Proposal of protocolization of oceanographic cruise plan designing

Bachelor's Thesis

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Degree in Nautical Science and Maritime Transport

Barcelona, 08 May 2020

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Abstract

In this project, a template has been created to develop cruise plans in order to organize the logistics of sampling on board oceanographic vessels, regardless of the type of study on which the project is based, being it geology, ichthyology, acoustics, meteorology, cartography, etc.

The template has been made in Word form format, so it is ready to be filled in but it also gives the option to be modified, either to add, remove or develop the sections that are deemed convenient.

To finally get the result of this template, the main actors in the logistics of the campaigns have been identified, who are mainly the ship's crew, the researchers who are going to participate in the cruise and the ship's manager who works in logistics from land, and surveys have been conducted to understand what the needs of each party are.

It should be said that a large part of this study has been based on my own experience on board the oceanographic ship "Ángeles Alvariño", 47 meters long and belonging to the Spanish Institute of Oceanography.

As of the date of this document, it is being considered to use the template for all internal campaigns of the Spanish Institute of Oceanography and a medical form template, also created in this project.

Keywords: oceanography, research, vessel, planning, voyage, cruise, marine, logistics, medical, form, crew, campaign

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LIST OF ABBREVIATIONS

BIOS: Bermuda Institute of Ocean Sciences

CSIC: Consejo Superior de Investigaciones Científicas (Superior Council of Scientific Investigations)

CTD: Conductivity, Temperature, and Depth (referencing the equipment that measures these variables)

IEO: Instituto Español de Oceanografía (Spanish Institute of Oceanography)

IMDG: International Maritime Dangerous Goods Code

IMO: International Maritime Organization

ISM: Instituto Social de la Marina (Navy Social Institute)

MSDS: Material Safety Data Sheet

NOAA: National Oceanic and Atmospheric Administration

R&D: Research and Development

R/V: Research Vessel

ROV: Remote Operated Vehicle

SOCIB: Sistema de Observación Costero de las Islas Baleares (Balearic Islands Coastal Observing and Forecasting System)

SOLAS: Safety of Life at Sea

STCW: Standards of Training, Certification and Watchkeeping

WHOI: Woods Hole Oceanographic Institution

WHO: World Health Organization

1. INTRODUCTION

Marine research often requires scientists to use research vessels to collect field samples and data in the so-called oceanographic or research cruises. Although scientists may be trained for the use of small skiffs, research onboard large vessels require a full crew team specialized in the use of boats for research purposes. The lack of communication between scientists and the boat crew often frustrates the coordination of personnel and slows down the preparation of material. Therefore, good cruise planning is essential to improve communication between scientists and crew members and to meet the research goals.

A cruise plan is a document used to formalize the cruise logistics, including the scheduled route and a list of participating people and required equipment. During my training rotations on board the research vessel Ángeles Alvariño, a researcher of the "Tunibal 2019" campaign and I discussed that current cruise plans in our institution (IEO) are not standardized and fail to strike a fluent communication between scientists and crew members.

From my viewpoint as a crew member, finding key information was difficult due to the use of scientific jargon and excessive information that was unnecessary for the crew members. From his viewpoint as a scientist, keeping laboratory protocols and other scientific information was necessary as a working guideline to all other scientists participating in the cruise. He also had the feeling that, some sections were too extensive and unnecessary for everyone, but keeping them in the cruise plan was mandatory due to the bureaucratic procedures.

Indeed, the lack of standardization in the design of a cruise plan leads chief scientists to copy and edit previous documents without a clear understanding of which pieces of information are necessary for the crew members. This conversation stimulated the idea of doing a study to identify key information that is necessary to include in the cruise plan.

The goal of this study is to unify criteria among scientists, crew members and administrative assistants involved in the research campaign. Using this information, I hereby propose a template to standardize cruise plans attending the needs of all parts involved in a research campaign.

The procedures of this project are in compliance with the Guidelines for Voyage Planning (Resolution A.893(21) adopted on 25 November 1999 by the IMO).

2. AIMS AND OBJECTIVES

This project aims to protocol the oceanographic cruise plan designing in order to maximize operational functionality during the development phases of on-board sampling work.

The expected result of this study is to create an ideal cruise plan template which should contain:

- In one hand, unified criteria from crew, scientific and administrative staff, about what should be written in order to be useful for all the interested parties,
- On the other hand, it should be a document that helps keeping in mind all the summarized logistic details
- And finally, which may be a writing that certifies, once approved by the managers of each concerned part, that the cruise is going to be carried out following the instructions stated in the document.

Specific objectives

- Identify the actors involved in oceanographic cruises and the tasks of everyone.
- Detect how information flow in the logistics of an oceanographic campaign from start to finish.
- Identify what objectives should the cruise plan meet and what information should contain through surveys and interviews with key actors.
- Design a generic cruise plan template.
- Design a specific cruise plan template for the Research Vessel “Ángeles Alvariño”.

3. METHODOLOGY

In order to reach the objective of obtaining a template with unified criteria that is useful for crew, scientific and administrative staff, first I identified the key actors in the oceanographic cruise map and the principal procedures that are carried out in the program.

It would not be possible to identify the document requirements without understanding how an oceanographic project work, from the time that the project is assigned to a specific group of scientists until what it is done after collecting the samples and data on board.

On the other hand, I analyzed a wide list of real previous cruise plans from the "Instituto Español de Oceanografía" as well as several cruise plans templates from other institutions around the world. This part of the study seeks to identify and put all the information that can be included in a cruise plan together and classified it into general sections.

From this point, a comparative statistic has been made between all of them that allows us to know what information is included in each cruise plan of each institution, this is the frequency of each section.

Another way of knowing what objectives the cruise plan should meet and what are the requirements to design an optimal template I made a poll survey asking for the opinion and needs of people from crew, scientific and administrative staff from different institutions in different countries.

3.1. Oceanographic cruises global frame

In this section, a global understanding of the tasks that are necessary to carry out a cruise and the required logistical procedures for the development of marine research projects are explained.

3.1.1. Key actors in oceanographic cruises

Each institution has different departments and different ways of organizing their logistics, but the main three key actors, representing their work group as head of department on the oceanographic cruise map are:

- The chief scientist
- The fleet manager
- The captain

- **Chief Scientist**

The chief scientist is the designated person to direct a specific survey. When we talk about oceanographic campaigns, he or she is the responsible for organizing the cruise in the aspects from a scientific insight, but when we talk about the project itself, usually is also in charge of the survey land base work. Below are the most important tasks divided into 3 parts: before boarding, during the field survey and after boarding.

Before the cruise, the tasks of the chief scientist include the identification of the phenomenon or problem under study, the description of the study to be carried out and making sure that the study meets the project requirements. The chief scientist is also in charge of the bureaucracy papers like the ship time

request, economic and administrative management, the assignment and preparation of the hiring of personnel and writing the cruise plan.

During the cruise, the chief scientist will oversee all the activities that are carried out and giving the pertinent instructions to the scientific team. He or she will have meetings with the ship's captain to give any new indications and comment the current status of the survey.

Once the cruise is finished, the chief scientist is also responsible for making a report of the work that has been carried out on board, the data obtained and the assessment of the cruise, as well as of the organization of the subsequent study of the samples.

- **Fleet manager**

The fleet manager is the maximum responsible of the institution's fleet management department.

Its main tasks include the assignment and distribution of economic and personnel resources, the organization of the cruise with the chief scientist, the organization and distribution of materials and equipment between ships and warehouses of the institution and the coordination of everything related to the ship’s activity.

During the preparation of the cruise, the fleet manager is the first one interested in receiving the cruise plan in order to organize the calendar of each vessel and to request the corresponding permits. He will be in charge to approve, together with the captain, that the requested activities are feasible to do on board.

- **Captain**

The captain, before the cruise, will check the viability of the attempted activities and will approve the programmed tasks, always being subject to weather conditions.

He or she has the main responsibility for the proper functioning of the ship, so that all scheduled activities can be carried out safely and effectively. For this, different watches and work shifts among the crew will be assigned depending on the needs of the scientific personnel, especially among sailors and technicians, and the maneuvers and use of equipment will be supervised to be carried out correctly. The good maintenance of the ship must be ensured and all applicable regulations regarding maritime safety, pollution prevention and prevention of occupational hazards, among others, must comply.

The captain will also be responsible for making a daily report of situation and activity to the vessel’s managers and for generating all the necessary documentation for the entrances and exits of port, boarding periods certificates for the scientific personnel, employing and unemploying the crew in front of the Maritime Authority and of managing the ship's resources.

Being the highest authority on board, the captain will have the last word when deciding whether an activity can be carried out or not and will have the power to expel any member on board who fails the safety and coexistence rules.

3.1.2. Main procedures in Oceanographic Cruises organization

The key for a success cruise lays, in great measure, in the planning stages. They require a lot of time, good communication and a good analysis to all details.

Even though each vessel or institution has their own procedure, the main aspects of cruise logistics, ordered chronologically by a general timeline, are detailed below.

- **Ship time request**

  This is the first step once the project is assigned and consist of a document which contains a preliminary information about the cruise, such as the description of the survey, objectives, dates, working area, materials needed, etc.

- **Legal documentation**

  In the event that the cruise work area includes foreign territorial zones, it would be necessary to request a permit in advance. Ideally, it is recommended to request it 12 months before the start of the cruise and at least 6 months before, but it depends on the country issuing it. This process is usually slow and without it the vessel could not work.

  Other legal aspects derived from this could be the need to embark foreign observers or share information, or the particularities of waste management on board the ports of destination (e.g. Antarctic waters or nature reserves).

  The conditions of transport and storage of the cruise material prior to embarkation should also be foreseen, since it will usually arrive at the port of call in advance. These aspects should be discussed with local transport agencies (e.g. frozen material).

  As for the staff, it is important to verify that all personnel have all necessary permits, insurance and certificates prior to boarding.

  Finally, it would be necessary to send and sign all the documents and forms required by the ship's managing institution.

- **Cruise Plan**

  This document is a guide for the development of the cruise. It should inform and be approved by all the parts involved (crew, managers and scientists) and in it, it should appear the summary of all the logistical aspects of the cruise and the intentional procedures to follow on board.

  In the following sections of this project, the description of the cruise plan will be detailed.

- **Cruise Report**

  In oceanographic campaigns financed by a public organism, it will be mandatory to submit a cruise report within a maximum period after the end of the campaign agreed by each organism.

  This report should include the basic information of the cruise, track, position of sampling stations, measured variables, participating personnel, expected results and incidents. It will also include the list of metadata collected during the campaign.

- **Transfer of data and metadata**

  Regarding the privacy of the data generated, it is possible to differentiate between two main groups: public financing campaigns and private financing campaigns.

  In the case of private campaigns, the data will be exclusively shared within the company.

  In the case of publicly funded campaigns, all data must be accessible to any interested person. As an example, in the Spanish system, the transfer of data will be carried out as follows:

  - Cruise report (Maximum 3 months from the end of the cruise).
  - Basic data acquired automatically during the cruise (Shared tco data servers immediately).
  - Data generated by the scientific staff (Term of 4 years from the end of the cruise).
  - Bathymetry data acquired through a multibeam probe (may be used by the vessel's operator for safety and operational issues without prior consultation with the researchers)

- **Publications derived from the cruises**

  In publications, master's thesis or doctoral thesis generated with data obtained in oceanographic campaigns financed by a public organism, explicit mention should be made of the vessel used, in addition to mentioning the funding agency and the specific project. A copy of the published documents must be also sent to the vessel's operator institution.

  Each operator will keep updated a record of R&D actions of each vessel, in which all publications or results obtained in projects developed on board will be collected.

3.2. Analysis of previous cruise plans

To carry out this study, an analysis of various cruise plans from previous years and from various national and international institutions has been made. The analysis consisted of examining carefully what information is included in these documents.

In the first place, more than 50 cruise plans from the Spanish Oceanography Institute published between 2017 and 2019 were analyzed, 20 of them corresponding to different projects and carried out in different ships. The other 30 correspond to projects that are repeated more than once a year and therefore have the same format.

Cruise plan templates from other institutions, both from Spain and other countries, have also been analyzed.

The following table is showing, in the upper part, the projects from which the previous IEO cruise plans have been analyzed and in the lower part, the cruise plan templates from other institutions examined.

Instituto Español de Oceanografía (IEO)	FAUCES	INTEMARES 1	RADMED	CANZEC
	PLOCAN	INTEMARES 2	TUNIBAL	CEIMARNET
	RAPROCAN	ISUNPECA	CARTAS-SUB	RADIALES
	STOCA	NUREIEVA-MAR	PECAN	IBERAS
	VULCANA	NERJA	RADCAN	INPULSE
Other institutions	Balearic Islands Coastal Observing and Forecasting System (SOCIB)	Woods Hole Oceanographic Institution (WHOI)	Lamont -Doherty Earth Observatory, Columbia University	
	National Oceanic and Atmospheric Administration (NOAA)	Scripps Institution of Oceanography	Bermuda Institute of Ocean Sciences (BIOS)	
	Oregon State University	Rosenstiel School of Marine and Atmospheric Science, Miami University	School of Oceanography, University of Washington	

Table 1. Previous cruise plans and cruise plan templates analyzed

With this comparison of campaign plans it has been possible to have a global vision of what information these documents contain and in what different ways it can be found. In section 3.2.1. the result of the comparison is presented.

3.2.1. Sections analyzed

After having read all the previous cruise plans exposed in section 3.2, the information contained has been classified into 8 general topics, which are described from 3.2.1.1 to 3.2.1.8, and these ones are, at the same time, subdivided into more specific aspects and that are described below.

3.2.1.1. Timeline control

Document control

This section gives reference to a way of having a control of the dates of edition of the document, by whom was it edited, the dates of approval of the document and by whom was it revised.

It can include various editors and supervisors and it can also refer to the cruise plan document itself or either to the whole process of the campaign managing

3.2.1.2. Overview

Data sheet

On the data sheet, the general information about the campaign can be found. This information can include, but it is not limited to:

- Name of the campaign
- Name of the project in which the campaign is framed
- Chief scientist's name
- Working area
- Working period of time
- Name of the vessel
- Start, end and intermediate ports
- Brief description of the objectives
- Number in scientific party and technicians
- If it has activities to be developed in foreign waters
- External financing projects involved
- Cruise number on the project historical series

3.2.1.3. Staff

Scientific Staff Management

In every cruise it is compulsory to declare a list of the people on board, both crew and passengers to the port authorities (the scientific party is considered to be passengers as they are not enrolled to the vessel). This is why this section it's a must in every cruise campaign.

This section is also important for the crew to prepare in advance all the logistics regarding berthing, working logistics and special diets.

The information showed here can include:

- Name and surnames
- Gender
- Identity document number
- Affiliation
- Role on board
- Contact details (Phone number, email and emergency phone number)
- Working dates
- Working shift
- Meal shift
- Berthing
- Comments[1]

[1] Intolerances, allergies, if the person is vegetarian or vegan or any other kind of comment which is relevant for the campaign

Medical form

In case of any injury or illness, a medical advice will be requested by the crew members through the radio station.

This form is intended for member's self-protection at sea, by having their medical history quickly available, for example in case of the person is unconscious or unable to talk over the radio.

An example of medical form is showed in the Appendix III

Crew expertise information

There is some equipment on board research vessels which require expertise technicians, such us ROV (Remotely Operated Vehicle) operator, sounding technicians, computer and data managers, electronic technicians, etc.

It is always useful for the scientific party to know what services they will have on board, what equipment they will have to operate and what equipment will be operated by the vessel's crew. In the same way it is necessary for the vessel's operation manager to know what crew personnel will be needed for the campaign.

Administrative management

As well as the scientific party and crew expertise list, it is also analyzed which institutions had the administrative points of contact on its cruise plans, mentioning the different departments to which each information must be referred.

3.2.1.4. Legal

Responsibilities on board, liabilities and assumption of risks

In this section the responsibilities that the main actors of the campaign have, mainly being the chief scientist and the Captain, are considered.

It is also stablished the liabilities per contract that each institution holds.

Disposition of data and reports

This section refers to the privacy of the data obtained during the campaigns and the reports resulting on the cruise.

Billing information

It is also analyzed how many of the institutions include the billing information in their cruise plan (name, address, city, state, zip, phone and account number).

Export controlled items

Some countries have export control laws, which are federal regulations that control the conditions under which certain information, technologies, and commodities can be transmitted or shipped overseas.

Items which may require a license for export, for example, in the US would be night vision goggles, inertial navigational systems, transponders, ROV's, etc.

3.2.1.5. Safety

Safety on board

It is analyzed if the cruise plans include aspects regarding the safety on board.

3.2.1.6. Operations

Timeline

Tentative planning by days or/and hours, showing the activities to be developed.

Itinerary

Working area either in general terms or by detailed waypoints.

Operations to be conducted

Detailed explanation of the activities to be done onboard. As example of activities we can mention the collection of fish, CTD measures, dredge operations, etc.

Scientific technical instructions

Very specific description of the methods used on each activity, oriented to the scientific members, such as how the samples are going to be labeled, with what product are they going to be preserved, etc.

3.2.1.7. Equipment

Equipment provided by the ship

Here the equipment belonging to the vessel's infrastructure, which is going to be used during the campaign, is specified. It can be material which is already onboard or even other equipment that is required by the scientists and the vessel's operator will reserve and will bring to the vessel for the dates selected.

Equipment provided by scientists

In this section, the equipment and materials which the scientific party is going to load for the campaign is detailed. Normally these are divided into:

- Inventoriable material: Understood as the one that does not suffer a rapid deterioration due to its use, such as microscopes and computers, amongst others. Usually they are declared by boxes.
- Consumables: Understood as the ones that cannot be used properly to their nature without consuming them, such as distilled water. Usually they are declared by boxes.
- Heavy loads: Big weights such as containers and heavy equipment

Hazardous materials

A hazardous material is any item or agent (biological, chemical, radiological, and/or physical), which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.

The IMO shipper's declaration form is mandatory for shipments of dangerous goods by sea under the International Maritime Organization regulations, as stated in the following paragraph from SOLAS Chapter VII.

"Each ship carrying dangerous goods in packaged form shall have a special list or manifest setting forth, in accordance with the classification set out in the IMDG Code, the dangerous goods on board and the location thereof. A detailed stowage plan, which identifies by class and sets out the location of all dangerous goods on board, may be used in place of such a special list or manifest. A copy of one of these documents shall be made available before departure to the person or organization designated by the port State authority." [2]

And this is also applicable to the solid and liquid dangerous goods transported in bulk.

Therefore, it is compulsory to send a complete list of dangerous items by name and quantity, MSDS and appropriate spill cleanup materials in adequate amounts.

The list of dangerous goods can be found in the IMDG code.

Communications

If scientists are going to need communications to land or to other vessels during the course of the campaign, in this section it is specified.

3.2.1.8. Meetings

Meetings

In this section, the meetings which are going to take place are specified. They can be face-to-face meetings, by phone or any other calling technologies.

Normally, the principal meetings which are hold during all the process of the campaign, from the ship time request to the last bureaucracy after the cruise, are:

- The pre-cruise meeting, when all the aspects regarding the organization of the campaign are discussed.
- The safety and coexistence meeting, held on the vessel, as soon as all the campaign participants are onboard.
- The post-cruise meeting, where the progress of the campaign is evaluated and the aspects to improve are commented.

[2] *SOLAS Chapter VII, Part A, Regulation 4, Paragraph 5.*

3.2.2. Statistical Results

The next step of the study, once classified all the information contained in the previous cruise plans from general groups to more detailed aspects, as exposed in section 3.2.1, and in order to analyze the frequency of the sections, an Excel matrix has been created. By frequency we mean the number of times that a section is found in a cruise plan divided by the number of cruise plans analyzed.

In this matrix the rows correspond to all the identified contents and the columns correspond to the institution that has been considered. It is made up of ones and zeros, where the "1" indicates that the section is included in the cruise plan of that institution and the "0" indicates that it is not included. Each one of the columns has been prepared by an average of all the cruise plans examined from that institution, with IEO being the one that contains the most copies.

As we can see in Figure 2, all the analyzed cruise plans coincide in including in the document the *itinerary* and the *operations to be conducted*, and together with the *timeline*, the *equipment provided by the ship* (both present in the 80% of the samples) and the *objectives*, *scientific staff management, equipment provided by the scientists* and *hazardous materials* (with a frequency of a 70%), are the most important sections according to the institutions studied. Half of the cruise plans include some information about the *document control*, *summary of the cruise* and *communications*, while the rest of the contents are minority.

In general terms, we can see that that the fundamental aspects of cruise planning are: what is going to be done and where, what material is required and who is going to take part in the cruise.

In Figure 1 it should be noticed that while within the staff management section, the scientific staff list has a frequency of 80%, very little institutions make reference to the administration management or the crew expertize information, meaning that, for example, it is not known what kind of technicians will be on board and how many hours a day are they available.

		FREQUENCY
Staff management	Scientific staff list	80%
	Medical forms and emergency contacts	20%
	Crew expertise information	20%
	Administrative contacts and addresses	30%

Table 2. "Staff management" section frequency in cruise plans

Another remarkable feature of Figure 1 is that within the cruise plan templates analyzed, only the fifth part of them pay special attention to legal and safety aspects and specify the meetings that are going to take place.

		FREQUENCY
Legal	Responsibilities, liabilities and risks	20%
	Disposition of Data and Reports	20%
	Billing information	20%
	Export controlled items	20%
Safety	Safety on board	20%
Meetings	Meetings	20%

Table 3. “Legal”, “Safety” and “Meetings” sections frequency in cruise plans

But that doesn’t mean that they do not care about that aspects. In some institutions, like the Lamont - Doherty Earth Observatory from Columbia University or the Scripps Research Institute, they organize the logistics of the cruise in several documents and forms which are available in their webpage, so they cover all the contents but not all of them are incorporated in the cruise plan. It is also common to have a science support plan were the specifications of the ship, the policies and the life on board coexistence rules are detailed.

It also should be highlighted the fact that when the operations to be conducted on board are described, almost all of them expose the timeline, itinerary and the description of the operations; only the 10% of them don’t include the timeline because they consider that just having the work area, the sampling order will be improvised depending on the weather or the scientific preferences, amongst other factors.

On the other hand, only 30% of the cruise plans detail scientific technical instructions, including in detail all the protocols to be followed in each sampling activity using scientific jargon, such as the chemical protocol used for the calibration of the oxygen sensor of their instruments or how to differentiate the gender of a fish. For them, it’s useful to have this information in hand even if it is mixed with all the other contents and the crew doesn’t understand it, while in contrast the remaining 60% consider that this technical information can be managed separately.

		FREQUENCY
Operations	Timeline	90%
	Itinerary	100%
	Description of the operations	100%
	Scientific technical instructions	30%

Table 4. “Operations” section frequency in cruise plans

In conclusion, we can see that all cruise plans follow a similar pattern and that the main sections are repeated continuously but that all of them have a different way of structuring the document and different perception about what information must be included in the cruise plan and which contents should be managed apart.

		IEO	SOCIB	NOAA	OREGON	WOODS	MIAMI	UW	SCRIPPS	BIOS	COLUMBIA	FREQUENCY
Timeline control	**Document control**	0	1	1	1	0	1	0	0	0	1	50%
Overview	**Summary**	1	0	1	1	0	0	0	1	0	1	50%
	Objectives	1	1	1	0	1	1	0	1	1	1	80%
Staff	**Scientific staff list**	1	1	1	1	0	0	1	1	1	1	80%
	Medical forms and emergency contacts	0	0	1	0	0	0	0	0	0	1	20%
	Crew expertise information	0	0	0	0	0	0	0	0	1	1	20%
	Administrative contacts and addresses	0	0	1	0	0	0	1	0	0	1	30%
Legal	**Responsibilities, liabilities and risks**	0	0	1	0	0	0	0	0	0	1	20%
	Disposition of Data and Reports	0	0	1	0	0	0	0	0	0	1	20%
	Billing information	0	0	0	1	0	0	0	0	1	0	20%
	Export controlled items	0	0	0	0	0	1	0	0	0	1	20%
Safety	**Safety on board**	0	0	1	0	0	0	0	0	0	1	20%
Operations	**Timeline**	1	1	1	0	1	1	1	1	1	1	90%
	Itinerary	1	1	1	1	1	1	1	1	1	1	100%
	Description of the operations	1	1	1	1	1	1	1	1	1	1	100%
	Scientific technical instructions	1	1	0	0	0	0	0	0	0	1	30%
Equipment	**Equipment provided by the ship**	1	1	1	1	1	1	1	0	1	1	90%
	Equipment provided by scientists	1	1	1	1	0	1	1	0	1	1	80%
	Hazardous materials	1	0	1	1	1	1	1	0	1	1	80%
	Communications	0	0	1	1	1	0	1	0	0	1	50%
Meetings	**Meetings**	0	0	1	0	1	0	0	0	0	0	20%

Figure 1. Global Cruise Plans Matrix

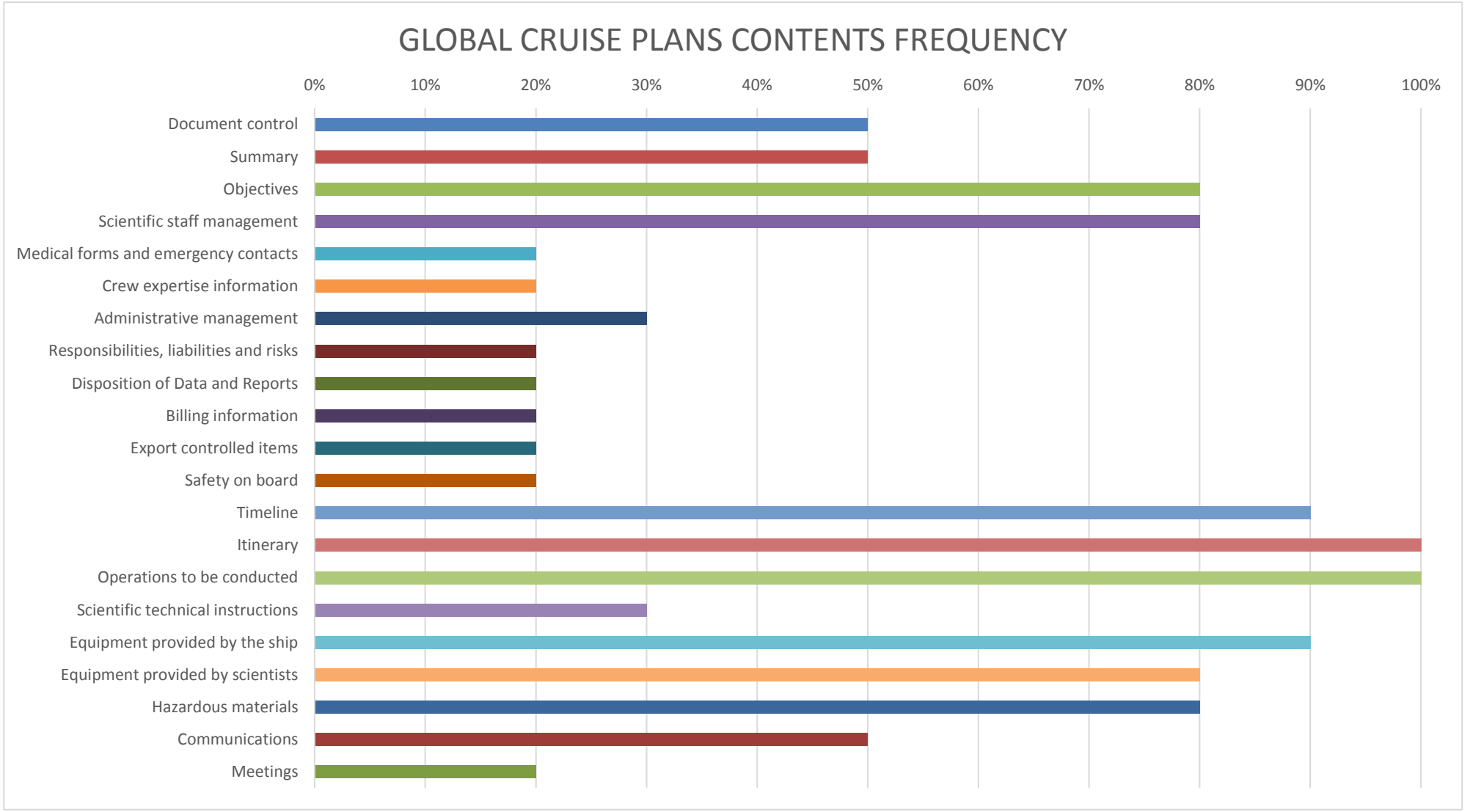

Figure 2. Sections frequency in Global Cruise Plans Chart

3.3. Surveys and Interviews

After a deep study of the cruise plan contents, it was really important to know the opinion of the individuals who really use this document to detect their needs and evaluate if the current models could be improved.

In order to do so, a survey in google forms was sent to scientists, crew and administrative staff from institutions in different countries.

The questions included in the poll were:

	QUESTION	ANSWER
1- Cruise Plan objective	What do you think should be the general objective of the "cruise plan" document?	Open answer
2- Importance of each section	Select from 1 to 5 how important is it to you to include the following topics on a cruise plan:	5 point rating scale on: 1- Document control 2- General information of the campaign 3- Work schedule and itinerary 4- Detailed technical information of the operations to be carried out 5- Vessel's equipment and infrastructures required 6- Materials and equipment to be provided by the scientific staff 7- Scientific participants list 8- Crew technicians list 9- Safety on board 10- Legal aspects 11- Meetings
3- Information distribution	Do you think that all previously valued information should be included in a single document called "cruise plan"?	Multiple choice: • Yes • No, I think it's better to distribute them in different documents • Other (specify)
4- Document audience	To whom do you think that the cruise plan is addressed?	Multiple choice: • It must be an equally useful document for all interested parties

		• It is more addressed to the scientific staff • It must be a summary document focused on informing the crew and vessel's manager
5- Pages extension	What extension do you think a cruise plan should have?	Multiple choice: • 1 to 10 pages • 10 to 20 pages • 20 to 30 pages • 30 to 40 pages • 40 to 50 pages • More than 50 pages
6- Document access	Who do you think should have access to the cruise plan?	Multiple choice: • Everyone involved • The head of each department • Others (specify)
7- Additional comments	If you think that any important section is missing or you have any additional comments, please write it here	Open answer

Table 5. Contained questions and answers in the "Cruise Plan Designing" poll

After obtaining 35 answers from people working in institutions from Saudi Arabia, Greece, Italy, USA, Spain, Norway and Australia the results were extrapolated to excel and a dynamic chart was created in order to analyze the answers filtering them by country, institution and profession.

The resulting statistics, graphs and conclusions are presented below.

3.3.1. Cruise Plan objective

Taking a look into the answers of *"What do you think should be the general objective of the "cruise plan" document?"* we can analyze the different opinions and get a conclusion on what objective should have this document in order to meet all the participants expectations.

For scientists with less experience the main objective of the document would be to clearly define the tasks and roles of each team member on board, including the location of stations and schedule, sampling procedures, etc. Some other points expressed to have a big importance are the need to clarify the technical needs that scientists will require in the cruise by informing crew personnel of the apologia of the oceanographic operations to carry be carried out and to give details to the manning and the administration staff about the people who will assist in the campaign and the general characteristics of the cruise.

A curious data observed is that some of the chief scientists, who are in fact responsible for writing the cruise plan, think that the important thing is to include all the information related to the pre-cruise, cruise and post cruise stage where the ship is meant to be the infrastructure, while others reckon that the cruise plan should be a summarized document carrying only the essential information about the onboard fieldwork.

On the other hand, for people in charge of the vessel's administration, amongst which we can find fleet managers, the general insight of the document objective is to indicate the operations to be carried out in the cruise in order to manage human and technical resources in the best possible way

Finally, for crew, the main point of the cruise plan would be simply to give information to all the involved parties of the work to be carried out in the cruise.

Putting all the opinions together and summing up, we can conclude that in order to meet with the document objective expectations of everyone, the cruise plan should:

1- Indicate the survey characteristics and technical needs
2- Ensure that everyone is clear about what the objectives of the cruise are and what their functions and tasks are, including crew.
3- Specify who, where and when is going to work in the survey

3.3.2. Importance of different cruise plan sections

In this part of the survey, we wanted to know how important it was for the survey participants to include the aforementioned topics or sections in the cruise plan letting them score from 1 to 5, 1 meaning unnecessary and 5 very important.

The results are shown in next pages **Figure 3** and **Figure 4**.

Among the total scoring results stand out the sections "General information of the campaign" and "Vessels' equipment and infrastructures required" with the highest scores and the sections "Legal aspects" and "Meetings" with the lowest.

What turns out being curious is that any of the sections got a score below 3, meaning that all of the mentioned topics are meant to be useful for the 100% of the respondents, however in less than half of the cruise plan templates analyzed included all these topics.

If we take a look to the next chart, we can observe that there is in fact some remarkable differences in a few sections scoring between professions.

As expected, crew members are the ones that give more importance to the work schedule and itinerary and less importance to the detailed technical information of the operations to be carried out, being this last one only of significant importance to scientists.

Administration staff are the ones who pay much more attention than anyone else to safety on board maybe because it is not under their control what it can happen during the cruise but it is their responsibility to ensure that the required standards are accomplished and they can do it through a "safety on board" written statement and good procedures to be followed in order to maintain high safety standards. If a problem surges fruit of the measures not being complied with, he or she would be covered.

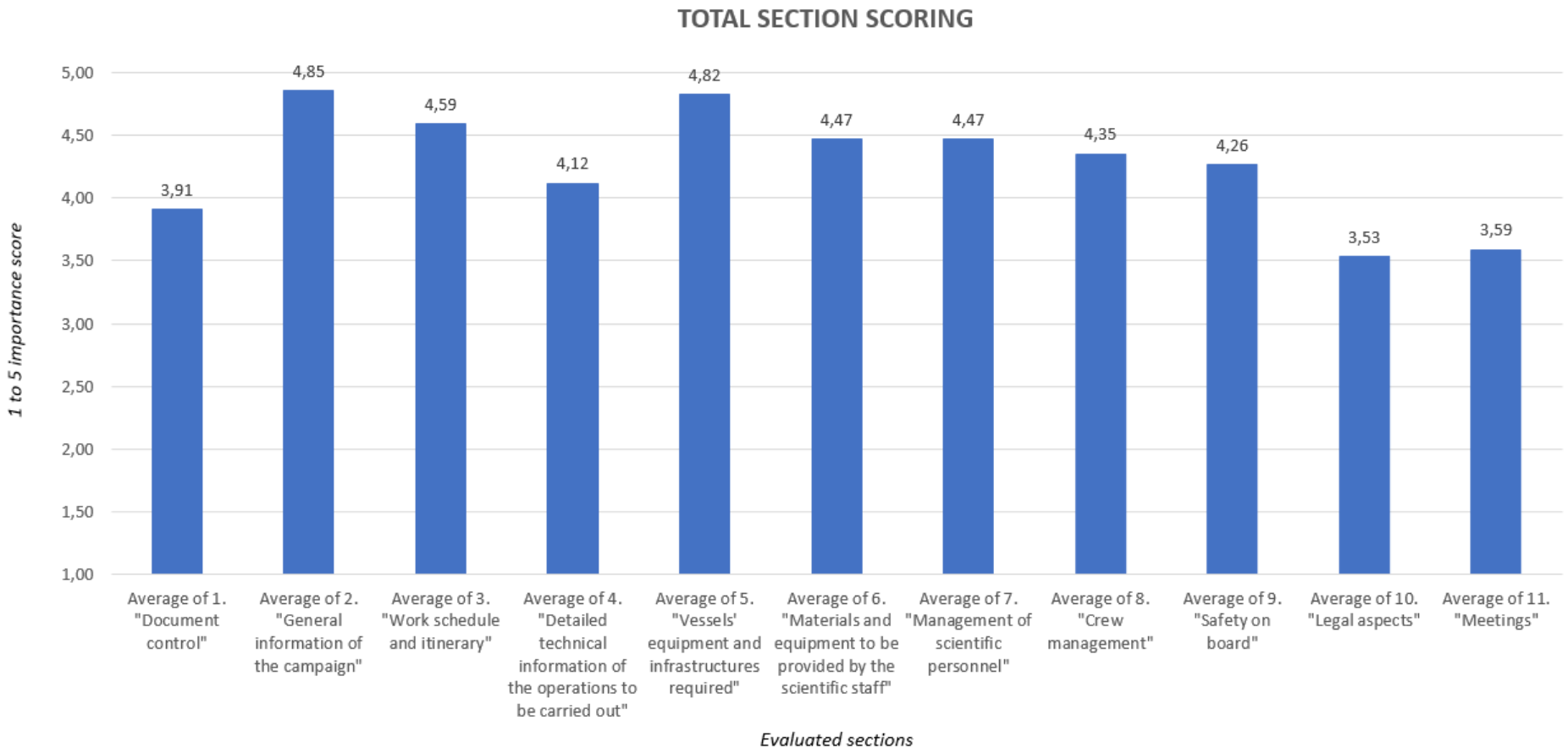

Figure 3. Cruise Plan section scoring

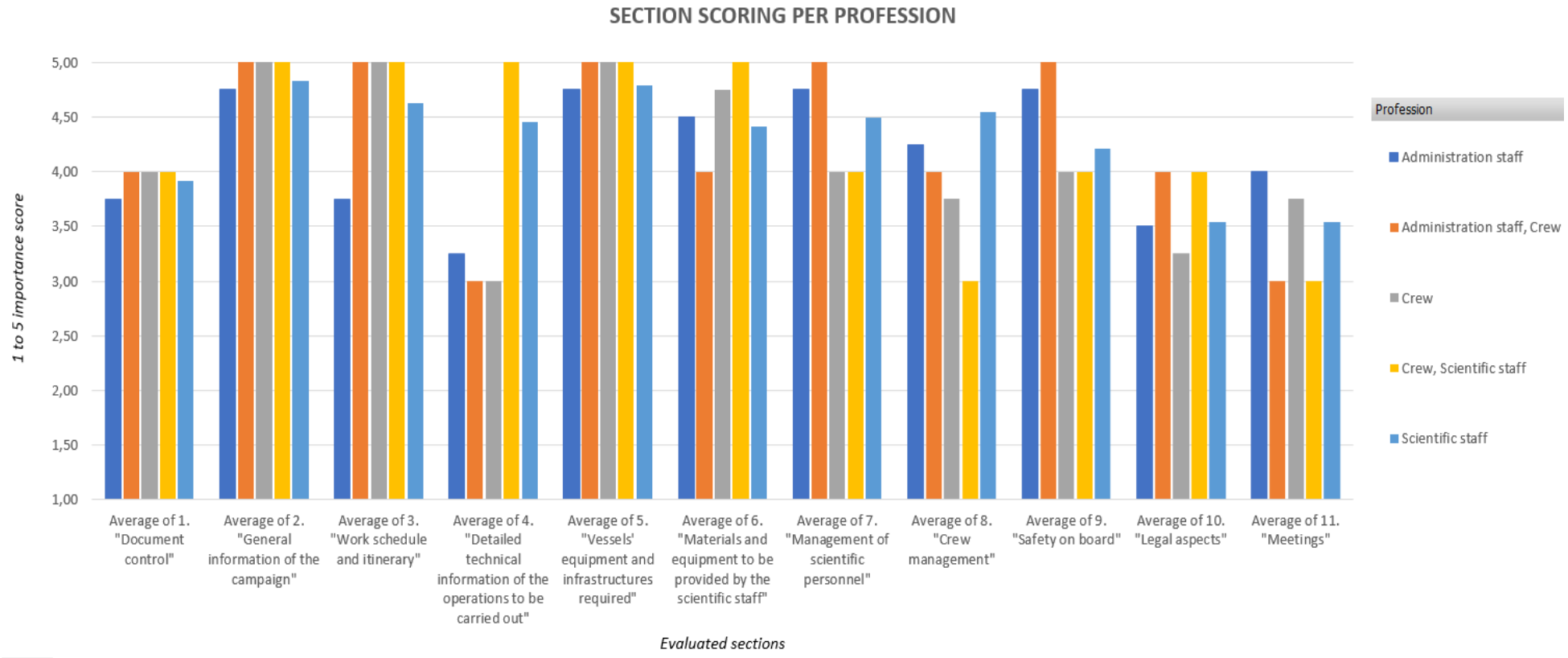

Figure 4. Cruise Plan section scoring per profession

3.3.3. Information distribution

Here we can find out what do participants think about how the different topics should be treated by answering the question: *"Do you think that all previously valued information should be included in a single document called "cruise plan"?"*

As we can see in the pie graphs below, the 65% of the total participants opine that all the information previously scored should be included in the cruise plan, while the remaining 35% consider that some of the sections should be treated in separate documents.

It can also be seen that, surprisingly, there are quite mixed opinions between scientists and managers as the latter prefer to wrap everything in a single document and the former prefer to do it separately.

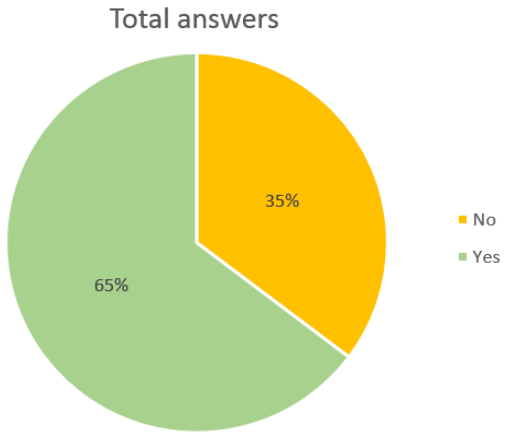

Figure 5. Information distribution total answers

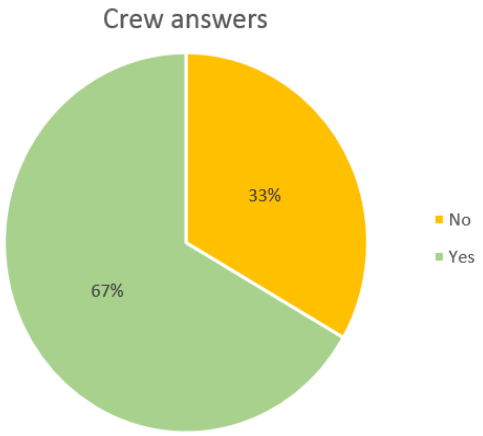

Figure 7. Information distribution crew answers

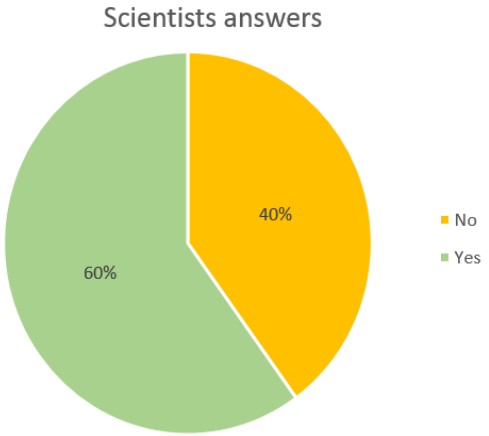

Figure 6. Information distribution scientists' answers

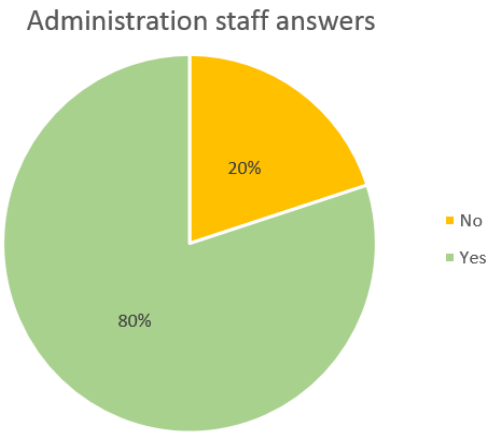

Figure 8. Information distribution administration staff answers

So, in general, it can be concluded that what works best for most is to place all the information in one document and if it is done separately, sections Safety on board and Legal aspects issues could be included in different documents provided by the R/V staff or Vessel's manager.

3.3.4. Document audience

If we analyze *"To whom do you think that the cruise plan is addressed?"* we can find out that the vast majority of the participants recognize the cruise plan to be an equally useful document for all the interested parties, noticing a little difference between administration staff or crew and scientific staff, since some of the first mentioned group believe that it must be a summary document focused on giving just the information that they require.

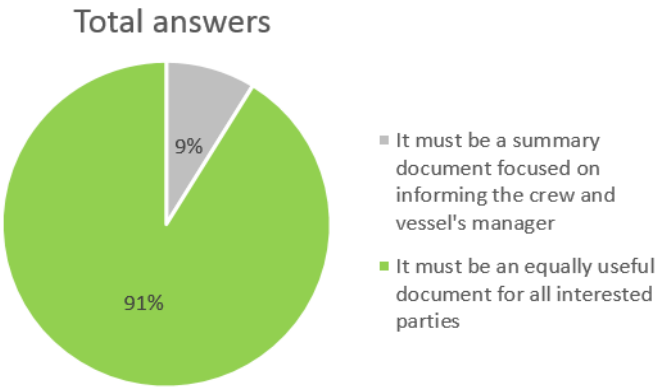

Figure 9. Information audience total answers

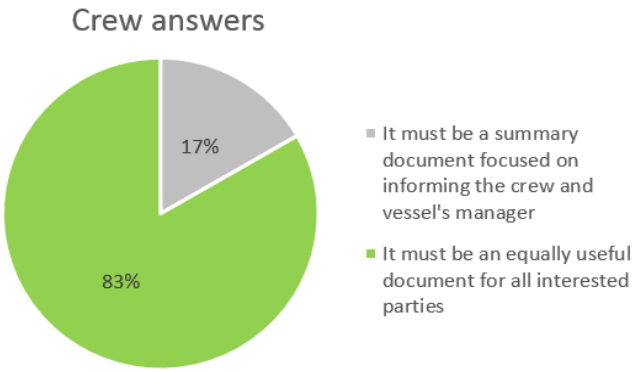

Figure 11. Information audience crew answers

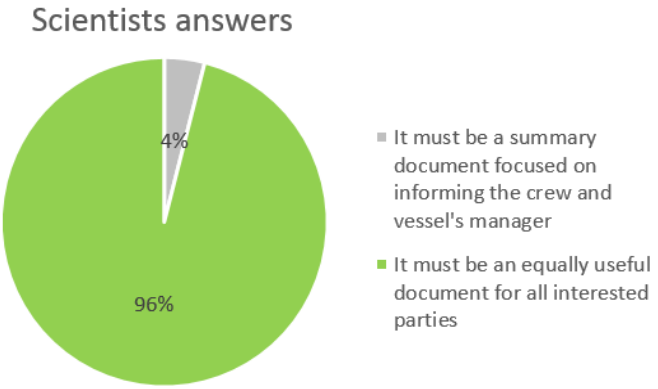

Figure 10. Information audience scientists' answers

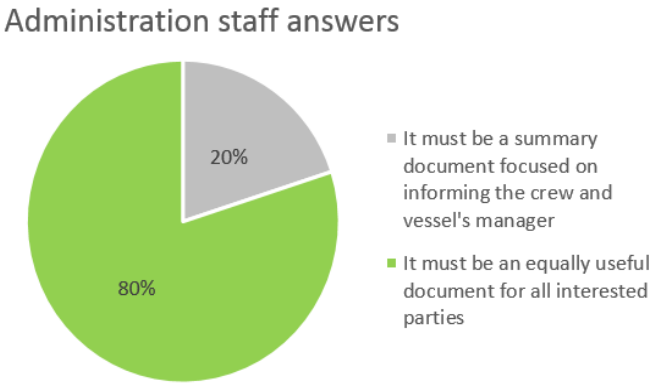

Figure 12. Information audience administration staff answers

From this part of the survey we can clearly assume that the cruise plan should inform everyone involved.

3.3.5. Pages extension

In this point we asked the question *"What extension do you think a cruise plan should have?"* and the obtained answers are shown below.

As it is logical to think, crew members are the first ones interested in receiving short cruise plans, insomuch as excluding technicians, most of them do not need lots of details to carry out their tasks effectively.

On the other hand, since the interviewed scientists are part of different lines of research that have different needs, we find more variety in their answers, with approximately half of those who think that the cruise plan should occupy between 10 and 20 pages and the other half that goes from 1 to 10 to 30-40 pages.

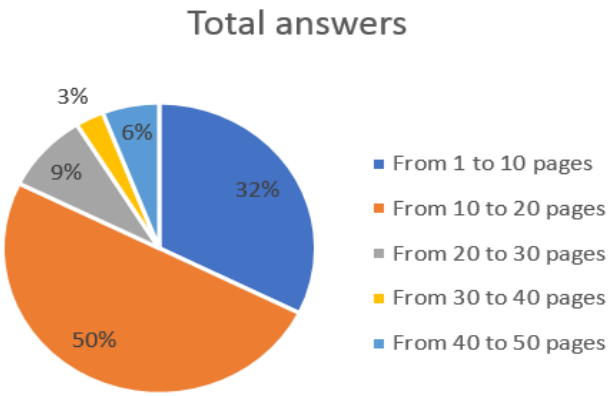

Figure 13. Cruise Plan extension total answers

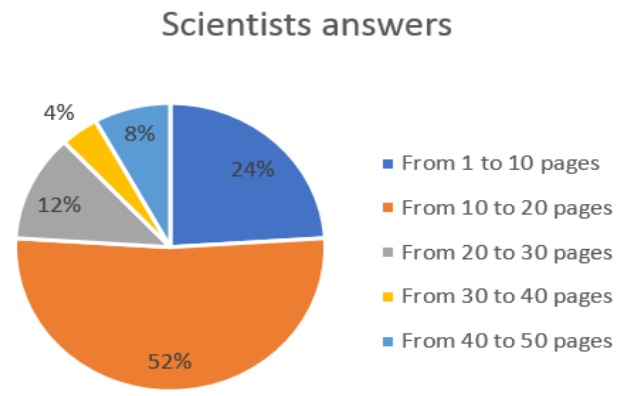

Figure 15. Cruise Plan extension scientists' answers

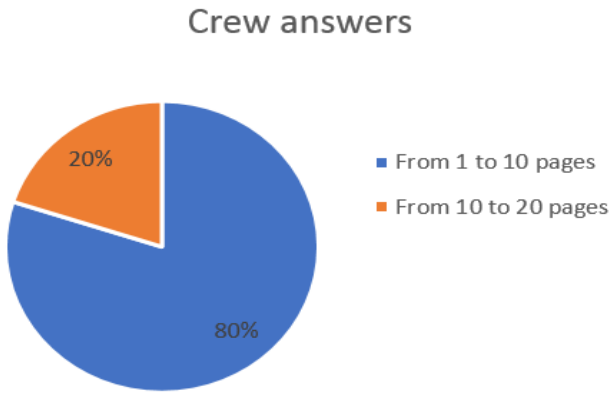

Figure 14. Cruise Plan extension crew answers

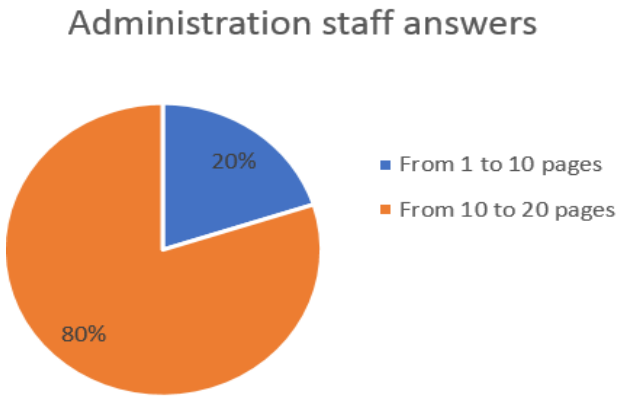

Figure 16. Cruise Plan extension administration staff answers

Thus, we can conclude that Cruise plans might vary in extension depending more in the scientific needs of each research line and the number of different activities to be carried during the sampling on board than on anything else and that they should be flexible in extension.

3.3.6. Document access

In order to determine who should have access to the cruise plan, we asked they question: *"Who do you think should have access to the cruise plan?"*

Although this question was quite obvious, we still wanted to see how the participants felt about sharing the information and we obtained the expected response from the greater part of them excluding the 12% that didn't feel like it is necessary to share the cruise plan with every participant of the cruise but only to head of each department and then that they could organize their teams in the most appropriate way.

The 3% who answered "others" referred to share the document only between researchers and crew and that it was not necessary to send it to the vessel's manager office.

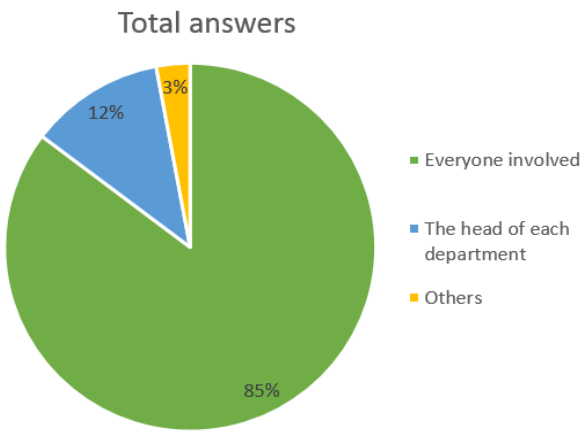

Figure 17. Document access total answers

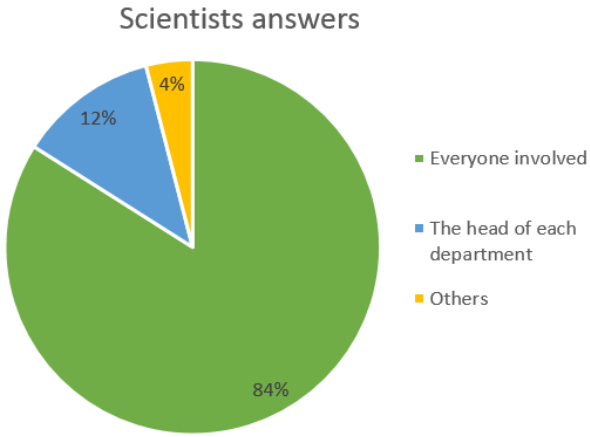

Figure 19. Document access scientists' answers

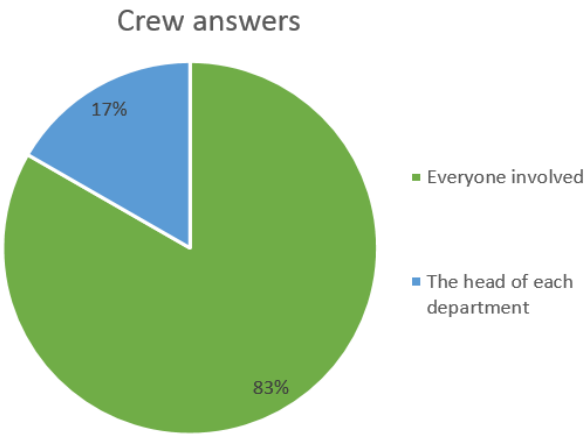

Figure 18. Document access crew answers

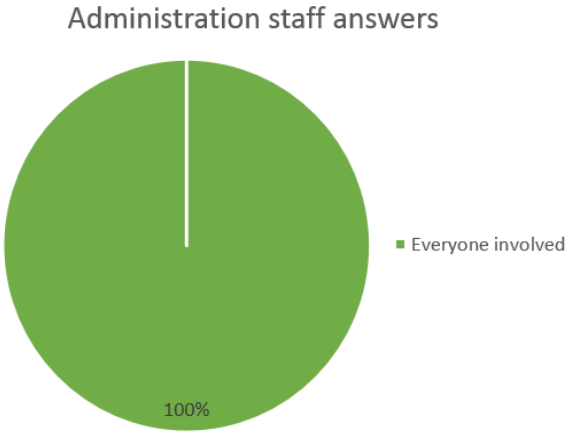

Figure 20. Document access administration staff answers

3.3.7. Comments collected in the survey and interviews

In addition to the comments collected in the last section of the survey, this part of the thesis also refers to personal interviews that were conducted with various members of the Spanish IEO and SOCIB institutions: the fleet managers of both institutions, José Ignacio Díaz and Carlos Castilla, various scientists, Diego Álvarez, Carmen Presas, Daniel Ottmann, Juan Francisco Fernández, Eva Alou and Nikolaos Zarokanellos and also some crew members of the R/V Ángeles Alvariño: the Captain Antonio Álvarez, the chief officer José Ramón Rodríguez and the computer technician Jorge López, in addition to talking to the CSIC's R/V García del Cid captain, Alex.

Hereunder are some suggestions, comments and problems transmitted by the aforementioned people.

For Nikolaos Zarokanellos, Glider research scientist, PhD student and ocean data manager in SOCIB, KAUST and HCMR it is important to have a section to deal with data acquisition and data backups, which can be either included in the cruise plan or not.

Carlos Castilla, R/V SOCIB administration manager suggests that it might be good if in the "meetings" section the technical visit on board was specified.

Pablo Carrera stated in the survey the need of external peer-review to see whether Material & methods and timing (survey time) meet with the expected results and objectives.

A good point brought up by Fernando Ramos is that in his case, a lot of different activities are carried out during the sampling onboard, due to his research line belongs to multi-disciplinary campaigns (acoustic evaluation campaigns, but defined as "pelagic ecosystem"). In order to avoid writing a cruise plan too dense for the chain of command, he prepares 2 different cruise plans: the extended version which includes all the methodologic part of each activity and the reduced version with just information about objectives, necessary equipment, list and data of the scientific personnel and their berthing, logistics of the cruise (with a forecast of work schedules) and any contingency that must be considered in advance.

This opinion also coincide with Diego's Alvarez (SOCIB-ICTS researcher) point of view with the small variant that he thinks that all the information should be placed in the cruise plan but a division in sections for each "users" is needed (info of interest for research or crew team for example).

Bruno Almón, IEO researcher, thinks that it is important to highlight what is the use of the collected information obtained during the sampling stage on board in order to put value on the work done and his colleague, Luis Miguel Fernández, points out the importance of crew and technicians to report before the cruise, with enough days ahead, if there is any problem with the types of equipment and facilities required by the chief scientist in the cruise plan.

As for the personnel managing the vessel, on the one hand, the general vision of all the crew members interviewed was quite similar, highlighting that their main concern is that the cruise plan arrives in time so that they can make a review of it in advance and that the information in it is easy to find, not mixed with the technical methodology of the survey activities to be carried out.

On the other hand, the main concern of the administration staff coincides in some way with that of the crew, and also adds to the importance of receiving the document on time, the need to process the relevant legal permits, to organize the schedule of the itinerant material that is shared between the

institution’s ships or that must be rented to external companies and the need to organize manning’s rotation periods.

In addition, they also encounter the problem that the scientific team sometimes wants to carry out improvised tasks that are not specified in the cruise plan and get indignant when they are not allowed because of institution policies.

Finally, a very outstanding common point spread by all the interviewees is that the cruise plan is a very important document but it must be "flexible" in order to adapt the work and voyage to changing weather conditions, ship's problems, crew issues, technical problems, etc.

4. Cruise plan template

After having made an extensive analysis of what a cruise plan should contain, to whom it should inform and what function it should have, apart from recalling the IMO guidelines for voyage planning, the STCW section A-VIII/2, Part 2 (Voyage planning) and the IMDG code, a generic template has been generated in Word form format that can serve as the basis for any scientist to write his or her own cruise plan, so that the needs of all interested parties are taken into account and that, at the same time, it can be moldable for any type of campaign which may require a change of format in any section.

4.1. Compliance with the IMO guidelines for voyage planning

The hereafter set out templates have been designed in compliance with the Resolution A.893(21) adopted on 25 November 1999 by the IMO "Guidelines for voyage planning" and recognizing the essential importance for safety of life at sea, safety of navigation and protection of the marine environment of a well-planned voyage.

Objectives

This resolution applies to all vessels and has the objective of developing a plan that includes appraisal, i.e. gathering all information relevant to the contemplated voyage or passage; detailed planning of the whole voyage or passage from berth to berth, including those areas necessitating the presence of a pilot; execution of the plan; and the monitoring of the progress of the vessel in the implementation of the plan.[3]

Appraisal

All information relevant, applicable to research vessels, includes[4]:

- its stability, and its equipment; any operational limitations; its permissible draught at sea in fairways and in ports; its maneuvering data, including any restrictions;
- any special characteristics of the cargo (especially if hazardous), and its distribution, stowage and securing on board the vessel;
- the provision of a competent and well-rested crew to undertake the voyage or passage;
- requirements for up-to-date certificates and documents concerning the vessel, its equipment, crew, passengers or cargo;
- existing ships' routeing and reporting systems, vessel traffic services, and marine environmental protection measures;
- volume of traffic likely to be encountered throughout the voyage or passage;

Planning

Each cruise plan, should be approved by the ships' master prior to the commencement of the voyage. The voyage plan should cover the entire voyage from berth to berth, therefore some important details include

[3] RESOLUTION A.893(21) adopted on 25 November 1999: "Guidelines for voyage planning", Sections 1.2 and 1.3
[4] RESOLUTION A.893(21) adopted on 25 November 1999: "Guidelines for voyage planning", Section 2.1

providing the plotting of the intended sampling track of the voyage well in advance in order to take considerations regarding:

- safe speed, proximity of navigational hazards along the intended route or track, the maneuvering characteristics of the vessel and its draught in relation to the available water depth;
- minimum clearance required under the keel in critical areas with restricted water depth;
- considerations relating to the protection of the marine environment;
- contingency plans for alternative action to place the vessel in deep water or proceed to a port of refuge or safe anchorage in the event of any emergency necessitating abandonment of the plan, taking into account existing shore-based emergency response arrangements and equipment and the nature of the cargo and of the emergency itself. [5]

Execution and Monitoring

The master will consider whether any particular circumstance or activity leads the vessel to an unacceptable hazard to the safe conduct of the passage and will decide if there may be a need to utilize additional deck or engine room personnel.

The plan should be available at all times on the bridge to allow officers of the navigational watch immediate access and reference to the details of the plan and the progress of the vessel in accordance with the cruise plan should be closely and continuously monitored. Any changes made to the plan should be made consistent with these Guidelines and clearly marked and recorded.[6]

4.2. Generic cruise plan template model

This template can be consulted in the APPENDIX I, in which, apart from the template itself, the functionality of the document is explained and the completion instructions are included.

4.3. R/V Ángeles Alvariño specific cruise plan template model

Based on the generic template, a specific cruise plan template model for the Research Vessel Ángeles Alvariño, has also been created and can been found in Appendix II.

The main differences that this template has compared to the generic one are:

- It is written in Spanish, which is the official language on board.
- The Document Control section has been suppressed due to the Institution's preference.
- Includes a list where it can be selected the permanent equipment of the vessel as well as the itinerant equipment managed by the Spanish Institute of Oceanography which are required to work with and the scientific spaces that will be used on board.
- Specific comments have been added in some sections in order to optimize the clarity of the organization of some aspects.

[5] RESOLUTION A.893(21) adopted on 25 November 1999: "Guidelines for voyage planning", Sections 3.2 and 3.4
[6] RESOLUTION A.893(21) adopted on 25 November 1999: "Guidelines for voyage planning", Sections 4.3, 5.1 and 5.2

4.4. Medical form

Marine researchers are not considered to be seafarers but passengers instead, therefore they have no obligation to be in possession of an IMO official medical certificate.

Despite this fact, it is important to have a register of each participant state of health in order to comply with the International Medical Guide for Ships, issued by the WHO, which can be found in the Appendix IV.

In Chapter 25 Medical Assistance, it is specified that in case of an emergency that can be an injury or an illness, ship's manning should:

"■ Provide the *doctor with all possible information about the patient, using the form provided below:*

- *complete the form before calling for assistance, except in emergencies;*
- *when giving the doctor details of a patient's symptoms or past illnesses miss nothing out, however long it takes;*
- *do* not leave out points you may judge to be unimportant." 7

It must be understood that although continuous attention is paid to safety, risks always exist, and in the eventuality of an accident which may lead to an unconscious state of the person, if any record of past illnesses, family background or important health details is available, it would not be possible to have a accurate diagnosis from the doctor in the medical radio consultation and thus, the risk of not choosing the best course of action might be increased.

Consequently, the "Voyage Medical Form" that is set out in Appendix III has been created for the researchers own safety at sea and could prevent misinformation in fatal situations which may lead to catastrophic consequences that could be avoided.

The anamnesis or medical histories used as guides for creating the resulting template have been issued by the Department of Human Development, Education and Culture of the Organization of American States and the Onboard Health Guide of the Spanish Navy Social Institute (ISM).

[7] World Health Organization International Medical Guide for Ships, Chapter 25 External Assistance, Medical Advice

5. CONCLUSIONS

The cruise plan, to be a good document, should be something in which all the information regarding the field survey on board is included, well organized and easy to find. It is a good signal when you see that the scientists are carrying the document with themselves to consult it onboard and that all crew is totally aware of the activities that are going to be carried out. From my personal experience, having something to track the progress of the work and to provide a guide, keeps people motivated.

The generic cruise plan template, result of this project, has been designed taking into consideration the opinion of different people with different professions and different positions within the oceanographic projects frame, so the different needs of all the cruise participants have been put together.

Because of that, I think that new emerging institutions can take benefit of this template at the time of designing their own cruise plans and that it can also serve as a model for any institution that wants to implement a unique planning format. I also believe that it can be of great help to novice chief scientists, who are in charge of writing the document, since many times they do not know what are the most important aspects for crew members and other times they do not have any other references available to write the plans more than the documents written by other authors in previous campaigns.

Although it is difficult to make a unique template for a standard campaign due to the fact that there are many different types of campaigns and because sometimes the cruise plans have to include information that complies with the funding institution requirements, the resulting template of this thesis solves this problem by having flexibility to add or modify sections depending on the needs of the survey.

Another example of the flexibility needs would be, for instance, the case of some institutions, which organize their logistics by different departments and therefore, instead of putting all the information together in the cruise plan, they deal with each aspect separately, thus they only write the most summarized and remarkable features for crew to know in it.

Starting from the generic template, a specific template was designed for the R/V Ángeles Alvariño (the boat in which I embarked for half a year as a deck cadet) and it was tested in two cruises, Vulcana and Raprocan. I order to do so, I transferred the details that were written in the actual cruise plan sent by the chief scientist into the template here devised. The workability of it was consulted with crew and some researchers involved in that field survey and was found to give an excellent result.

Finally, it should be said that the specific template of the AA is in the process of being implemented by the Spanish Institute of Oceanography, so that in their next cruises it might be required to send the plans in the Appendix II displayed format, as well as presenting the medical form, set out in Appendix III, from all the cruise participants in a closed envelope to the captain before boarding.

As Pablo Picasso used to say, *"Our goals can only be reached through a vehicle of a plan, in which we must fervently believe, and upon which we must vigorously act. There is no other route to success".*

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APPENDIX I. GENERIC CRUISE PLAN TEMPLATE MODEL

CRUISE PLAN FILLING INSTRUCTIONS

Despite the existence of different types of campaigns and, therefore, different models of the cruise plans, this template is a generic model that collects the common sections that are present in all types of campaigns and that can be adapted to changes in format that are considered appropriate.

This template is divided into 6 sections and 2 annexes, which are indicated below:

Section 1 – Cruise Data Sheet

In this table you should fill in the most generic data of the cruise.

Section 2 – Document control

This section aims to keep track of the dates of editing and approval of each modification made in the document, leaving a record of the different versions that may have been made.

In the edition column, it should be noted who and when drafted or modified de document, understanding that it should be someone from the scientific staff. Once the document has been delivered, the person who has reviewed it, understanding that it may be the ship's manager or the captain and considering that everything is correct, must return the document having noted his name and the date of revision in the approval column.

Section 3 – Equipment and spaces of the vessel required

In this section the materials and equipment of the boat that are required for the planned activities should be indicated. These can be permanent (they are always on board) or itinerant (they are owned by the ship's managing institution but they are taken from one ship to another depending on the needs of the cruises.

The desired format of this table is in hands of the managing institution of the vessel, since check boxes to select the equipment can be added or, on the other hand, a separate list can be provided to the scientific party and that they will write down on the table the equipment they need.

Section 4 – Equipment, materials and technical support provided by the scientific party

In this section it should be indicated which materials, equipment and technical support will be provided by the scientific staff. As a remark, it should be taken into account that it is compulsory to present the technical sheet of all chemical compounds that are going to be shipped and these can be sent separately, it is not necessary to include them in the cruise plan. It should also be

noted that due to stability issues it is necessary to indicate the approximate weight of heavy equipment, understood as those which weight more than 250 kg.

Section 5 – Waypoints list, schedule and activities

This section is the most moldable of the template, since it can vary depending on many factors, such as weather conditions or the results that are being obtained in real time.

Since there are types of cruises in which it is not known with certainty the exact sampling points, it is possible to add or remove columns, to fill the table totally or partially or even to delete the table and write the procedures that will be followed during the cruise manually, together with the methodology section.

Section 6 – Sampling methodology

This space is reserved to detail more specifically the sampling methods to be followed and to include any other information of special scientific interest that is considered useful for the cruise.

Annex I – Scientific personnel to be onboard

In this section you must fill in the fields of a table where the most important data about the personal, professional and functional information of all the members of the scientific party participating in the campaign are collected.

Annex II – Vessel's useful information

This space is reserved to be edited by the vessel's institution in order to include any information about the vessel which is considered to be useful for the scientist to have on hand, such as a direction to find the vessel's characteristics and technical specifications, security issues, rules on safety and coexistence onboard, required forms for filling, etc.

CRUISE PLAN R/V **"NAME"**

SECTION 1 - CRUISE DATA SHEET

Project Title:	Click here to write text.
Type of campaign:	E.g.: GeologyE.g.: GeologyE.g.: Geology
Chief Scientist:	Name and surname Affiliation Email Phone number
Operating area:	Click here to write text.
Cruise start:	Click here to write a date.
Loading port:	Click here to write text.
Loading date:	Click here to write a date.
Cruise end:	Click here to write a date.
Unloading port:	Click here to write text.
Unloading date:	Click here to write a date.
Days at sea:	Click here to write text.
Summary of objectives:	Click here to write text.
Historical series:	◉ Yes ○ No
Foreign operations:	○ Yes ◉ No
Participating institutions:	Click here to write text.
Financing programs involved:	Click here to write text.

SECTION 2 - DOCUMENT CONTROL

This section has the purpose of being able to visualize the changes or editions that are being made on the document, indicating who and when it is edited (for example, the chief scientist) and who and when the plan is approved (for example, the head of fleet and / or captain).

VERSION Nº	EDITED		APROVED	
Click here to write text.Click here to write text.Click here to write text.	By:	Name Function Date	By:	Name Function Date
	By:	Name Function Date	By:	Name Function Date
Click here to write text.Click here to write text.Click here to write text.	By:	Name Function Date	By:	Name Function Date
	By:	Name Function Date	By:	Name Function Date
Click here to write text.Click here to write text.Click here to write text.	By:	Name Function Date	By:	Name Function Date
	By:	Name Function Date	By:	Name Function Date
Click here to write text.Click here to write text.Click here to write text.	By:	Name Function Date	By:	Name Function Date
	By:	Name Function Date	By:	Name Function Date

SECTION 3 - EQUIPMENT AND SPACES OF THE VESSEL REQUIRED

Permanent scientific equipment:	E.g.: Thermosalinograph, Echo Sounders, water destilation system, etc.
Please mark off the desired configuration of the selected equipment: E.g.: EK80 echo sounder using frequencies 18, 38, 70 and 120 on CW mode and at a maximum depth of "x".	
Portable scientific equipment:	E.g.: ROV, Tasife, etc.
Please mark off the desired configuration of the selected equipment, as well as if you wish to request any equipment not mentioned by us: Click here to write text	
Deck equipment:	E.g.: Winches and wire, cranes, frames, etc.
Laboratories and scientific spaces:	Indicate which laboratories and scientific spaces of the vessel are going to be used

SECTION 4 - EQUIPMENT, MATERIALS AND TECHNICAL SUPPORT PROVIDED BY THE SCIENTIFIC PARTY

Inventory materials:	E.g.: Microscope
Heavy equipment[8]:	E.g.: Container – 3.000 kg
Hazardous materials[9]:	E.g.: Ethyl alcohol
Technical support:	Click here to write text

[8] Understood as those which weight more than 250 kg. Due to stability issues it is necessary to indicate the approximate weight.

[9] It is mandatory to include, separately, the technical sheet of each of the chemical compounds which are going to be brought onboard.

SECTION 5 – WAYPOINTS LIST, SCHEDULE AND ACTIVITIES

Expected date	Expected time	Waypoint name	Latitude	Longitude	Activities to be developed	Sampling duration	Comments

This table is subject to changes depending on weather conditions and on the results that are being obtained in real time, as well as format changes if it is considered necessary to insert more rows and/or columns for additional information, such as the depth of the station, the miles and navigation time between one and the other, etc.

SECTION 6 – SAMPLING METHODOLOGY

This space is reserved to detail more specifically the sampling methods and to include any other information of scientific interest that is considered useful for the cruise.

ANNEX I - SCIENTIFIC PERSONNEL TO BE ONBOARD

	Name and Surname	Institution	Function	Date and place of birth	Contact information (email + phone + ID)	Cruise dates	Working shift	Assigned cabin[10]	Comments[11]
1	Name Surname 1 Surname 2	E.g.: NOAA, Oregon University…	E.g.: CTD technician	dd/mm/yy Place	Email Phone number ID nº	dd/mm to dd/mm	hh:mm to hh:mm	E.g.: Starboard 1	E.g.: Celiac
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									

[10] Consult the vessel's layout plan of berths

[11] Intolerances, allergies or comments that may be relevant for the cruise, such as "Need to sleep onboard one night before the start of the cruise."

ANNEX II – VESSEL'S USEFUL INFORMATION

This space is reserved to be edited by the vessel's institution in order to include any information about the vessel which is considered to be useful for the scientist to have on hand, such as a direction to find the vessel's characteristics and technical specifications, security issues, rules on safety and coexistence onboard, required forms for filling, etc.

APPENDIX II. R/V ÁNGELES ALVARIÑO CRUISE PLAN TEMPLATE MODEL

PLAN DE CAMPAÑA B/O ÁNGELES ALVARIÑO

FICHA IDENTIFICATIVA DE LA CAMPAÑA

Nombre de la campaña:	Haga clic aquí para escribir texto.
Nombre del proyecto:	Haga clic aquí para escribir texto.
Tipo de campaña:	Ej: GeologíaEj: GeologíaEj: Geología
Jefe de campaña:	Nombre y apellidos Centro/Institución Email Teléfono
Zona de trabajo:	Haga clic aquí para escribir texto.
Inicio de campaña:	Haga clic aquí para escribir una fecha.
Puerto de embarque:	Haga clic aquí para escribir texto.
Carga de material:	Haga clic aquí para escribir una fecha.
Final de campaña:	Haga clic aquí para escribir una fecha.
Puerto de desembarque:	Haga clic aquí para escribir texto.
Descarga de material:	Haga clic aquí para escribir una fecha.
Duración:	Días de duración de la campaña
Serie histórica:	○ Sí ◉ No
Actividades en aguas extranjeras*:	◉ Sí ○ No
*En caso afirmativo, incluir autorización recibida o estado de tramitación o informar del estado y fecha de tramitación.	
Instituciones participantes	Haga clic aquí para escribir texto.

INTRODUCCIÓN

Enmarcar brevemente la campaña en cuanto a actividades pasadas o proyectos previos. (Máximo 15 líneas)

OBJETIVOS

Describir los objetivos principales de la campaña

EQUIPOS Y ESPACIOS DEL BUQUE REQUERIDOS

Equipamientos científicos permanentes:	☐ SONDA MULTIHAZ KONGSBERG EM710 0,5º x 1º ☐ SONDA PARAMÉTRICA KONGSBERG TOPAS PS18 ☐ SONDA HIDROGRÁFICA KONGSBERG EA600 (12 y 200 kHz) ☐ SONDA MULTIHAZ INVEST. PESQUERA SIMRAD MS70 ☐ SONDA CIENTÍFICA SIMRAD EK80 (18, 38, 70, 120, 200 y 333 ☐ PERFILADOR DOPPLER DE CORRIENTES VMADCP RDI 150 kHz ☐ SONAR DE RED SIMRAD FS70 ☐ SISTEMA DE CAPTURAS SCANMAR ☐ ESTACIÓN METEREOLÓGICA AANDERAA DATALOGER 3660 ☐ SISTEMA DE INTEGRACIÓN DE DATOS MDM 500 ☐ TERMOSALINÓGRAFO SBE21 ☐ FLUORÓMETRO TURNER 10AU ☐ SISTEMA DESTILACIÓN DE AGUA ULTRAPURIFICADA Q-POD MilliQ + DEPÓSITO 60L (LAB. MULTIPROPÓSITO) ☐ SISTEMA DESTILACIÓN DE AGUA PURIFICADA E-POD ELIX + DEPÓSITO 60L (LAB. BIOLOGÍA) ☐ PERFILADOR VELOCIDAD DEL SONIDO AML SMART SV ☐ PERFILADOR DOPPLER DE CORRIENTES LADCP (150 kHz - 300 kHz) ☐ SISTEMA HiPAP DE POSICIONAMIENTO SUBMARINO
Por favor, indique en su caso la configuración deseada de los equipos seleccionados: Ej: EK80 utilización de frecuencias 18, 38, 70 y 120 en modo CW y a profundidad máxima “x”.	

Equipamientos científicos itinerantes:	☐ ROV LIROPUS 2000 (Implica el embarque de técnicos adicionales)* ☐ TRINEO - TASIFE (Implica el embarque de técnicos adicionales)* ☐ MiniROV Seabotix (Implica el embarque de técnicos adicionales)* ☐ Puesto de Survey (Puede implicar el embarque de técnicos adicionales)* ☐ Utilización software HYPACK (Para reserva llave / Lic. Hardware) ☐ SBL + CHIGRES (Implica el embarque de técnicos adicionales)* ☐ Multinet MAMOUTH (Implica el embarque de técnicos adicionales)* ☐ MAQUINILLA MULTIPROPÓSITO. IBERCISA1. Cable 6000 m. D14 mm. + 2 CHIGRES COAXIALES ☐ TAMBOR DE RED. IBERCISA TR-E/2x120/2x2,8 m3 ☐ CONTENEDORES (CUFES, SALINÓMETRO, CITOMETRÍA, LABORATORIO RADIOACTIVO) ☐ OTROS (especificar)
**Al solicitar los equipos SBL, Trineo o Mamouth se asume que embarcará 1 técnico adicional en jornadas de 8h por cada uno de ellos. En el caso del ROV deberán embarcar 3 técnicos adicionales en jornadas de 12h + 1 técnico survey. Estos técnicos serán considerados como personal ajeno a la tripulación, por lo tanto el número máximo de personal científico que pueda embarcar se verá reducido.*	
Por favor, indique la configuración deseada de los equipos seleccionados, así como si desea solicitar algún otro equipo no mencionado en la lista: Ej: El ROV Liropus 200 y/o el SBL configurado para aguas someras o aguas profundas, rango de profundidades de trabajo del ROV, etc	
Otros equipamientos:	☐ CÁMARA DE MUESTRAS REFRIGERADA (4 ºC) ☐ CONGELADOR - 80 ºC ☐ CONGELADOR - 20 ºC ☐ ANCLAJES Y CONEXIONES PARA 2 CONTENEDORES LABORATORIO DE 20' o 2 de 10' en distintas posiciones

Equipamientos de cubierta:	☐ MAQUINILLAS ARRASTRE PESCA. Cable 3000 mts*. D 18 mm ☐ MAQUINILLA OCEANOGRÁFICA. Cable conductor 6000 mts*. D 8 ☐ MAQUINILLA OCEANOGRÁFICA. Cable inox. 4000 mts*. D 8 mm ☐ MAQUINILLA DE SONDA DE RED. Cable 1500 mts*. D 11 mm ☐ GRÚA PRINCIPAL. FERRI serie A4, Q = 5000 Kg, R = 9 m ☐ PÓRTICO de POPA. FERRI, ángulo de trabajo 120 º, Q. máx.= 5000 ☐ PÓRTICO costado Er. FERRI, ángulo de trabajo 45 º, Q. máx. = 2100
**Las longitudes de cable indicadas en las maquinillas hacen referencia a las longitudes nominales máximas y se debe tener en cuenta que el cable en profundidad se acorta.*	
Espacios científicos:	☐ LABORATORIO MULTIPROPÓSITO (20m2) ☐ LABORATORIO HÚMEDO (20m2) ☐ LABORATORIO DE BIOLOGÍA (10m2) ☐ PARQUE DE PESCA (45m2)

EQUIPOS, MATERIALES Y APOYO TÉCNICO APORTADO POR EL PERSONAL CIENTÍFICO

Material inventariable:	Haga clic aquí para escribir texto.
Equipos pesados[12]:	Haga clic aquí para escribir texto
Materiales peligrosos[13]:	Haga clic aquí para escribir texto.
Apoyo técnico:	Haga clic aquí para escribir texto.

[12] Se entienden como aquellos que pesan más de 250 kg. Por temas de estabilidad es necesario indicar el peso aproximado.
[13] Es obligatorio incluir por separado la ficha técnica de cada uno de los compuestos químicos que se van a embarcar.

ESTACIONES DE TRABAJO, CRONOGRAMA Y ACTIVIDADES

Esta sección es totalmente moldeable, ya que se entiende que dependiendo del tipo de campaña, no se sabe con certeza los puntos exactos donde se va a muestrear. Queda abierta la posibilidad de añadir o quitar columnas, rellenar la tabla total o parcialmente o incluso eliminar la tabla y escribir manualmente, junto con la sección de metodología, los procedimientos que se van a ir siguiendo durante la campaña.

También se entiende que el orden de las estaciones puede variar dependiendo de muchos factores, como por ejemplo las condiciones meteorológicas o los resultados que se vayan obteniendo a tiempo real.

Fecha prevista	Hora prevista	Nombre de estación	Latitud	Longitud	Actividades a desarrollar	Duración del muestreo	Comentarios

Velocidad de crucero del buque: 10 millas/hora

METODOLOGÍA DE MUESTREO

Este espacio se reserva para detallar más específicamente los métodos de muestreo y para incluir cualquier otra información de interés científico que se crea de utilidad para la campaña.

ANEXO I - INFORMACIÓN ÚTIL SOBRE EL BUQUE

En este anexo se detallan algunos valores de utilidad y se adjunta un hipervínculo que dirige a la página web del Instituto Español de Oceanografía donde se puede encontrar la siguiente información sobre el buque:

- Características del buque
- Especificaciones técnicas
- Datos de contacto
- Tríptico de seguridad
- Guía rápida de información para los científicos
- Normas sobre seguridad y convivencia a bordo

Flota IEO - Ángeles Alvariño

Tabla de límites de profundidad de los equipos y sensores del buque:

Equipo/Sensor	Marca/Modelo	Prof.Máxima
CTD Sensor Presión	Digiquartz 410K-134	6800m
CTD Sensor Conductividad 1	SBE4C	6800m
CTD Sensor Conductividad 2	SBE4C	6800m
CTD Sensor Fluorómetro/Turbidez	FLNTURTD	6000m
CTD Sensor Oxígeno (Oxímetro)	SBE43	7000m
CTD Sensor Peachímetro (PH/ORP)	SBE27	1200m
CTD Sensor Temperatura 1	SBE3 PLUS	6800m
CTD Sensor Temperatura 2	SBE3 PLUS	6800m
Altímetro CTD/Roseta	PSA-916 (007601)	6000m
Sensor PAR Irradiance (Waterproof)	QCP 2300-HP	10000m
Sound Velocity Profile (SVP) (S/N:40022)	AML SV PLUS·X	5000m
Sound Velocity Profile (SVP) (S/N:40128)	AML SV PLUS·X	6000m
Sound Velocity Profile (SVP) (Tanque SV)	AML Smart SV·Xchange	500m
ROV Config. Aguas Profundas con TMS	Liropus 2000	2000m
ROV Config. Aguas Someras	Liropus 2000	500m
MiniROV	TELEDYNE Seabotix	250m
SBL Config. Aguas Profundas	Limitado por el Pez	2000m
SBL Config. Aguas Someras	Limitado por el Pez	500m

LISTADO DE PERSONAL CIENTÍFICO

	Nombre y apellidos*[14]	Institución*	Cargo	Fecha y lugar de nacimiento*	Datos de contacto (email + tlf + DNI*)	Fechas de embarque	Turno de trabajo	Camarote[15]	Comentarios[16]
1	Nombre Apellido 1 Apellido 2	Ej: IEO, Universidad de La Laguna…	Ej: Técnico CTD	dd/mm/aa Lugar	Email Teléfono Nº DNI Fecha caducidad	dd/mm a dd/mm	hh:mm a hh:mm	Ej: 1 Er	Ej: Celíaco
2									
3									
4									
5									
6									
7									
8									
9									
10									

[14] Los datos reseñados con asterisco son de obligado cumplimiento para la tramitación del seguro y la documentación de Marina Mercante
[15] Consultar el plano de disposición de camarotes
[16] Intolerancias, alergias o comentarios que puedan ser relevantes para la campaña, como por ejemplo “pernoctará 1 día antes del inicio de la campaña”.

APPENDIX III. VOYAGE MEDICAL FORM

This form is voluntary and is intended to improve your own protection at sea. It can also be replaced by a document accrediting the state of health of the person embarking issued by a registered doctor, or by the Prevention Service of the company to which he belongs, indicating any aspect that he considers should be taken in consideration in case of accident.

Although continuous attention is paid to safety, risks always exist, and on board ships there is a limited ability to diagnose and cure, as there are no expert medical personnel and the material and equipment to treat patients is limited to the provisions of the regulations applicable to medicine cabinet and nursing.

In the event of an accident, a medical radio consultation will be carried out and the patient will be attended by a remote expert doctor, who will assess the seriousness of the situation and give the necessary guidelines for action.

The information contained in this document, which will have been delivered in a closed envelope to the Captain, will always be confidential and will be used only in the event of an accident that could render the person unconscious or incapacitated. After the cruise, the Captain will return all the envelopes to the Chief Scientist.

PERSONAL INFORMATION

Name and surname	Click here to write text.
ID	Click here to write text.
Health card number	Click here to write text.
Birth date	Click here to write text.
Nationality	Click here to write text.
Address	Click here to write text.
Phone number	Click here to write text.
Emergency phone nº 1	Click here to write text.
Emergency phone nº 2	Click here to write text.

FAMILY ILNESS

Please indicate if any of these diseases has been or is suffered by a member of your family.

☐	Diabetes	☐	Kidney Dysfunction	☐	Obesity	☐	Allergy
☐	High Blood Pressure	☐	Jaundice	☐	Gout	☐	High Blood Fats
☐	Cystic Fibrosis	☐	Alcoholism	☐	Asthma	☐	Cancer
☐	Heart Trouble	☐	Tuberculosis	☐	Psychiatric Illness	☐	Others

If you have marked any box, please specify Click here to write text.

STATEMENT OF PRESENT HEALTH

Height	Click here to write text.	Weight	Click here to write text.	Usual blood pressure	Click here to write text.	Usual pulse	Click here to write text.
Your statement of present health is				☐ Excellent ☐ Good ☐ Poor*			
Do you take drugs routinely?				☐ Yes ☐ No			
Do you take any herbal or folk medicines?				☐ Yes ☐ No			
Please specify if you marked "yes" in any of the two previous questions Click here to write text.							
Are you a regular smoker?				☐ Yes ☐ No			
How often do you consume alcohol?				☐ Daily ☐ Weekly ☐Monthly ☐ Never			

* If your health is poor, you should reconsider your approach to embark for the cruise.

MEDICAL HISTORY

	YES	**NO**
Are you currently under medical treatment?	☐	☐
Have you ever had any serious illness?	☐	☐
Have you ever had any major surgery?	☐	☐
Do you have any physical limitations?	☐	☐
Have you received any treatment for drug or alcohol addiction?	☐	☐
Have you been treated for any emotional or nervous illness?	☐	☐
Do you have any allergies?	☐	☐
Have you had an accident that resulted in you being partially disabled?	☐	☐
Have you significantly increased or lost weight in the past three years?	☐	☐
Have you visited a tropical country in the last three years?	☐	☐
For women: Have you been treated for a gynecological problem?	☐	☐
If any of your answers have been affirmative, please explain		

Click here to write text.		
In case you have suffered from any of the diseases mentioned below, please mark the associated box		
☐ Recurrent ear infections	☐ Psychiatric Consultation / Treatment / Hospitalization	☐ Venereal disease
☐ Headaches	☐ Bone, joint, or back disease	☐ COVID -19 or SARS
☐ Hearing aids / pacemaker / artificial limb / other assistive devices	☐ Paralysis / numbness / Tingle	☐ Physical disability
☐ Asthma	☐ Epilepsy seizures	☐ Pneumonia
☐ Malaria	☐ Eye disease-glaucoma, etc.	☐ Chronic cough
☐ Tuberculosis	☐ Corrective lenses	☐ Lung disease
☐ Chronic or frequent colds	☐ Eye surgery	☐ Frequent indigestion
☐ Skin problems	☐ Stomach, liver or intestine problems	☐ Diabetes
☐ Hepatitis or jaundice	☐ High cholesterol	☐ Heart diseases
☐ Kidney disease	☐ Anemia, blood problems	☐ High blood pressure
☐ Bladder disease	☐ Cancer	☐ Hernia or rupture
☐ Benign tumor	☐ Rheumatic fever	☐ Others
If you have checked any box, please specify Click here to write text.		

ADITIONAL INFORMATION

Please disclose any chronic physical or psychiatric illness that may affect your participation in the cruise. If so, please state the name of the disease, the duration (specify dates) and the final result and attach a document from the doctor that certifies that you can participate in the cruise.
Click here to write text.

Date and signature of the person embarking

APPENDIX IV. WHO MEDICAL FORM

Forms to be used in communicating to a doctor information about a patient's illness (part A) or injury (part B)

(A) IN THE CASE OF ILLNESS

1 Routine information about the ship

1.1 Name of ship
1.2 Call sign
1.3 Date and time (GMT)
1.4 Course, speed, position, and cargo
1.5.1 Port of destination ……., which is……hours/days away
1.5.2 Nearest port ……., which is……hours/days away
1.5.3 Alternative port ……., which is……hours/days away
1.6 Local weather (if relevant)

2 Routine information about the patient

2.1 Surname
2.2 Other names
2.3 Rank
2.4 Job on board (specify kind of work, not just the trade)
2.5 Age and sex

3 Details of illness

3.1 When did the illness first begin?
3.2 Has the illness occurred before? If so, when?
3.3 How did the illness begin (suddenly, slowly, etc.)?
3.4 What did the patient first complain of?
3.5 List all the patient's complaints and symptoms.
3.6 Describe the course of the present illness from the start of the illness to the present time.
3.7 Give details of past illnesses/injuries/operations.
3.8 List serious illnesses of parents, brothers, and sisters, if known (family history).
3.9 List social pursuits and previous occupations, including hobbies (social and occupational history).
3.10 List all medicines/tablets/drugs that the patient was taking before the present illness began and indicate the dose(s) and how often taken (see 6.1).
3.11 Does the patient smoke? If so, how much and how often?
3.12 Does the patient drink alcohol? If so, how much (on how many days a week, on average, and how many drinks a day, on average)?
3.13 Does the patient take any herbal or folk medicines? If so, how are they taken?
3.14 Does the patient use recreational drugs? If so, how are they taken?

4 Results of examination of patient

4.1 Note temperature, pulse, blood pressure, and respiration.
4.2 Describe the general appearance of the patient (healthy, obviously ill, pale, etc.).
4.3 Describe the appearance of affected parts of the body (consider faxing or e-mailing a digital photograph).
4.4 Describe your observations about the affected parts of the body (swelling, tenderness, lack of movement, etc.).
4.5.1 What tests have you done (urine, blood, other) and what were the results?
4.5.2 Give the results, if available, of any previous blood tests, X-rays, or other investigations.

5 Diagnosis

5.1 What is your diagnosis?

6 Treatment

6.1 List ALL given or frequency of administration (see 3.10).
6.2 Describe how the patient responded to the treatment.

7 Problems

7.1 What problems are you worrying about now?
7.2 What do you need advice about?

8 Other comments

9 Comments by the doctor

(B) IN THE CASE OF INJURY

1 Routine information about the ship

1.1 Name of ship
1.2 Call sign
1.3 Date and time (GMT)
1.4 Course, speed, position, and cargo
1.5.1 Port of destination ……., which is……hours/days away
1.5.2 Nearest port ……., which is……hours/days away
1.5.3 Alternative port ……., which is……hours/days away
1.6 Local weather (if relevant)

2 Routine information about the patient

2.1 Surname
2.2 Other names
2.3 Rank
2.4 Job on board (specify kind of work, not just the trade)
2.5 Age and sex

3 History of the injury or injuries

3.1 Exactly how did the injury or injuries occur?
3.2 Did the patient lose any blood? If so, how much?
3.3 When did the injury or injuries occur?
3.4 How long before the accident did the patient last eat or drink?
3.5 What does the patient complain of? (List the complaints in order of importance or severity.)
3.6 List all past illnesses/injuries/operations.
3.7 List ALL medicines/tablets/drugs that the patient was taking before the present injury or injuries occurred, indicating doses and frequency of administration.
3.8 Has the patient been taking any alcohol?
3.9 Do you think the patient might have taken narcotic drugs, amphetamine, etc?
3.10 Does the patient remember everything that happened? If not, how long before the accident is his or her last clear memory?
3.11 Did the patient lose consciousness, even for a very short time? If so, for how long and when in relation to the injury?

4 Results of examination of patient

4.1 Note temperature, pulse, blood pressure, and respiration.
4.2 Describe the general condition of the patient.
4.3 List what you believe to be the patient's injuries in order of importance and severity.

4.5.1 What tests have you done (urine, blood, other) and what were the results?
4.5.2 Give the results, if available, of any previous blood tests, X-rays, or other investigations.

5 Treatment

5.1 Describe first aid and other treatment you have administered since the injury or injuries occurred.
5.2 List ALL the medicines/tablets/drugs that the patient has taken or been given, and indicate the dose(s), the number of times given, and frequency of administration.
5.3 How has the patient responded to the treatment?

6 Problems

6.1 What problems are worrying you now?
6.2 What do you need advice about?

7 Other comments

8 Comments by the doctor