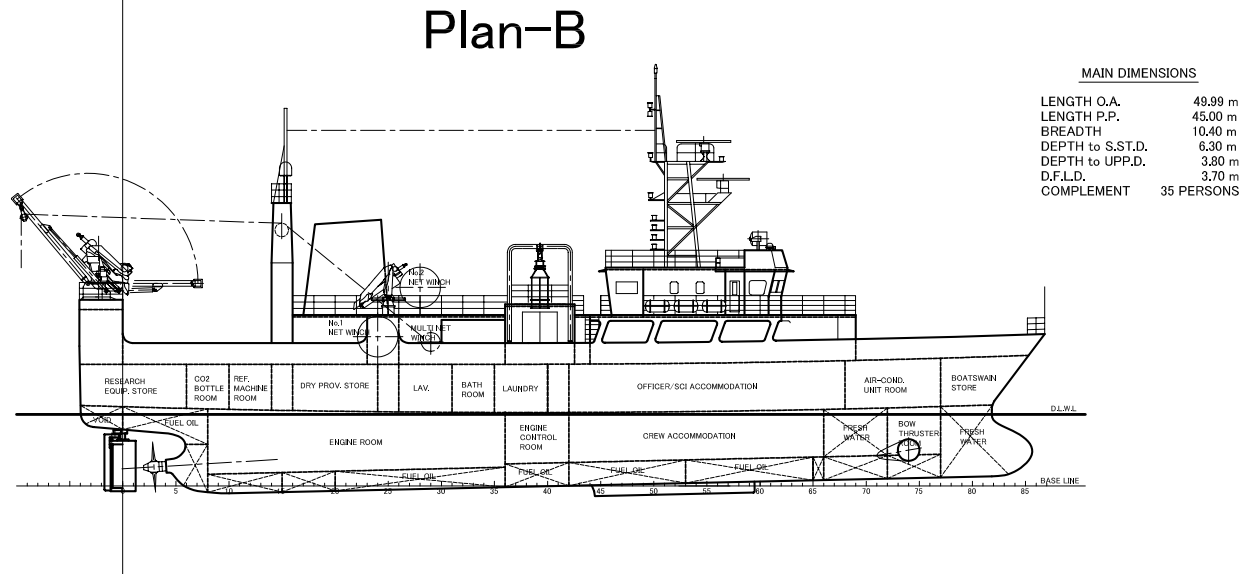
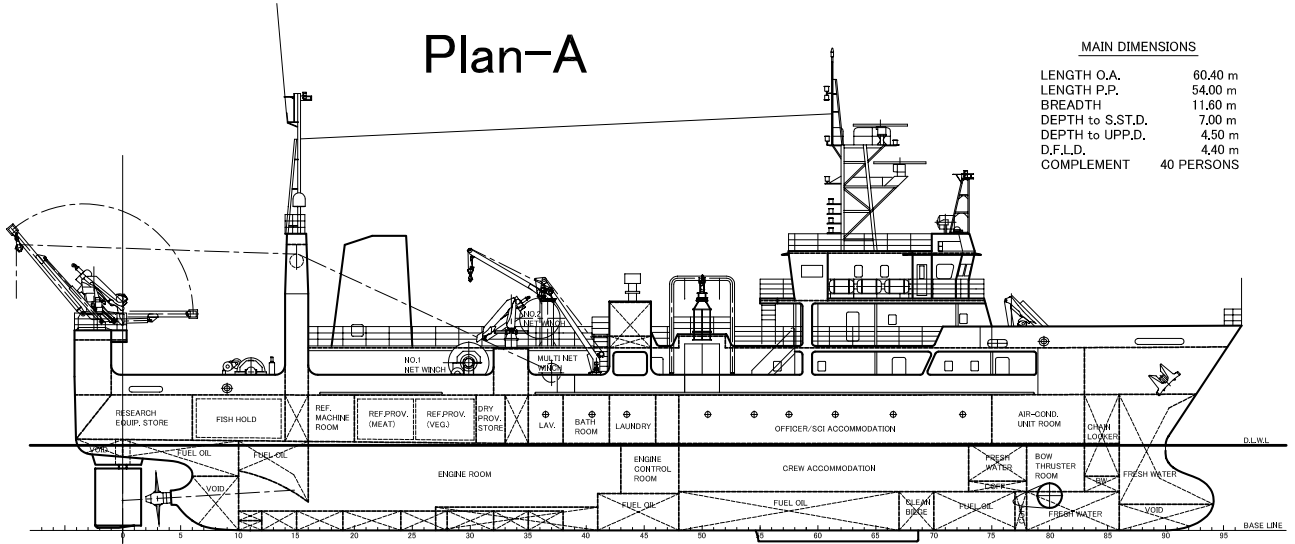
Campagnes Charif										
Intercalibrations avec Al Amir (Première année)										
Stations	Durée (heure)									
Demersal (<200 m)	1.5									
Demersal profond (200 à 800 m)	2									
CTD	0.5									
Moyenne distance interstations=	10									
Vitesse de croisière	7									
Navigation										
Nombre d'heurs d'activité	15									
Sortie/entrée ports	23									
Zones d'évaluation Demersale										
Zone	Chalutage			Océanographique		Navigation prospection (mn)	Nombre de jours			
	0-200	200-800	CTD	CTD			Recherche	Déplacement entre points	Navigation	Total
Cap Blanc – Cap Boujodor	120	34	0	0		1540	16.5	14.7	4.5	35.7
Cap Boujodor – Sidi Ifni	25	15	0	0		400	4.5	3.8	1.2	9.5
Sidi Ifni – Cap Spartel	55	50	0	0		1050	12.2	10.0	3.5	25.7
Cap Spartel – Saïdia	30	30	0	0		600	7.0	5.7	2.5	15.3
Total stations	230	129	0	0		3590	40.2	34.2	11.7	86.1
Evaluation Demersale (en heures)										
Zone	Chalutage			Océanographique		Total stations	Déplacement entre points (heures)			
	0-200	200-800	CTD	CTD			Recherche	Déplacement entre points	Navigation	Total
Cap Blanc – Cap Boujodor	180	68	0	0		248	220	14.7	4.5	35.7
Cap Boujodor – Sidi Ifni	38	30	0	0		68	57	3.8	1.2	9.5
Sidi Ifni – Cap Spartel	83	100	0	0		183	150	10.0	3.5	25.7
Cap Spartel – Saïdia	45	60	0	0		105	86	5.7	2.5	15.3
Total stations	345	258	0	0		603	513	34.2	11.7	86.1
							Escale			11.0
							Total			97.1

Intercalibrations avec le nouveau bateau (Deuxième anée)									
Stations									
Durée (heure)									
Demersal (<200 m)	1.5								
Demersal profond (200 à 1000 m)	2								
CTD	0.5								
Moyenne distance interstations=	10								
Vitesse de croisière	7								
Navigation									
Nombre d'heurs d'activité	15								
Sortie/entrée ports	23								
Zones d'évaluation Demersale									
Zone	Chalutage			Océanographique		Navigation prospection (mn)	Nombre de jours		
	0-1500m	0-800m	800-1500m	CTD			Recherche	Déplacement entre points	Navigation
Cap Blanc - Cap Boujdor	110	87	0	0	870	8.7	8.3	4.5	21.5
Cap Boujdor - Sidi Ifni	125	103	0	0	1032	10.3	9.8	1.2	21.3
Sidi Ifni - Cap Spartel	88	62	0	0	618	6.2	5.9	3.5	15.6
Cap Spartel - Saïdia	80	72	0	0	716	7.2	6.8	2.5	16.5
Total stations	403	324	0	0	3236	32.4	30.8	11.7	74.9
Evaluation Demersale (en heures)									
Zone	Chalutage			Océanographique		Navigation prospection (heures)	Nombre de jours		
	0-800m	800-1500m		CTD			Recherche	Déplacement entre points	Navigation
Cap Blanc - Cap Boujdor	131	0	0	0	124	8.7	8.3	4.5	21.5
Cap Boujdor - Sidi Ifni	155	0	0	0	147	10.3	9.8	1.2	21.3
Sidi Ifni - Cap Spartel	93	0	0	0	88	6.2	5.9	3.5	15.6
Cap Spartel - Saïdia	107	0	0	0	102	7.2	6.8	2.5	16.5
Total stations	485	0	0	0	462	32.4	30.8	11.7	74.9
Aires strates									
Casa-Saïdia	385		2.29						Aire strate (0-1500)
Fnideq - Spartel	43		0.26						Aire strate (0-800-1000)
Escale Tanger		2							
Sidi Ifni - Casa-Sidi Ifni	588		3.50						
Escale Casa		8							
Lagouira-Dakhla	198		1.18						
Escale Dakhla		1							
Dakhla - Casa	755		4.49						
Total		11	11.72						
									22.72

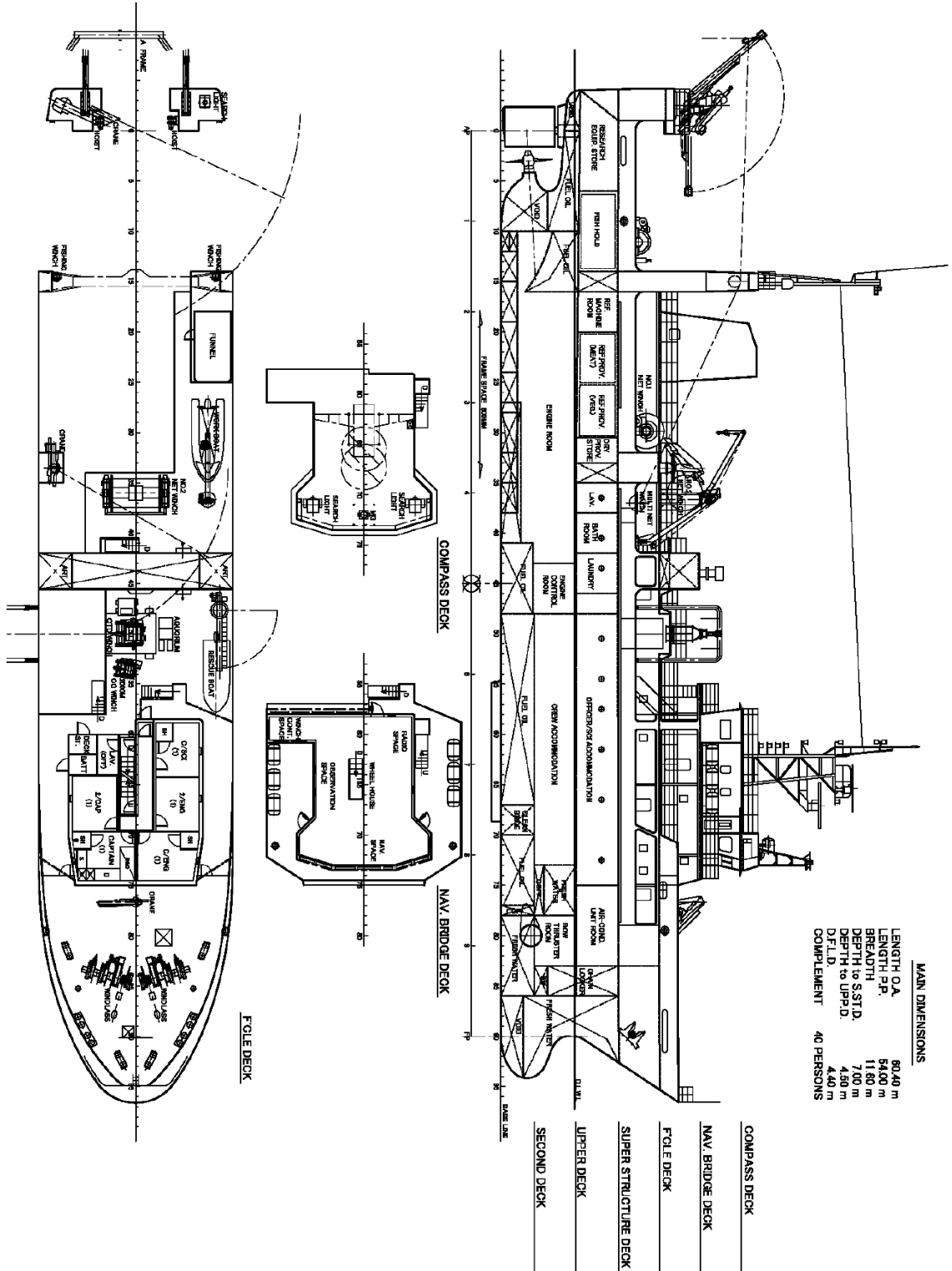
ANNEX 4. PRELIMINARY DESIGN AND SPECIFICATIONS

4-1. Preliminary Design

(1) Comparison of vessel scale between Plan A and Plan B

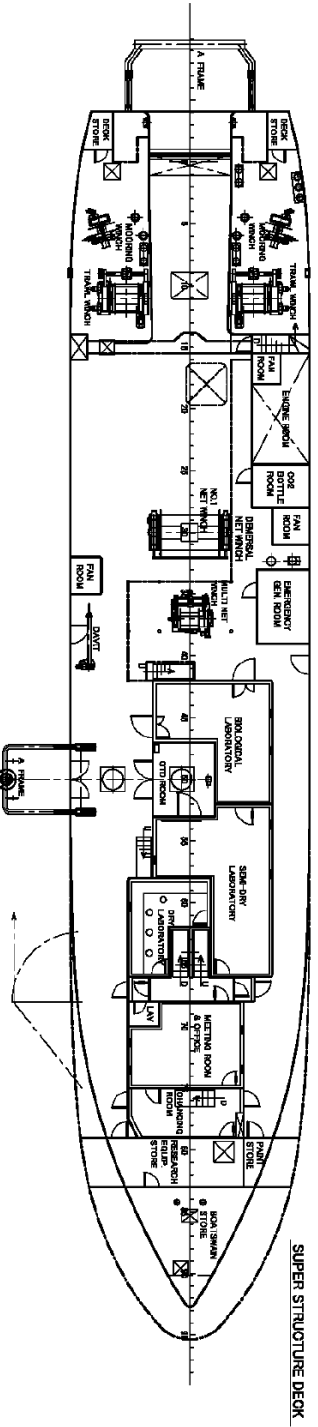
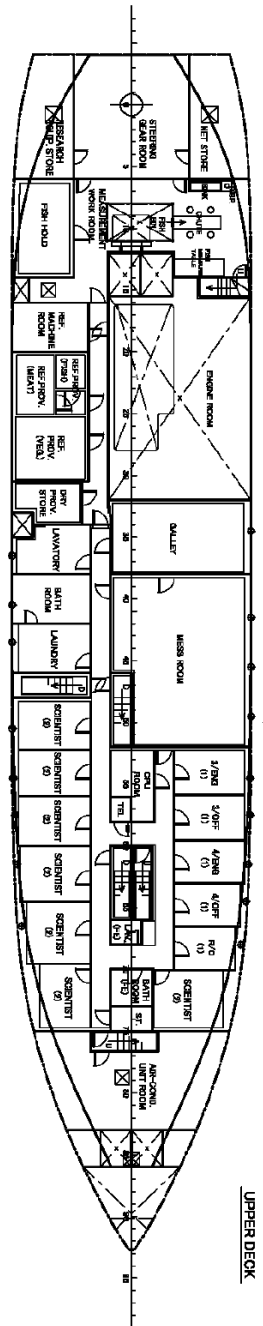
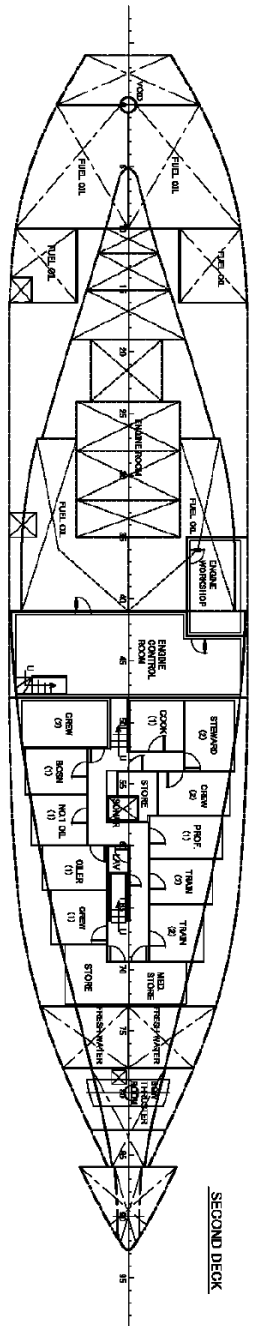


(2) Plan A

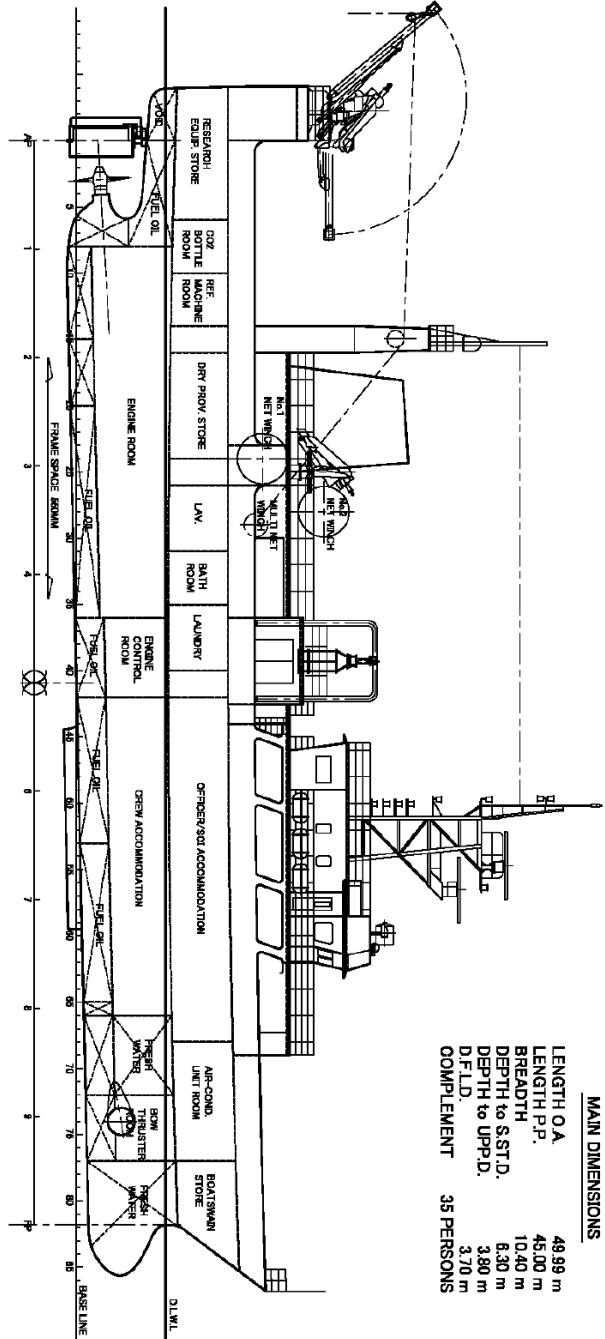
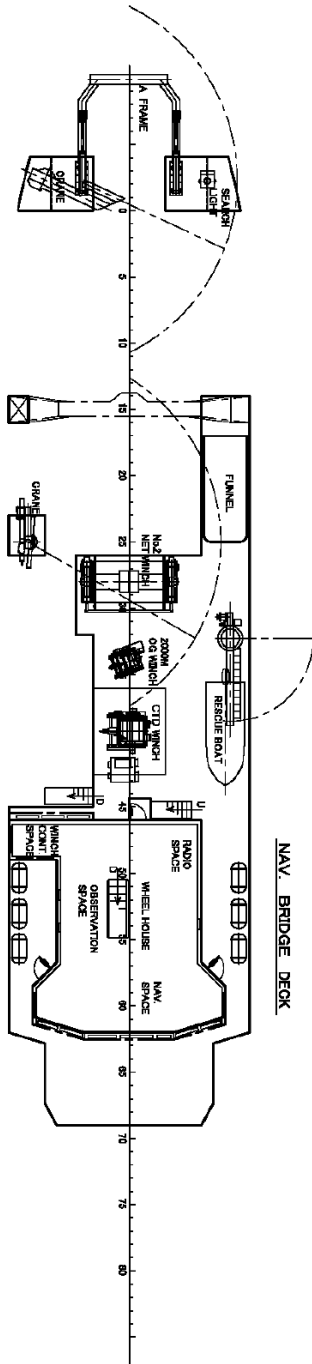


MAIN DIMENSIONS

LENGTH O.A.	60.40 m
LENGTH P.P.	54.00 m
BREADTH	11.80 m
DEPTH to S.S.T.D.	7.00 m
DEPTH to U.P.P.D.	4.50 m
D.F.L.D.	4.40 m
COMPLEMENT	40 PERSONS



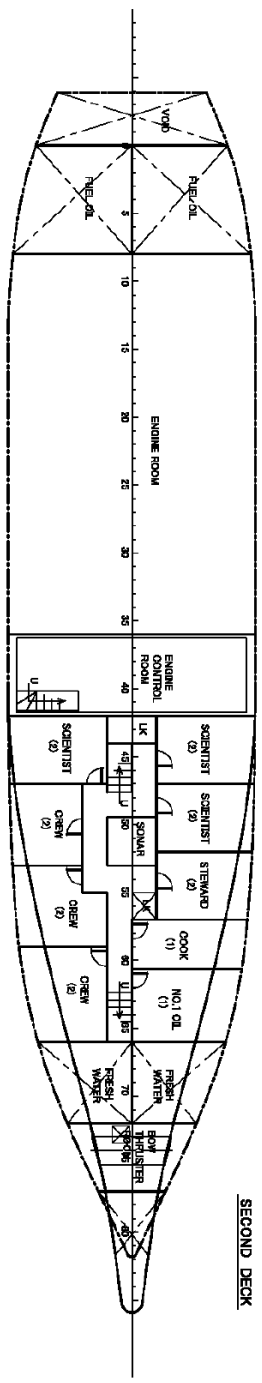
(3) Plan B



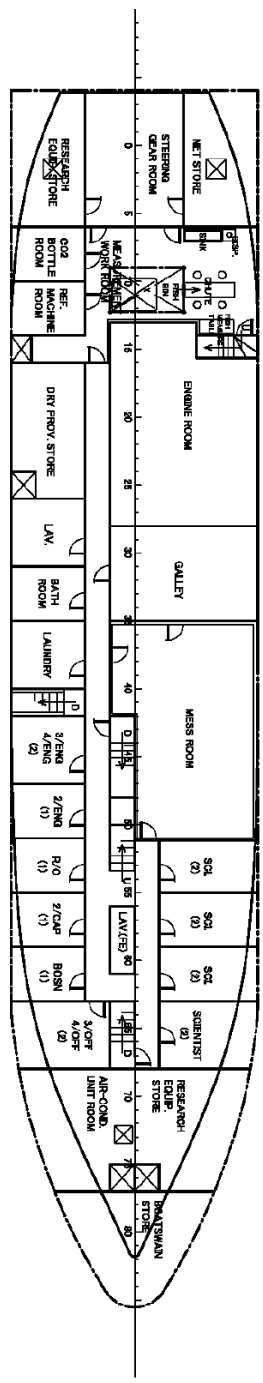
MAIN DIMENSIONS

LENGTH O.A.	49.99 m
LENGTH P.P.	45.00 m
BREADTH	10.40 m
DEPTH to S.S.T.D.	8.30 m
DEPTH to U.P.P.D.	3.90 m
D.F.L.D.	3.70 m
COMPLEMENT	35 PERSONS

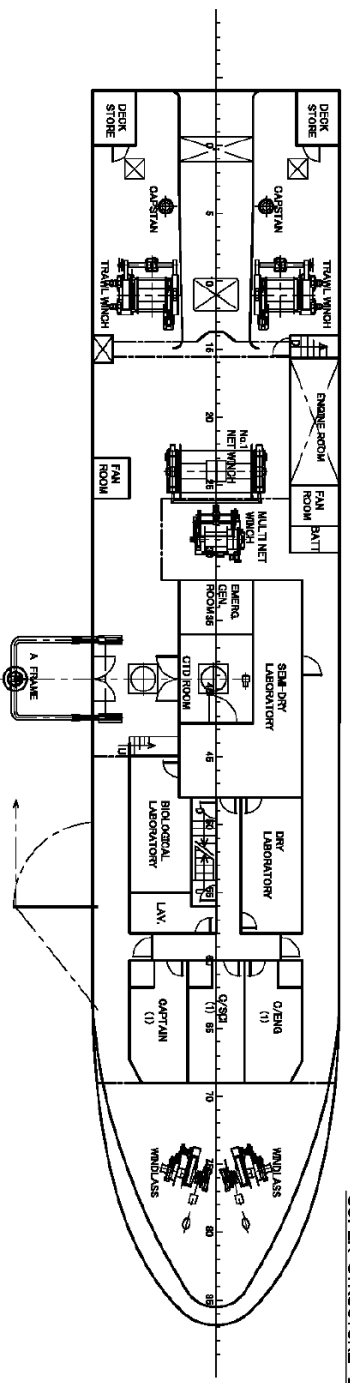
- COMPASS DECK
- NAV. BRIDGE DECK
- SUPER STRUCTURE DECK
- UPPER DECK
- SECOND DECK



SECOND DECK



UPPER DECK



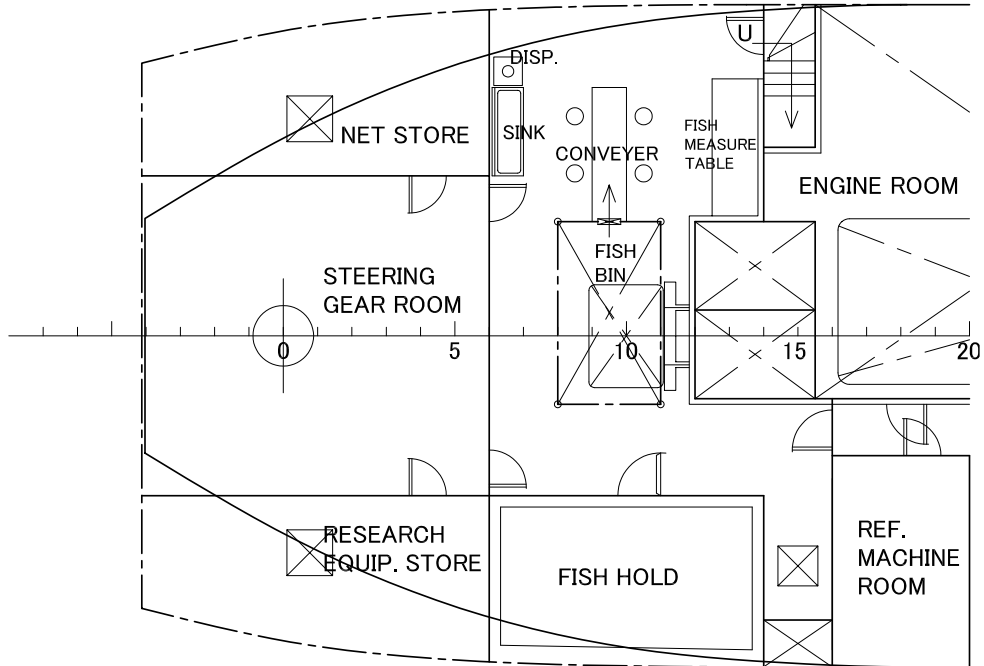
SUPER STRUCTURE DECK

(4) Fish Measurement Work Room

Plan A

MEASUREMENT WORK ROOM (Detail)

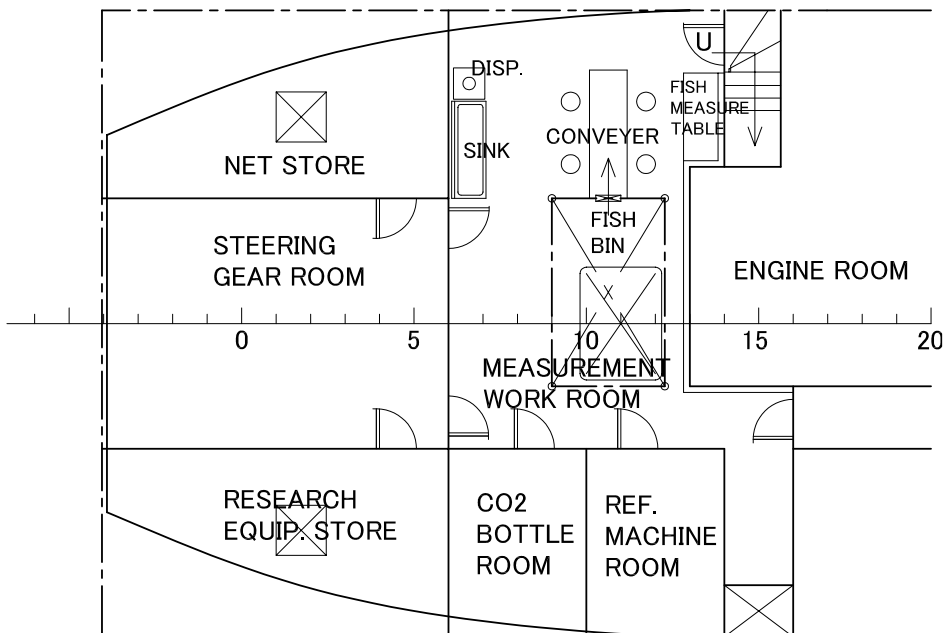
UPPER DECK



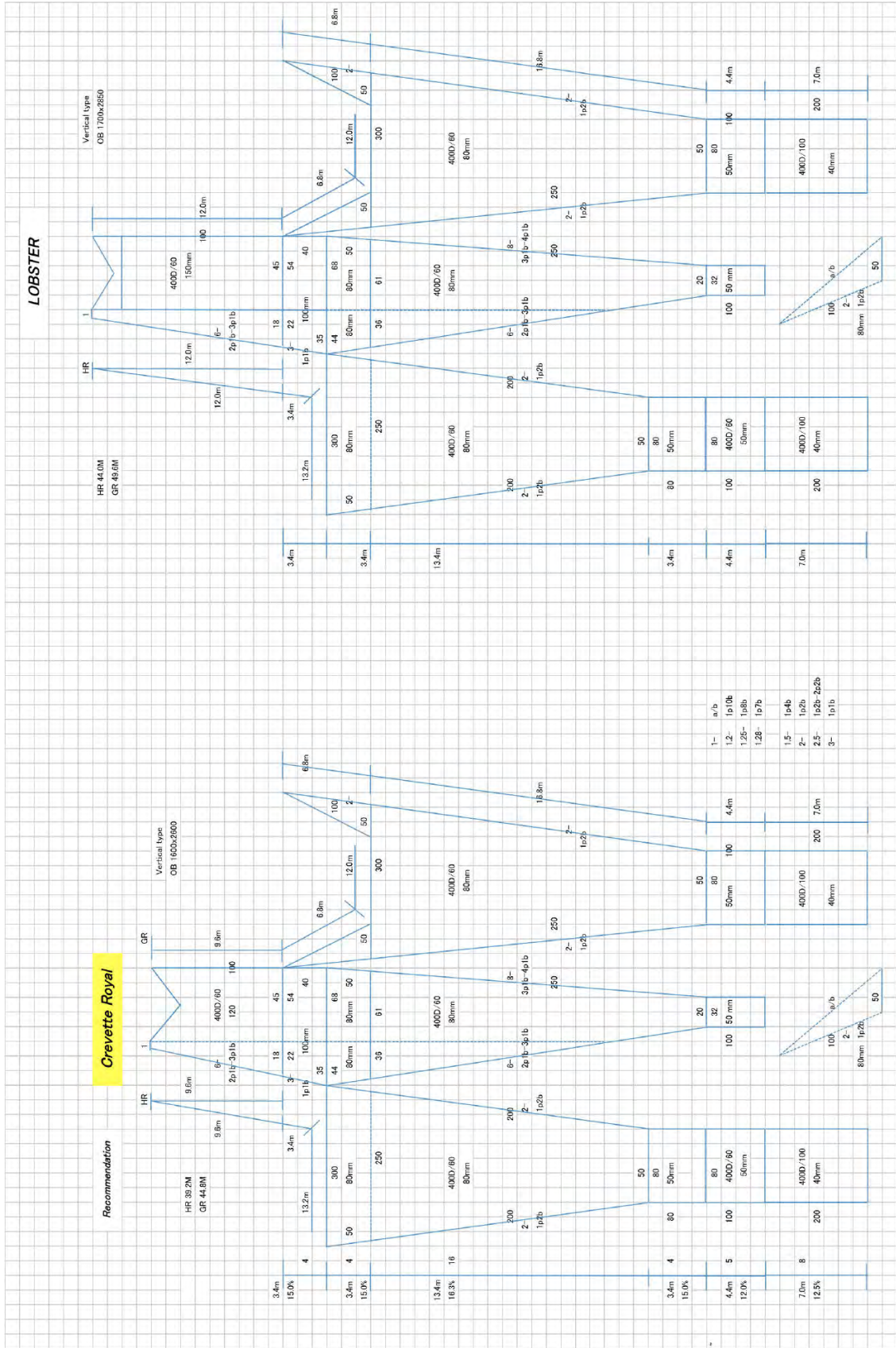
Plan B

MEASUREMENT WORK ROOM (Detail)

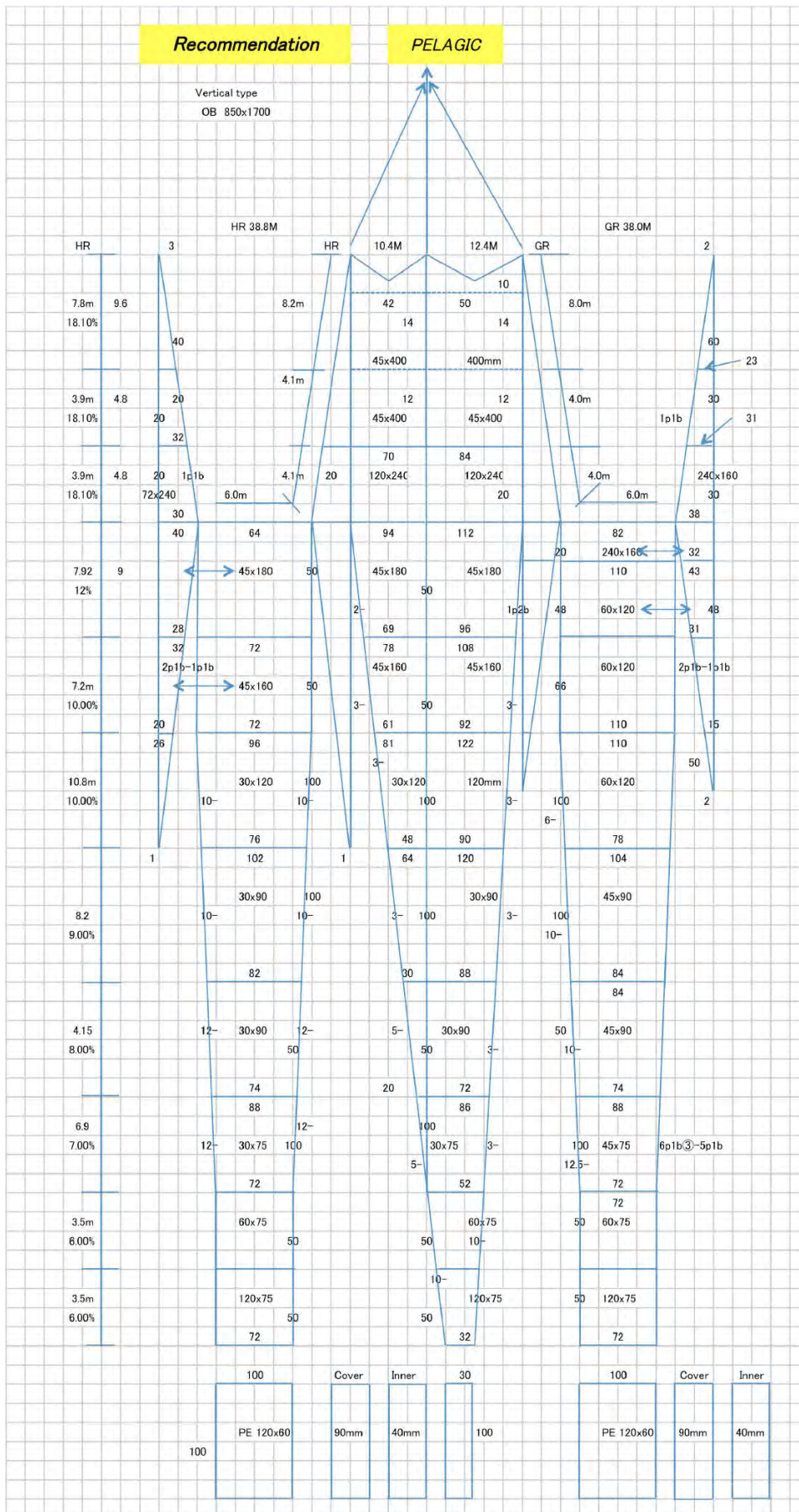
UPPER DECK



Bottom Trawl (Shrimp / Lobster)



Pelagic Trawl



4-2. Comparison of Specifications

1/7

Ship Name	AL AMIR MOULAY ABDALLAH	CHARIF AL IDRISSE	Projected Vessel (Plan-A)	Projected Vessel (Plan-B)	YOKO MARU
Type	Single Decker with long F'csls	Single Decker with long F'csls	Double Decker with F'csls	Double Decker with Deck house	Double Decker with F'csls
Type of Ship	Fisheries Research Vessel	Fisheries Research Vessel	Fisheries Research Vessel	Fisheries Research Vessel	Fisheries Research Vessel
Shipyards	SUMITOMO H.I.	NAGASAKI SHIPYARD	-----	-----	NIIGATA S&R
Delivered	Jan. 15, 2001	Jun. 18, 1986	-----	-----	Nov. 30, 2010
Port of Registry	AGADIR	CASABLANCA	-----	-----	NAGASAKI / JAPAN
Gross Tonnage	293	397	abt. 1,100	abt. 800	991
Navigation Area	Ocean Going International Voyage	Ocean Going International Voyage	Ocean Going International Voyage	Ocean Going International Voyage	Great Coasting International Voyage
GMDSS	A1+A2+A3	A1+A2+A3	A1+A2+A3	A1+A2+A3	A1+A2+A3
Class	NK / LR	NK / LR	NK / LR	NK / LR	JG
L(overall)	38.50	41.00	abt. 60.40	abt. 49.99	58.60
L(between pp)	33.50	35.00	54.00	45.00	52.30
Breadth	7.80	8.80	11.60	10.40	11.00
Depth(upper)	-----	-----	7.00	6.30	6.85
Depth(lower)	3.50	3.92	4.50	3.80	4.50
Designed Draft	3.00	3.20	4.40	3.70	4.40
Fishing for Research	Trawl(pelagic) Long line	Trawl (bottom)	Trawl (bottom and pelagic)	Trawl (bottom and pelagic)	Trawl (bottom and pelagic)
Complement	Crew 14	Crew 16	Crew 20	Crew 20	Crew 22
	Scient. 7	Scient. 9	Scient. 15	Scient. 11	Scient. 9
			Others 5	Others 0	Others 2
	Total 21	Total 25	Total 40	Total 31	Total 33
$V_{trial} / V_{service}$ (kts)	13.18/ abt. 12.2	12.47/ abt. 10.9	14.0 / abt. 13.0	13.5 / abt. 12.5	14.61 / abt. 13.0
Survey Speed (kts)	abt. 10		abt. 10	abt. 10	abt. 10
Fuel Oil(m ³)	90.77	111.27	250.00	210.00	232.97
Fresh Water(m ³)	18.47	53.52	80.00	40.00	106.38
Fish Hold(m ³)	16.21(-20°C)	24.05	12.00(-20°C)	Nil	Nil
O&M Fish Samples	-----	-----	28.0	26.0	32.0
Biological Labo.	7.8	10.4	22.0	11.5	22.0
Dry Laboratory	7.8	-----	12.0	12.0	12.0
Semi-dry Labo.	-----	-----	29.0	23.0	29.0
Acoustic Labo.	9.7	9.8	6.0	5.0	6.0
Total(m ²)	25.3	20.2	97.0	77.5	101.0
Windlass	2CD-2WE×1 24.5kN×12m/min	2CD-2WE×1 29.4kN×9m/min	1CD-2HD-1WE×2 44.1kN×12m/min	1CD-1HD-1WE×2 25.5kN×12m/min	1CD-2HD-1WE×2 44.1kN×12m/min
Capstan / Mooring Winch	Capstan×2 14.7kN×20m/min	Capstan×2 14.7kN×20m/min	1HD-1WE×2 29.4kN×15m/min	Capstan×2 19.6kN×20m/min	1HD-1WE×2 29.4kN×15m/min
Rudder	K7 Flap rudder	Kort nozzle rudder	Schilling rudder	Flap rudder	Schilling rudder
Steering Gear	24.7kN-m, 2.2kW 35°(P)+35°(S)	72.5kN-m, 3.7kW 35°(P)+35°(S)	149.5kN-m, 7.5kW 70°(P)+70°(S)	58.8kN-m, 3.7kW 45°(P)+45°(S)	149.5kN-m, 7.5kW 70°(P)+70°(S)

- Note: 1. Showing the particulars at the time of delivery except Plan-A and Plan-B
2. Makers and types of machinery/equipment indicated in Plan-A and Plan-B are only for reference.

Ship Name	AL AMIR MOULAY ABDALLAH	CHARIF AL IDRISSI	Projected Vessel (Plan-A)	Projected Vessel (Plan-B)	YOKO MARU
Warp Winch	34.3/17.6kN× 80/160m/min×2 20mmΦ×2,000m	44.1kN× 80/min×2 22mmΦ×3,000m	85/59/36kN× 55/80/130m/min×2 18mmΦ×5,000m	85/59/36kN× 55/80/130m/min×2 18mmΦ×5,000m	85/59/36kN× 55/80/130m/min×2 22mmΦ×2,500m
Net Winch	34.3kN×45m/min 1 drum, 5m ³	29.4kN×30m/min 1 drum, 2sets	Bottom × 1 Pelagic × 1	Bottom × 1 Pelagic × 1	29.4/19.6kN× 40/60m/min×1 2 drums, 8m ³ + 8m ³
Line/Net hauler	4.9kN×80m/min×1	-----	-----	-----	-----
Deck Crane	157kN-m× 1 cargo w. 19.6kN (telescopic type)	102kN-m× 1 cargo w. 19.6kN (folding type)	24.5/20.0kN × 11.5/14.1m × 1 (folding & telescopic)	24.5/20.0kN × 11.5/14.1m × 1 (folding & telescopic)	24.5/20.0kN × 11.5/14.1m × 1 (folding & telescopic)
Fore Crane (general use)	-----	-----	8.82/3.92kN × 7.5/11.0m × 1 (telescopic type)	-----	8.82/3.92kN × 7.5/11.0m × 1 (telescopic type)
Mid Space Crane (fishing operation)	-----	-----	8.82/14.7kN × 9.0/6.4m × 1 (folding & telescopic)	8.82/14.7kN × 9.0/6.4m × 1 (folding & telescopic)	8.82/14.7kN × 9.0/6.4m × 1 (folding & telescopic)
Research Winches	-----	-----	-----	-----	2,000m Armored W. 3.92kN×67m/min 6.4Φ×2,000m
	500m Hydrog. W. 7.8kN×50m/min 6.0Φ(SUS)×500m	Electric motor winch 1.96kN×114m/min	2,000m Hydrog W. 5.9kN×60m/min 5Φ(SUS)×2,000m	2,000m Hydrog W. 5.9kN×60m/min 5Φ(SUS)×2,000m	3,000m Hydrog W. 4.9kN×67.5m/min 5Φ(SUS)×3,000m
	-----	-----	-----	-----	5,000m Hydrog W. 49kN×79.5m/min 12Φ×5,000m
	CTD W. 7.8kN×50m/min 6.4Φ×500m (armored cable)	-----	2,000m CTD W. 7.84kN×60m/min 6.4Φ×2,000m (armored)	2,000m CTD W. 7.84kN×60m/min 6.4Φ×2,000m (armored)	7,000m CTD W. 22kN×60/120m/min 8.03Φ×7,000m (armored)
	-----	-----	Multi Net W. 25.5kN×60m/min 10.52Φ×2,000m (armored)	Multi Net W. 25.5kN×60m/min 10.52Φ×2,000m (armored)	MOCNESS Net W. 53.9kN×59m/min 10.52Φ×2,500m (armored)
A Frame (aft)	-----	-----	SWL 53.9kN outreach 3.0m	SWL 53.9kN outreach 3.0m	SWL 53.9kN outreach 3.0m
A Frame (midship)	SWL 5.9kN outreach 1.7m	-----	SWL 29.4kN outreach 3.0m	SWL 29.4kN outreach 3.0m	SWL 29.4kN outreach 3.0m
Hyd. Oil Pump	driven by main engine 215L/min×2	driven by main engine 162L/min×1	electro-hydraulic 37kW for windlass and fore crane	electro-hydraulic 22kW for windlass	electro-hydraulic 37kW for windlass and fore crane
	electro-hydraulic 57L/min×1, 37kW	electro-hydraulic 31L/min×1, 5.5kW	electro-hydraulic 90kW for warp/net winch, etc.	electro-hydraulic 90kW for warp/net winch, etc.	electro-hydraulic 90kW for warp/net winch, etc.
	electro-hydraulic 70L/min×1, 11kW	-----	electro-hydraulic 22kW for control	electro-hydraulic 22kW for control	electro-hydraulic 22kW for control
	-----	-----	electro-hydraulic 55kW for mooring winch, cranes, etc.	electro-hydraulic 45kW for capstan, cranes, etc.	electro-hydraulic 55kW for mooring winch, cranes, etc.
Air Condition Unit	compressor 11kW fan 3.7kW, 1 set	compressor 11kW fan 3.7kW, 2 sets	5 sets for 5 zones	5 sets for 5 zones	5 sets for 5 zones
Bow Anchor / Chain Cable	stockless 480kg / 19Φ×275m	stockless 685kg / 22Φ×302.5m	stockless 965kg / 32Φ×275m	stockless 675kg / 26Φ×275m	stockless 965kg / 32Φ×275m
Anti-Rolling Tank	-----	-----	Semi-active	-----	Semi-active

Ship Name	AL AMIR MOULAY ABDALLAH	CHARIF AL IDRISSI	Projected Vessel (Plan-A)	Projected Vessel (Plan-B)	YOKO MARU
Main Engine	YANMAR 6N21A-UN 736kW(1,000PS) × 800/287min ⁻¹ ×1	NIIGATA 6MG-22LX 809kW(1,100PS) × 900/329min ⁻¹ ×1	1,838kW(2,500PS) × 750/262min ⁻¹ ×1	1,471kW(2,000PS) × 750/285min ⁻¹ ×1	NIIGATA 6MG28HX 1,838kW(2,500PS) × 750/262min ⁻¹ ×1
Propeller	4CPP×1 D=2,100mm	4CPP×1 D=1,850mm	4CPP & PBCF×1 2,700φ	4CPP & PBCF×1 2,550φ	4CPP & PBCF×1 2,700φ
Generator Engine	YANMAR 6HAL2-N×2 115kW×1,500min ⁻¹	NIIGATA 6NSAK-G×2 147kW×1,500min ⁻¹	2 sets 441kW×1,200min ⁻¹	2 sets 245kW×1,200min ⁻¹	NIIGATA 6NSD-G×2 441kW×1,200min ⁻¹
Generator	AC385V, 50Hz 125kVA × 2	AC385V, 50Hz 160kVA × 2	AC385V, 50Hz 500kVA × 2	AC385V, 50Hz 275kVA × 2	AC450V, 60Hz 500kVA × 2
Harbour Use Generator	-----	-----	200kW×1,500min ⁻¹ AC385 250kVA×1	-----	-----
Emergency Generator set	-----	-----	AC385V 50kVA × 1 50kW×1500min ⁻¹	AC385V 50kVA × 1 50kW×1500min ⁻¹	AC450V 50kVA × 1 50kW×1800min ⁻¹
Fresh water Generator	4t/day (distilling)	1.5t/day (distilling)	10t/day(distilling) 5t/day(reverse)	5t/day(distilling) 5t/day(reverse)	10t/day(distilling) 5t/day(reverse)
Bowthruster	-----	4FPP×500Φ T=7.84kN(Hyd. oil)	4CPP×1,250Φ T=39.2kN(Hyd. oil)	4CPP×1,100Φ T=29.4kN(Hyd. oil)	4CPP×1,250Φ T=39.2kN(Hyd. oil)
Shore Connection Box	AC220V, 3-phase, 50Hz, 60A	AC385V, 3-phase, 50Hz, 60A	AC220V, 3-phase, 50Hz, 120A	AC220V, 3-phase, 50Hz, 120A	AC440V, 3-phase, 60Hz, 300A
Magnetic Compass	Desk mount type × 1 Portable type × 1	Stand type × 1 Table type × 1	Reflector type × 1	Reflector type × 1	Reflector type × 1
Auto Pilot	TOKIMEC PR-2022-SL-025S	TOKYO KEIKI GYLOT-101	ST Mode 1. Automatic, 2. Manual, 3. Lever, 4. Remote, 5. Joystic	ST Mode 1. Automatic, 2. Manual, 3. Lever, 4. Remote, 5. Joystic	YOKOKAWA PT500A-N2
Gyro Compass	TOKIMEC 1-Master 2-Repeaters	TOKYO KEIKI 1-Master 3-Repeaters	IMO approved type 1-Master, 7-Repeaters	IMO approved type 1-Master, 7-Repeaters	YOKOKAWA 1-Master, 7-Repeaters
Joystic Control System	-----	-----	Rudder, CPP, Bowthruster control	Rudder, CPP, Bowthruster control	Rudder, CPP, Bowthruster control
NO.1 Marine Radar	FURUNO X band, 25kW, 96n.m. with ARPA	FURUNO 25kW, 127n.m.	X band, 25kW, 96 n.mile with ARPA	X band, 25kW, 96 n.mile with ARPA	FURUNO X band, 25kW, 96 n.mile with ARPA
NO.2 Marine Radar	FURUNO X band, 6kW, 48n.m.	FURUNO 25kW, 100n.m.	SAME AS ABOVE	SAME AS ABOVE	SAME AS ABOVE
GPS Compass	-----	-----	LCD with DGPS function	LCD with DGPS function	FURUNO SC-110, 1set with DGPS function
Radio Direction Finder	FURUNO FD-160	TAIYO TD-A202B	-----	-----	-----
ECDIS (Chart Plotter)	Sodena, Turbo 2000 Chart plotter	-----	Color LCD, Position Calculation, Nav. Plan./Record.	Color LCD, Position Calculation, Nav. Plan./Record.	FURUNO FEA-2107 Color LCD
GPS Navigator	FURUNO GP-500MkII×1 GP-280×1	FURUNO FSN-80	2 sets LCD with DGPS function	2 sets LCD with DGPS function	FURUNO GP-150, 2 sets with DGPS function
Echo Sounder	FURUNO FE-1282	FURUNO FE-824	IMO approved type Range : 400m	IMO approved type Range : 400m	FURUNO FE-700
Doppler Log	FURUNO DS-70	JRC JLN-202	Speed range ; -10.0 to 40.0 kn	Speed range ; -10.0 to 40.0 kn	FURUNO -10.0 to 40.0 kn
Weather Facsimile Receiver	FURUNO FAX-210	FURUNO FAX-14311	Auto channel select. Thermal printing	Auto channel select. Thermal printing	JRC, JAX-91 Thermal printing
MF/HF Radio Telephone	FURUNO 250W, with DSC	JRC, SSB Radio Tel 400W, 1.6-25MHz	IMO approved type with DSC/NBDP	IMO approved type with DSC/NBDP	JRC, JSS-296 with DSC/NBDP
INMARSAT-C	FURUNO FELC.12 with EGC	JRC, Inmarsat-A JUE-35B	For duplicate equip. with EGC	For duplicate equip. with EGC	JRC, JUE-85 with EGC

Ship Name	AL AMIR MOULAY ABDALLAH	CHARIF AL IDRISSI	Projected Vessel (Plan-A)	Projected Vessel (Plan-B)	YOKO MARU
VHF Radio Telephone	FURUNO, 2 sets 25W, 57C with DSC	JRC, 1 set JHV-229, 12ch	2 sets 25W, 57C with DSC	2 sets 25W, 57C with DSC	JRC, 2 sets 25W, 57C with DSC
Inmarsat Fleet Broadband	-----	-----	for Tel, Fax & Data	for Tel, Fax & Data	JRC JUE-500 for Tel, Fax & Data
V-Sat	-----	-----	Ku-band VSAT Internet & e-mail	Ku-band VSAT Internet & e-mail	-----
AIS	-----	-----	IMO Approved Type	IMO Approved Type	FURUNO, FA-150 IMO approved type
Ship LAN System	-----	-----	IPv4 & 5e standards Info. & Data servers, PCs&Printer, UPS,	IPv4 & 5e standards Info. & Data servers, PCs&Printer, UPS,	M. H. I. Info. & Data servers, PCs&Printer, UPS,
Spare Parts Management System	-----	-----	1 set of PC Display&Print of Stock	1 set of PC Display&Print of Stock	JRCS Display&Print of Stock
Bottom Trawl Net	-----	* 2 sets for Fishes * 2 sets for Shrimp	* 2 sets for Fishes * 2 sets for Cephalopods * 2 sets for Shrimp/Hake	* 2 sets for Fishes * 2 sets for Cephalopods * 2 sets for Shrimp/Hake	NICHIMO 1 set
Otter Board for bottom trawl	-----	2 pairs	1 pair for Fishes and Cephalopods 1 pair for Shrimp/Hake	1 pair for Fishes and Cephalopods 1 pair for Shrimp/Hake	Single Type 1 pair
Pelagic Trawl Net	Taito Seiko 1 set	2 sets for Fishes	2 sets for Fishes	2 sets for Fishes	NICHIMO 1 set
Otter Board for pelagic	1 set	2 pairs	1 pair	1 pair	Double Plate(Al) 1 pair
Auto Tension Winch System	-----	-----	Same System as YOKO MARU	Same System as YOKO MARU	NICHIMO/SONIC Auto Tension Winch System
Scanbas System	SCANMER CGM-05	-----	SCANMAR depth/temp, distance trawl speed, trawleye	SCANMAR depth/temp, distance trawl speed, trawleye	SCANMAR depth/temp, distance trawl speed, trawleye
CTD System	Sea Bird SBE 911plus CTD 1) Under water unit SBE9plus*1 a) Option Sensor • Altimeter • DO sensor b) Carousel Water Sampler(SBE-32) c) Sample Bottle 2.5liters*12 2) Deck Unit SBE11plus*1 3) Software	-----	Sea Bird SBE 911plus CTD 1) Under water unit SBE9plus*1 a) Option Sensor • Fluorometer b) Carousel Water Sampler(SBE-32) c) Sample Bottle Rosette 5liters*24 2) Deck Unit SBE11plus*1 3) Software Seasoft [®]	Sea Bird SBE 911plus CTD 1) Under water unit SBE9plus*1 a) Option Sensor • Fluorometer b) Carousel Water Sampler(SBE-32) c) Sample Bottle Rosette 5liters*24 2) Deck Unit SBE11plus*1 3) Software Seasoft [®]	Sea Bird SBE 911plus CTD 1) Under water unit SBE9plus*1 a) Option Sensor • Altimeter(PSA -916D) • DO sensor(SBE43) • Fluorometer (ECO-FL) • Sediment(OBS-3) b) Carousel Water Sampler(SBE-32) c) Sample Bottle Niskin 10liters*12 2) Deck Unit SBE11plus*1 3) Software Seasoft [®]
Alkalinity & Dissolved Inorganic Carbon Extraction	-----	-----	MARIANDA VINDTA 3C	MARIANDA VINDTA 3C	-----

Ship Name	AL AMIR MOULAY ABDALLAH	CHARIF AL IDRISSI	Projected Vessel (Plan-A)	Projected Vessel (Plan-B)	YOKO MARU
OPCS (Optical Particle Counting and Sizing System)	-----	-----	CUFES Continuous Underway Fish Egg Sampler	CUFES Continuous Underway Fish Egg Sampler	Sea-Bird SBE-45 MicroTSG ·Fluorometer (WET-STAR) ·Deck sensor ·Precision thermometer(SBE-38)
Thermometer Salinometer	Digital thermometer	Bathy thermograph Induct. salinometer	Thermosalinometer	Thermosalinometer	TSURUMI XBT/XCTD SYSTEM
Net Sampling System	Plankton net (Ocean Ins.) 0.333/0.145mm mesh with flow meter /depressor	-----	Hydro-Bios MultiNet Type Midi Net opening 0.25m ² 5 net bags with zippers, 150µ mesh both Vertical and Horizontal Collection	Hydro-Bios MultiNet Type Midi Net opening 0.25m ² 5 net bags with zippers, 150µ mesh both Vertical and Horizontal Collection	MOCNESS(BESS) ·1 & 4m ² Net system 1m ² (150µ mesh)×9 4m ² (800µ mesh)×5 ·1m ² Net system 1m ² (150µ mesh)×9
VMPS	-----	-----	-----	-----	TSURUMI Vertical Multiple-opening Plankton Sampler
ADCP (Acoustic Doppler Current Profiler) Vessel Mount Type	ADCP Sunwest SW2000-115 115kHz Water depth 500m Max.128 layer	-----	ADCP T. RD Instruments Ocean Surveyor 150kHz Water depth 375-400m	ADCP T. RD Instruments Ocean Surveyor 150kHz Water depth 375-400m	ADCP T. RD Instruments Ocean Surveyor 38kHz, 150kHz Water depth 300-1,000m Max. 128 layer
LADCP (Lowered ADCP)	-----	-----	T. RD Instruments beam angle 20 deg 4 beams, 64MB M.	T. RD Instruments beam angle 20 deg 4 beams, 64MB M.	-----
Doppler Current Meter	AANDERAA, 3 sets RCM-9 2,000m	TSURUMI MTCM-4	SEAGUARD, 4 sets RCM, 2,000m Option sensor 1) Temperature 2) Conductivity 3) Pressure 4) Turbidity 5) DO	SEAGUARD, 4 sets RCM, 2,000m Option sensor 1) Temperature 2) Conductivity 3) Pressure 4) Turbidity 5) DO	-----
Weather Station	-----	-----	NIPPON ELE. INST. Automatic Weather Observation Station	NIPPON ELE. INST. Automatic Weather Observation Station	NIPPON ELE. INST. Automatic Weather Observation Station
Gyrocompass and Motion sensor	-----	-----	KONGSBERG Seapath 300	KONGSBERG Seapath 300	OCTANS(IXSEA)
Scientific Fish Finder	SIMRAD EK60 38kHz split beam 120kHz split beam	SIMRAD Scientific Sounder System	SIMRAD EK60 18kHz split beam 38kHz split beam 120kHz split beam 200kHz split beam	SIMRAD EK60 18kHz split beam 38kHz split beam 120kHz split beam 200kHz split beam	SIMRAD EK60 18kHz split beam 38kHz split beam 70kHz split beam 120kHz split beam
Scientific Multibeam Sonar	-----	-----	SIMRAD ME70 45 split beam 70-120kHz	SIMRAD ME70 45 split beam 70-120kHz	SIMRAD ME70 45 split beam 70-120kHz
Multibeam echo sounder (seabed mapping)	-----	-----	SIMRAD EM710 70-100kHz Depth 1,500m	SIMRAD EM710 70-100kHz Depth 1,500m	-----
Fish Finding Sonar	FRUNO CSH-53 1-15°CRT 1-Transceiver 1-TDR(50kHz) Range 75-2,000m	FURUNO CH-12 Range 50-1,500m	FURUNO FSV-35 1-CRT 1-Transceiver 1-TDR(24kHz) Range 60-5,000m	FURUNO FSV-35 1-CRT 1-Transceiver 1-TDR(24kHz) Range 60-5,000m	SIMRAD SX90 1-CRT 1-Transceiver 1-TDR(26kHz) Range 50-4,500m

Ship Name	AL AMIR MOULAY ABDALLAH	CHARIF AL IDRISI	Projected Vessel (Plan-A)	Projected Vessel (Plan-B)	YOKO MARU
Synchronous Transmitter	-----	-----	SIMRAD SU16 ADCP, EK60, ME70, EM710, FSV-35	SIMRAD SU16 ADCP, EK60, ME70, EM710, FSV-35	SIMRAD SU16 ADCP, EK60, ME70, SX90
Fish Finder	FURUNO FCV-1500 1-Display unit 1-Transceiver 2-TDR(28/68kHz)	-----	-----	-----	Furuno FCV-1500L 1-Display unit 1-Transceiver 2-TDR(28/88kHz)
Tide Meter	-----	-----	SEAGUARD WLR, 4647C-300m	SEAGUARD WLR, 4647C-300m	-----
Particle Analysis and Imaging	-----	-----	FlowCAM	FlowCAM	FlowCAM
Particle Size Analyzer	-----	-----	Micromeritics SediGraph 5120 Spec 0.1-300µm option 300-2,000µm	Micromeritics SediGraph 5120 Spec 0.1-300µm option 300-2,000µm	-----
Fast Repetition Rate Fluorometer	Turner Designs 10AU Field Fluorometer	-----	Turner Designs 10AU Field Fluorometer	Turner Designs 10AU Field Fluorometer	KIMOTO DF-03
FluoroProbe	-----	-----	-----	-----	BBE FluoroProbe
pH Meter	-----	Portable Type	Portable Type	Portable Type	-----
DO Meter	-----	Portable Type	-----	-----	-----
DO Field Recorder	-----	2 sets	-----	-----	-----
Multiple Corer	-----	Core sampler Gravity type 2 sets	4 transparent PVC tubes	4 transparent PVC tubes	RIGOSHA Core Tube×4 82×400
Bottom Grab	-----	Ekman-Berge type 2 sets	Van Veen Grab Sampler	Van Veen Grab Sampler	-----
Ultra-Pure Water Generator	-----	-----	Aquarius FRU414CA/CB 0.65L/min	Aquarius FRU464CA/CB 0.65L/min	MILLIPORE Direct-Q UV
Reverse osmosis water purifier	-----	-----	Aquarius RFP542HA 25L/h at 25°C	Aquarius RFP742HA 25L/h at 25°C	-----
Sediment Electric Grinder	-----	-----	1 set Precision Grinder	1 set Precision Grinder	not supplied by Shipbuilder
Onboard Sediment Sieving System	-----	-----	1 set	1 set	not supplied by Shipbuilder
Drying Oven	-----	-----	1 set 99ℓ, max. 250°C	1 set 99ℓ, max. 250°C	-----
Sample Storage Freezer	-----	-----	-25°C 365ℓ × 1	-25°C 365ℓ × 1	-20~-30°C 504ℓ × 3 -20~-35°C 540ℓ × 1
Deep Freezer	-45°C, 506ℓ	-----	-86°C, 35ℓ×1	-86°C, 35ℓ×1	-85°C, 86ℓ×1
Medical Refrigerator	-----	-----	100~200ℓ 2 point temp. alarm	100~200ℓ 2 point temp. alarm	+2°C~+14°C 177ℓ×1
Inverted Microscope	-----	-----	Leica DM IL LED 2 sets	Leica DM IL LED 2 sets	not supplied by Shipbuilder
Stereoscopic Microscope	Nikon SMZ645-3 with lamp house, Nikon α photo2 YS2-H with lamp house	OLYMPUS BHT-321, 2 sets	Nikon SMZ 1000, 2 sets Nikon camera benthos Ocular micrometer (10 mm/0,1mm) Monitor TV	Nikon SMZ 1000, 2 sets Nikon camera benthos Ocular micrometer (10 mm/0,1mm) Monitor TV	not supplied by Shipbuilder

Ship Name	AL AMIR MOULAY ABDALLAH	CHARIF AL IDRISI	Projected Vessel (Plan-A)	Projected Vessel (Plan-B)	YOKO MARU
Ichtyometer	1 set 0-50cm	-----	2 sets	2 sets	not supplied by Shipbuilder
Marine Precision Scale	Max. 1,200g 1 set Max. 6,000g 1 set	-----	Max. 800g, 2 sets precision 0.01g	Max. 800g, 2 sets precision 0.01g	not supplied by Shipbuilder
Scale(big)	Max. 50kg 2 sets Max. 20kg 1 set	-----	Max. 60kg, 1 set precision 5g	Max. 60kg, 1 set precision 5g	not supplied by Shipbuilder
Scale(small)	Max. 5kg 1 set	-----	Max. 3kg, 2 sets precision 0.1g	Max. 3kg, 2 sets precision 0.1g	not supplied by Shipbuilder