European Maritime Safety Agency

Tender specifications
Attached to the Invitation to tender

Invitation to tender no. EMSA /OP/17/2017 for a second study investigating cost efficient measures for reducing the risk from fires on ro-ro passenger ships (FIRESAFE II)

1. Introduction

The European Maritime Safety Agency (hereafter EMSA or the Agency) was established under Regulation (EC) 1406/2002, as amended by Regulation (EU) 100/2013 of 15 January 2013, for the purpose of ensuring a high, uniform and effective level of maritime safety and prevention of pollution by ships. Among its tasks, the Agency provides technical and scientific assistance to the European Commission and European Union Member States on matters relating to the proper implementation of European Union legislation on maritime safety and pollution by ships, including technical assistance in the preparation of submissions to the International Maritime Organization (IMO) as appropriate (EMSA Work Programme 2016, §4.4).

More information about the Agency and its structure and activities can be found on the Agency's website http://www.emsa.europa.eu.

1.1. Background issues

The IMO Correspondence Group on Casualty Analysis (CA CG)[1] reviewed a number of fires on vehicle decks of either ro-ro passenger or ro-ro cargo ships took place in the period from 1994 to 2011. This report was brought to the attention of MSC at its 92nd session and the relevant recommendations were forwarded to the SDC 1 and the SSE 1 sub-committees[2]. However, in the absence of any intervention, SDC decided to invite "*interested Member Governments and international organizations to submit proposals for new outputs to the Committee*"[3].

EMSA also further analysed this type of accident using the in-house EMCIP database (European Marine Casualty Information Platform which is managed by EMSA), as well as the MARINFO database which is populated with data from four commercial providers. This analysis showed that the number of fires on ro-ro decks remains at high levels, including very serious accidents such as those involving the NORMAN ATLANTIC and the SORRENTO.

The EU Member States and the European Commission submitted at MSC 97 a proposal for the establishment of a new output concerning fires on ro-ro decks of passenger ships[4]. The document suggested a full review of relevant legislation and was agreed by the Committee to include a new item with a target completion year of 2019, while also instructing SSE 4 to consider the scope and the work plan of the item in question[5].

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[1] Document FSI 21/5
[2] Documents SDC 1/24/1 and SSE 1/20
[3] Document SDC 1/26, 24.6
[4] Document MSC 97/19/3
[5] Document MSC 97/22, 19.19 and 19.20

The SSE Subcommittee at its 4th session endorsed a two-step approach; the development of Interim Guidelines should take place first with a subsequent development of amendments to SOLAS chapter II-2 and the associated codes[6]. Furthermore, the Sub-Committee endorsed five main tasks to be addressed under the review of SOLAS chapter II-2 and associated codes (prevention/ignition, detection and decision, extinguishment, containment; integrity of LSA and evacuation), while it also invited Members States and international organizations to submit relevant proposals for consideration at SSE 5.

1.2. FIRESAFE I study

In September 2015, EMSA held a workshop on fires on ro-ro decks for maritime administrations and accident investigation bodies, together with relevant speakers from industry. Following this workshop, a Group of Experts (GoE) was formed to discuss and further analyse this issue. One of the first tasks of the group was to evaluate and score the different risk areas that were identified in the casualty analysis correspondence group of the IMO FSI sub-committee which led to the development of document FSI 21/5.

The results of this exercise showed that the experts consider that *Electrical Fire as ignition risk* and *Fire Extinguishing Failure* are the greatest risk contributors. Consequently, it was proposed that EMSA would initiate the FIRESAFE I study in order to further investigate these two risks and potential risk control options. The full report can be downloaded at http://www.emsa.europa.eu/firesafe.html.

The study investigated risk control options (RCOs) for mitigating the risk from fires on ro-ro decks for both newbuildings and existing passenger ships. The first part considered RCOs in relation to Electrical Fire as ignition risk and the second part RCOs to mitigate the risk of Fire Extinguishing Failure (with a focus on drencher systems).

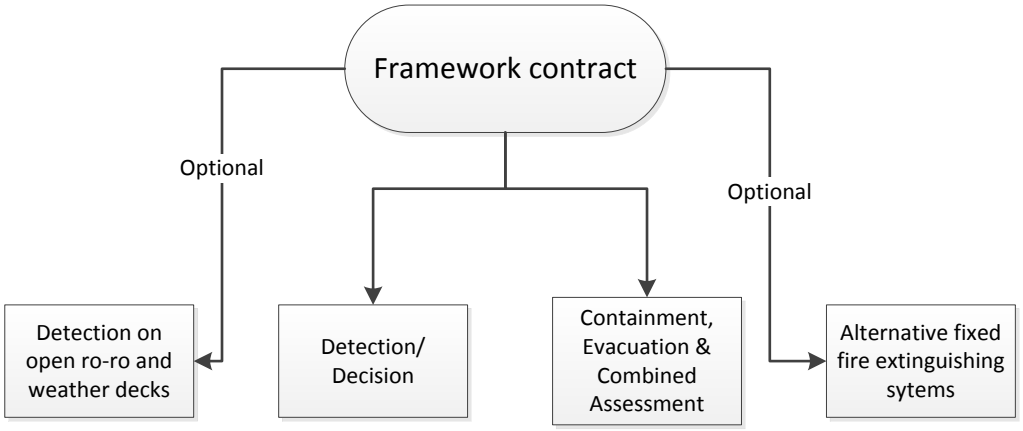
The study also produced a coarse risk model covering the various stages of a fire incident on a ro-ro passenger ship. This model was also in general agreement with the high level risk model developed by the GoE. In this model there are generally 5 stages that are identified in a fire incident on board a ship: ignition, detection/decision, extinguishment, containment and evacuation.

2. Objective, scope and description of the contract

The subject matter of the FWC is the provision of a study under two main specific contracts and two specific contracts that will only be activated under certain circumstances. The first specific contract will be investigating risk control options for mitigating the risk from fires on ro-ro decks in relation to *Detection* and *Decision*. The second specific contract will be investigating risk control options for mitigating the risk from fires on ro-ro decks in relation to *Containment and Evacuation* while it shall also include a combined assessment and if necessary re-evaluation of RCOs identified in previous parts as well as in FIRESAFE I.

In addition, two specific contracts might be concluded, one of which would focus specifically on alternative fixed fire extinguishing systems and the other one on detection systems in open ro-ro and weather decks. The conclusion of these specific contracts will depend mainly on the availability of budget. The four specific contracts of the framework contract shall be identified as the different *parts* of the study and are further described below.

[6] Document SSE 4/19.



The study shall encompass both newbuildings and existing passenger ships. Information from other research projects shall be used for further analysis while avoiding duplication of the work. The research project by Germany (SSE 2/INF.3)[7] focussed on electrically powered vehicles (Battery Electric Vehicles (BEV) and Hybrid Electric Vehicles (HEV)), fuel cell vehicles and vehicles with refrigeration units that are connected to the ship's power distribution system. The expected increased risk from the carriage of alternatively fuelled vehicles shall also be taken into consideration in the execution of this study.

2.1. Detection & Decision

2.1.1. Objective and scope

The main objective of this part of the study shall be to identify a range of RCOs and assess those most likely to be cost beneficial in relation to detection and the subsequent decision after a fire incident on any ro-ro passenger ship, considering open, enclosed ro-ro spaces and weather decks. The work carried out in the FIRESAFE I shall also be taken into consideration without being duplicated.

Overall, common tools used in risk analysis shall be used when carrying out the study as described in the Formal Safety Assessment (FSA) Guidelines of IMO. EMSA will make relevant accident data available to the contractor from the EMCIP and MARINFO databases, as far as this is permitted by disclosure clauses and by signing a non-disclosure declaration.

The analysis shall address both newbuildings and existing ships and if necessary, shall study separate RCOs taking into account the differences between the two groups.

The final outcome shall potentially include specific proposals aiming at regulatory amendments to the relevant regulatory instruments.

[7] Study on fire safety in connection with the transport of vehicles with electric generators or electrically powered vehicles on ro-ro and ro-pax ships – BMVBS, Federal Ministry of Transport, Building and Urban Development

2.1.2. Description

By the nature of their operations, ro-ro passenger ships tend to have long vehicle decks (open or enclosed), thereby creating very large un-subdivided areas. The short distance between vehicles, which often contain a considerable amount of combustible material, allows fire to spread quickly over the vehicle deck. In addition, the low ceiling level also creates conditions for a rapid fire growth[8].

Early detection of the fire and quick activation of the fire extinguishing means is often cited as the key to successful extinguishment. The decision process and detection time were not being separately investigated in detail in FIRESAFE I as they were not the main focus area, therefore it was decided to include both detection and decision in the same node of the risk model[9].

In this part of the study, this specific node shall be analytically investigated and separated into its two main components, namely detection and decision. In relation to detection especially, there seems to be a need of updating the currently applicable SOLAS Ch.II-2/ 20.4 which came into force in 2002 as a significant number of very serious accidents seems to be specifically connected to some sort of failure of detection leading to late reaction by the crew. One important question is if an efficient fire patrol system is maintained by a continuous fire watch at all times during the voyage, a fixed fire detection and fire alarm systems is not required as stipulated by 4.3.1 and another important question is if the current standards for installation of fixed detection systems (FSS Code, Ch. 9/ 2.4) are fit for purpose in relation to their efficiency on the different types of ro-ro decks. Regarding the latter, relevant simulations or tests are expected to be performed.

Regarding decision related issues, one of the main points to be addressed shall be the often discovered problem in fire incidents of crew members disregarding the indications of the fixed detection system, as it was reported in the Commodore Clipper incident: "*The fire detection system ceased to function at 0249:12; 6 minutes and 54 seconds after the first alarm. During this period, 16 sensors detected smoke, activating a combined total of 81 times. The system had been silenced 11 times and reset 7 times by the combined inputs from the bridge and ECR control stations*.[10]"

Based on the above information, the contractor shall perform a risk assessment following the methodology described in the FSA Guidelines (MSC-MEPC.2/Circ.12/Rev.1), leading to a range of proposed RCOs in relation to failure of detection and decision following fire incidents on ro-ro decks. The contractor shall assess the RCOs that are most likely to be cost beneficial for both newbuildings and existing ro-ro passenger ships. More specifically:

- Step 2 of the FSA process as described in the FSA Guidelines; a partial risk analysis shall be performed in order to quantify the probabilities of occurrence using up-to-date (until 2016) accident data. A sensitivity and uncertainty analysis shall also be performed;
- Step 3 of the FSA process; risk control options shall be developed together with the relevant quantitative reduction in risk. At least three RCOs per task (detection and decision) shall be to the Agency's satisfaction before proceeding to the next step;
- Step 4 of the FSA process; the RCOs defined in step 3 shall be analysed in a way to facilitate the understanding of the costs and benefits resulting from the adoption of an RCO and the pertinent costs and benefits for these RCOs shall be estimated. Finally, the cost-effectiveness of the RCOs shall be expressed in terms of suitable indices.

[8] An analysis of fixed water sprinkler systems on ro-ro decks – Rasmus Frid and David Palm, Department of Fire Safety Engineering and Systems Safety, Lund University, Sweden

[9] Study investigating cost effective measures for reducing the risk from fires on ro-ro passenger ships (FIRESAFE I)

[10] Report on the investigation of the fire on the main vehicle deck of Commodore Clipper while on passage to Portsmouth 16 June 2010 - MAIB

- Step 5 of the FSA process; specific proposals for rule making shall be discussed in a way that could be presentable to the relevant decision makers in an auditable and traceable manner.

Should it be necessary to visit existing ships in order to retrieve relevant information, provisions of anonymity shall be granted.

2.1.3. Deliverables

The contractor shall present the information detailed in 2.1.2 as the first report of the study. Following the delivery of the report, EMSA may produce comments with regard to its contents and possibly also provide contributions from expert parties. The contractor shall duly consider these comments, provide EMSA with a response thereto and, if deemed necessary review the final report to reflect additional, relevant elements arising from such comments.

2.2. Containment, Evacuation and Combined Assessment

2.2.1. Objective and scope

The main objective of this part of the study shall be to identify a range of RCOs and assess those most likely to be cost beneficial in relation to containment and evacuation after a fire incident on any ro-ro passenger ship, considering open, enclosed ro-ro spaces and weather decks as well as the composition of a combined assessment of all RCOs investigated so far including 2.1 and the FIRESAFE I study.

Overall, common tools used in risk analysis shall be used when carrying out the study as described in the Formal Safety Assessment (FSA) Guidelines of IMO. EMSA will make relevant accident data available to the contractor from the EMCIP and MARINFO databases, as far as this is permitted by disclosure clauses and by signing a non-disclosure declaration.

The analysis shall address both newbuildings and existing ships and if necessary, shall study separate RCOs taking into account the differences between the two groups.

The final outcome shall potentially include specific proposals aiming at regulatory amendments to the relevant regulatory instruments.

2.2.2. Description

2.2.2.1. Containment and evacuation

In the review of the casualty analysis correspondence group it was already highlighted that "*Many of the findings of the casualty investigation reports studied reiterate well-known problems, e.g. […] structural fire integrity and fire containment*[1]." Indeed, fire and smoke containment are well known issues in these incidents especially for the case of uncontrolled fires. In the case of the Lisco Gloria accident, however, the same document indicated that "*The A-60 fire insulation proved to be significantly more effective than one would have expected under the given circumstances and, supplemented by the measures of the crew, facilitated safe evacuation of the passengers.*"

It has also been observed that often drencher systems are mainly used for cooling and containment when the fires are fully developed, while external fire extinguishing means have also been used for containment purposes as well. This study shall question the adequacy of current means of fire and smoke containment and investigate RCOs that could mitigate the risk of containment failure.

Regarding the failure of evacuation the main issue to be addressed is related to SOLAS Ch. II-2, Reg. 20.3.1.5: "*Permanent openings in the side plating, the ends or deckhead of the space shall be so situated that a fire in the cargo space does not endanger stowage areas and embarkation stations for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo spaces."* The study shall indicate based on simulation or experimental results the optimal distance and arrangement of such openings. Other means of failure of evacuation following a fire on a ro-ro deck may also be identified and analysed, however the focus of the study shall be that of protection of stowage areas, embarkation stations and evacuation routes and LSA failure due to heat but not LSA failure due to intrinsic or environmental issues.

Additionally on evacuation issues, FSI 21/5 also reported that "attention was drawn to the need for escape ways to provide safe access to lifeboats and life rafts, and to difficulties of disembarking pedestrian passengers when the only means was via a single ramp to a vehicle, special category or ro-ro space".

Based on the above information, the contractor shall perform a risk assessment following the methodology described in the FSA Guidelines (MSC-MEPC.2/Circ.12/Rev.1), leading to a range of proposed RCOs reducing the risk of failure of containment and evacuation. The contractor shall assess the RCOs that are most likely to be cost beneficial for both newbuildings and existing ro-ro passenger ships. More specifically:

- Step 2 of the FSA process as described in the FSA Guidelines; a partial risk analysis shall be performed in order to quantify the probabilities of occurrence using up-to-date (until 2016) accident data. A sensitivity and uncertainty analysis shall also be performed;
- Step 3 of the FSA process; risk control options shall be developed together with the relevant quantitative reduction in risk. At least three RCOs shall be to the Agency's satisfaction before proceeding to the next step;
- Step 4 of the FSA process; the RCOs defined in step 3 shall be analysed in a way to facilitate the understanding of the costs and benefits resulting from the adoption of an RCO and the pertinent costs and benefits for these RCOs shall be estimated. Finally, the cost-effectiveness of the RCOs shall be expressed in terms of suitable indices.
- Step 5 of the FSA process; specific proposals for rule making shall be discussed in a way that could be presentable to the relevant decision makers in an auditable and traceable manner.

Should it be necessary to visit existing ships in order to retrieve relevant information, provisions of anonymity shall be granted.

2.2.2.2. Combined assessment

At the finalisation of the task of containment and evacuation failure, a combined assessment shall be conducted:

a) An analysis shall be conducted combining the results, proposals and applied RCOs from 2.1, 2.2 and FIRESAFE I. Uncertainty and sensitivity analyses shall be conducted identifying any potentially contradicting elements in the proposals.

RCOs that may reduce the risk in the scope of all the relevant parts shall be identified and analytically reported.

b) A combined Cost-Benefit Analysis (CBA) according to the IMO FSA Guidelines shall be conducted. Elements from the previous parts and reports may be used; however extensive explanations shall be given for all RCOs proposed.

c) After an objective comparison of the alternative options and based on the potential reduction of risks and its cost-effectiveness, specific recommendations for decision making shall be made.

2.2.3. Deliverables

The contractor shall present the information detailed in 2.2.2.1 as the second report of the study and the information detailed in 2.2.2.2 as the third report of the study. Following the delivery of the reports, EMSA may produce comments with regard to its contents and possibly also provide contributions from expert parties. The contractor shall duly consider these comments, provide EMSA with a response thereto and, if deemed necessary review the reports to reflect additional, relevant elements arising from such comments.

2.3. Alternative fixed fire extinguishing systems (optional)

2.3.1. Objective and scope

The main objective of this part of the study shall be to compare different available fixed fire extinguishing systems and evaluate their effectiveness in terms of extinguishment, suppression, containment and water consumption. The alternative of the water wall solution shall be one of the systems that shall be considered.

The analysis shall address newbuildings and existing ships, different deck types as well as the possibility of the existence of alternatively fuelled vehicles as cargo. The contractor may also draw information from previous relevant projects such as the IMPRO project that investigated the efficiency of water based active firefighting systems for ro-ro spaces.

2.3.2. Description

There is a question of drencher head effectiveness in water spray systems designed in accordance with resolution A.123(V) if a high vehicle is parked directly underneath. In a loaded vehicle deck there is very little space between the top of high vehicles and the drencher head, or for that matter, between vehicles, which also leads to a significantly reduced effectiveness of manual fire extinguishing means.

On this issue and according to 7 above it is reported that "*High pressure water mist systems seem to be particularly suitable because they disperse the fire-fighting agent very evenly throughout the room, also allowing it to reach covered areas.*"

In May 2008 MSC 84 approved and adopted MSC.1/Circ.1272 through MSC.265(84), Guidelines for the approval of fixed water-based fire-fighting systems for ro-ro spaces and special category spaces equivalent to that referred to in resolution A.123(V). These Guidelines provided a performance-based fire test method for the approval of water mist and other water-based extinguishing systems, intended to show equivalence to water spray systems designed in accordance with resolution A.123(V).

Since that time, research conducted in Sweden for the IMPRO project, along with a number of serious ro-ro fires, have shown that the water spray system design based on resolution A.123(V), was in need of improvement. A proposed outline of water spray system design improvements was provided to the relevant Correspondence Group at IMO by Sweden.

Within the Correspondence Group, it was decided that new water spray system guidelines should be combined with the performance guidelines in MSC.1/Circ.1272, to provide for a prescriptive option as well as a performance-based option.

It was the relevant working group's decision at FP 55 that, since either option provides a level of reliability that is significantly better than that provided by resolution A.123(V), revised guidelines should be approved with both options. In May 2012, MSC 90 approved the revised Guidelines[11] .

The working group considered that existing fixed fire-extinguishing systems for special category spaces, approved and installed based on resolution A.123(V), should be permitted to remain in service as long as they are serviceable. One of the main points that can be considered is that for existing ships there may be available solutions that have a better efficiency than resolution A.123(V); however their cost-effectiveness has not been studied.

The contractor shall evaluate the following:

- Through a desk study, the expected efficiency of alternative fixed fire extinguishing systems (including water walls) shall be evaluated regarding extinguishment, suppression, containment, water consumption and expected cost of installation on newbuildings and existing ships. An interim report based on this work shall be delivered;
- Based on the evaluation above, the system that is expected to have the best performance in combination with a feasible cost shall be tested in order to measure accurately the expected risk reduction in relation to a conventional drencher system. Relevant information on the risk model shall be taken from FIRESAFE I and from 2.2 above;
- A CBA shall be performed for the measured risk reduction according to the FSA Guidelines;
- If relevant, specific proposals for rule making shall be discussed in a way that could be presentable to the relevant decision makers in an auditable and traceable manner.

2.3.3. Deliverables

The contractor shall present the information detailed in 2.3.2 in two reports; one interim based on the first bullet point included therein and a final (fourth) report. Following the delivery of the reports, EMSA may produce comments with regard to its contents and possibly also provide contributions from expert parties. The contractor shall duly consider these comments, provide EMSA with a response thereto and, if deemed necessary review the reports to reflect additional, relevant elements arising from such comments.

2.4. Detection systems in open ro-ro and weather decks (optional)

2.4.1. Objective and scope

The main objective of this part of the study shall be to investigate the possibility and effectiveness of installation of fixed detection systems on open ro-ro and weather decks of passenger ships.

The analysis shall address newbuildings and existing ships, different deck types as well as the possibility of the existence of alternatively fuelled vehicles as cargo. The final outcome shall potentially include specific proposals aiming at regulatory amendments to the relevant regulatory instruments.

2.4.2. Description

Several total losses in recent years occurred on ro-ro passenger and cargo ships of the open Ro-Ro space type (Norman Atlantic, Sorrento, Lisco Gloria, Und Adriyatik). The open Ro-Ro spaces represent challenges with regard to fire scenario, as there is a well-ventilated fire under a tight steel deck which reflects heat and

[11] MSC.1/Circ.1430 Revised Guidelines For The Design And Approval Of Fixed Water-Based Fire-Fighting Systems For Ro-Ro Spaces And Special Category Spaces

accumulates fire gases. There are also notable challenges with regard to escape ways, location of life-saving appliances and air intake to the engine room and emergency generator, which can be contaminated and damaged by smoke and flames emerging from openings provided in the side of the Ro-Ro spaces[12].

One of the main issues with open ro-ro and weather decks is that detection systems may not be as efficient as in enclosed ro-ro spaces. In the case of smoke detection systems, this is also recognised by SOLAS, since it does not allow these systems to be a possible alternative to fixed fire detection and fire alarm systems (Ch.II-2, Reg. 20.4.2).

The contractor shall evaluate the following:

- Available and emerging fire detection technologies shall be evaluated for use on open ro-ro and weather decks. Video-analytics, fibre optic linear heat detection shall be considered among others;
- Through a desk study, the expected efficiency of these systems shall be evaluated in terms of activation time and sensitivity to weather conditions, loading conditions and deck configuration;
- Based on the evaluation above, the system that is expected to have the best performance in combination with a feasible cost shall be tested in order to measure accurately the expected risk reduction in relation to conventionally expected detection times;
- Relevant information on the risk model shall be taken from FIRESAFE I and from 2.1 above;
- A CBA shall be performed for the measured risk reduction according to the FSA Guidelines;
- If relevant, specific proposals for rule making shall be discussed in a way that could be presentable to the relevant decision makers in an auditable and traceable manner.

2.4.3. Deliverables

The contractor shall present the information detailed in 2.4.2 in two reports; one interim based on the first bullet point included therein and a final (fifth) report. Following the delivery of the reports, EMSA may produce comments with regard to its contents and possibly also provide contributions from expert parties. The contractor shall duly consider these comments, provide EMSA with a response thereto and, if deemed necessary review the reports to reflect additional, relevant elements arising from such comments.

3. Contract management responsible body

EMSA– Unit B.2.1, in charge of Ship Safety, will be responsible for managing the contract.

4. Project Planning

4.1. Reporting

The reports shall comprise the parts as required in sections 2.1.3, 2.2.3, 2.3.3 and 2.4.3 of these tender specifications. They shall be supplied in electronic form and one copy per report in paper form after their final approval.

The reports shall be written in clear, concise and correct English. It should be noted that the reports might be submitted to IMO as information papers and should therefore be drafted accordingly.

The reports shall be fully proof-checked by the contractor and presented in the style / layout described below.

[12] Fires on ro-ro decks – DNVGL (2016)

As regards the editorial features of the reports, the contractor shall adhere to the following:

- The text font shall be ‘Verdana’ or ‘Arial’; font style regular; size 10.
- Bold font shall be avoided as far as possible.
- The cover sheet of the report can be formatted as per contractor design but shall be subject to approval by EMSA. The rest of the report text shall be delivered in “Verdana” font as described above.

The report shall include:

- a contents page that links to the relevant sections;
- a figures page that links to the relevant figures;
- a tables page that links to the relevant tables;
- an abstract of no more than 200 words and an executive summary of maximum 6 pages;
- the following standard disclaimer:

  “*The information and views set out in this [report/study/article/publication…] are those of the author(s) and do not necessarily reflect the official opinion of EMSA. EMSA does not guarantee the accuracy of the data included in this study. Neither EMSA nor any person acting on EMSA’s behalf may be held responsible for the use which may be made of the information contained therein.*”

4.2. Meetings

The contractor shall hold a kick-off meeting with EMSA, at the contractor’s premises or other place of the contractor’s choice during the first month of the implementation of each specific contract.

At the completion of each report the contractor shall organise a meeting at the contractor’s premises or other place of the contractor’s choice to present to EMSA, and discuss in detail, the results of the study. At the end of each month of the study (every four weeks starting from the signing of the contract) web-meetings shall be arranged in order to report on the status of the study. If the completion of reports shall coincide, there is no need to hold two separate meetings.

The contractor may also be called to present the results of the study to the workshops on fires on ro-ro decks of 2017, 2018 and 2019 that are expected to be held at EMSA’s premises at the end of each year and to the FSA Experts Group of IMO. In addition to these meetings and workshops that are already foreseen, the contractor may be called to hold presentations to up to three additional unforeseen events in Europe, which should have a maximum duration of two days.The contractor shall cover all expenses in relation to these presentations within the price of the provided service.

Note: If the submitted reports are not of a standard deemed by EMSA to be sufficient, they will be returned to the contractor with appropriate comments, who will be responsible for their revision or rewriting.

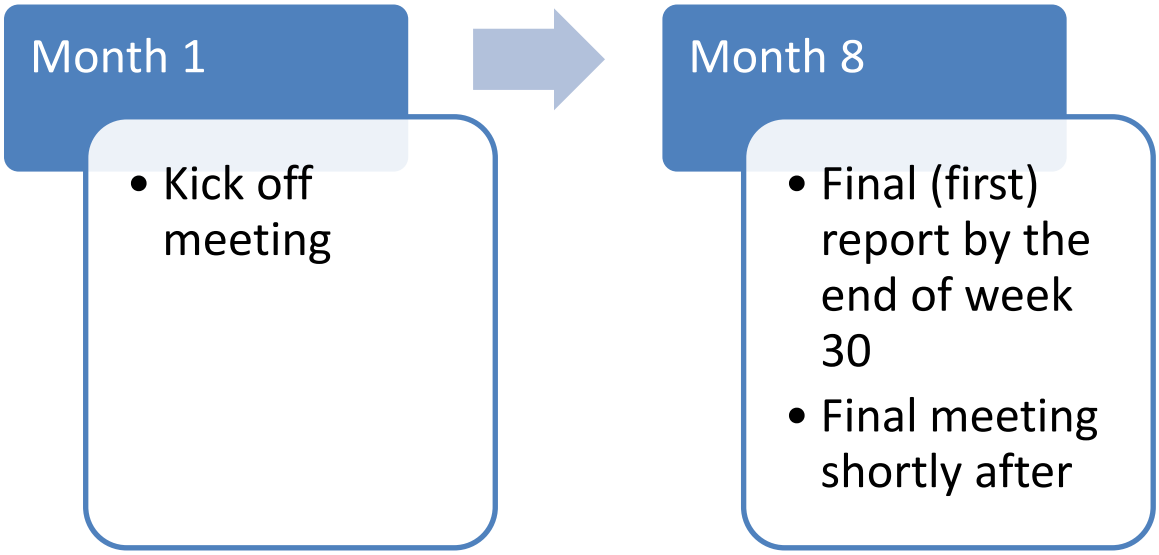
Finally, the contractor shall appoint a dedicated contact person who will establish and maintain direct communication with EMSA regarding any technical or contractual issues.

5. Timetable

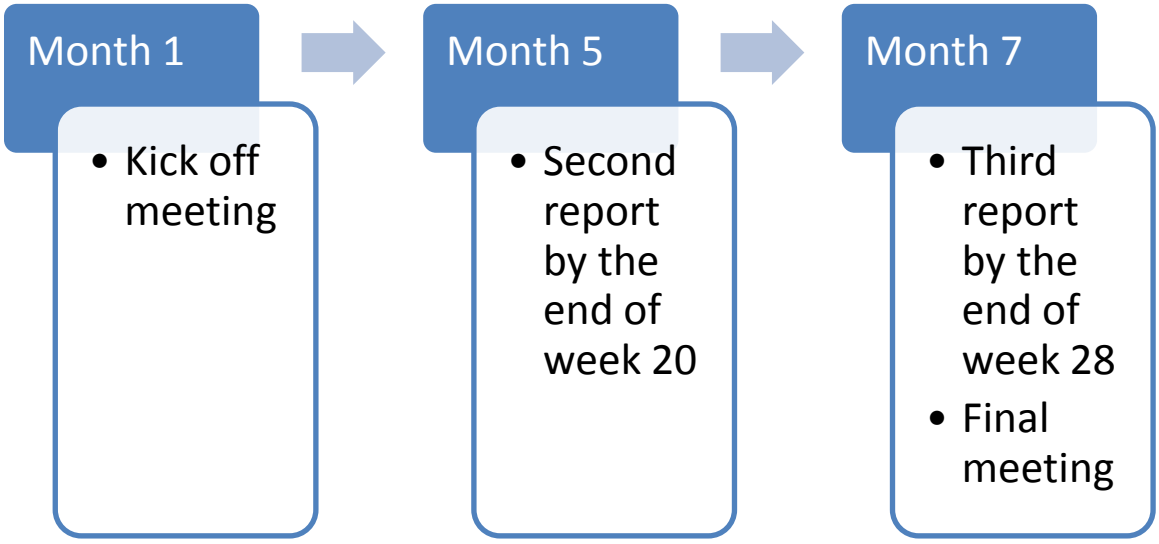
The estimated date for signature of the framework contract is September 2017. It should be noted that the first part of the study (2.1) is expected to commence as soon as the framework contract is signed and that the second part of the study (2.2) is expected to commence in early January 2018. The two other parts of the study (2.3, 2.4) might be commenced at any point during the execution of the study and could be requested to be running in parallel with the first parts of the study.

The timetable is set based on the required deliverables and meetings of each part of the study and shall be as follows:

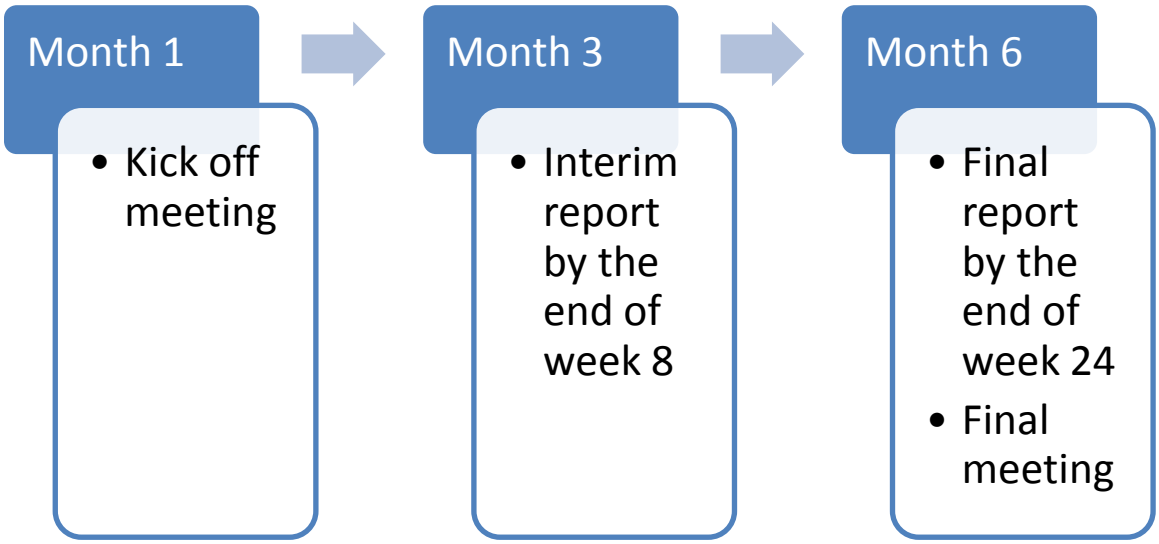
For part 1 (as described in 2.1):



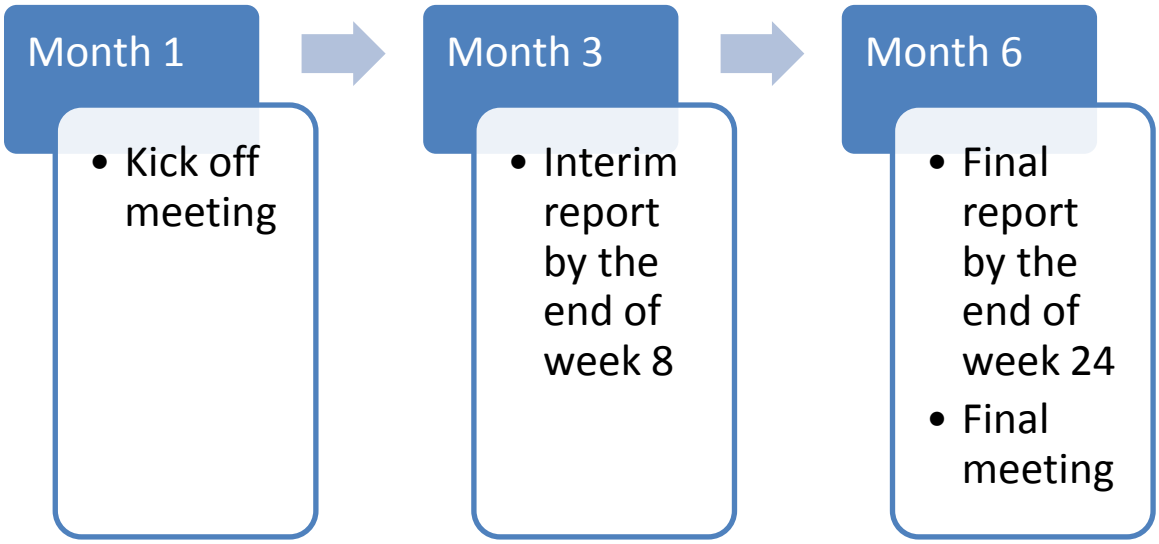
For part 2 (as described in 2.2):



For part 3 (as described in 2.3):



For part 4 (as described in 2.4):



As can be seen from the above, a maximum duration of 26 months shall be foreseen for the completion of the four parts of the study. The following important points must be noted:

- The various parts of the study may be requested to be done in parallel or within overlapping periods. In this case the number of meetings and the timetable will be adjusted accordingly.
- Within 3 years of the duration of the framework contract, the contractor may be requested to present the results of specific study or studies to the parties indicated under section 2.

- The travelling costs associated with these presentations (i.e. excluding the ones in the annual EMSA workshop on ro-ro fires as mentioned in 4.2) will be covered under the framework contract articles I.3.2 and II.16.

6. Estimated Value of the Contract

The maximum budget available for this contract is EUR 540.000 excluding VAT.

In addition, each part of the study will have the following estimated maximum budget (which includes the kick-off and final meetings):

- 1st part: 150.000 Euro
- 2nd part: 150.000 Euro
- 3rd part: 120.000 Euro
- 4th part: 120.000 Euro

7. Terms of payment

Payments shall be issued in accordance with the provisions of the draft framework contract available on the Procurement Section under the call to tender EMSA/OP/17/2017 on the EMSA website at the following address: www.emsa.europa.eu.

8. Terms of contract

When drawing up a bid, the tenderer should bear in mind the terms of the draft framework service contract.

EMSA may, before the contract is signed cancel the award procedure without the tenderers being entitled to claim any compensation.

9. Financial guarantees

N/A

10. Subcontracting

If the tenderer intends to either subcontract part of the work or realise the work in co-operation with other partners he shall indicate in his offer which part will be subcontracted, as well as the name and qualifications of the subcontractor or partner. It should be noted that the overall responsibility for the work remains with the tenderer.

The tenderer must provide required evidence for the exclusion and selection criteria on its own behalf and, when applicable, on behalf of its subcontractors. The evidence for the selection criteria on behalf of subcontractors must be provided where the tenderer relies on the capacities of subcontractors to fulfil selection criteria[13]. The exclusion

[13] To rely on the capacities of a subcontractor means that the subcontractor will perform the works or services for which these capacities are required.

criteria will be assessed in relation to each economic operator individually. Concerning the selection criteria, the evidence provided will be checked to ensure that the tenderer and its subcontractors as a whole fulfil the criteria.

11. Requirements as to the tender

Bids can be submitted in any of the official languages of the EU. However, as the main working language of the Agency is English, bids should preferably be submitted in English and should in particular include an English version of the documents requested under points 14.5 and 15 of the present tender specifications.

The tenderer shall complete the Tenderer's Checklist.

If the tenderer intends to either subcontract part of the work or realise the work in co-operation with other partners (Joint Offers) he shall indicate it in his offer by completing the form "Information regarding joint offers and subcontracting".

The tender must be presented as follows and must include:

- **a)** **A signed letter** indicating the name and position of the person authorised to sign the contract and the bank account to which payments are to be made.
- **b)** **The Financial Form** completed, signed and stamped. This document is available on the Procurement Section (Financial Form) of EMSA's website (www.emsa.europa.eu)
- **c)** **The legal Entity Form** completed, signed and stamped along with the requested accompanying documentation. This document is available on the Procurement Section (Legal Entity Form) of EMSA's website (www.emsa.europa.eu)

Tenderers are exempt from submitting the Legal Entity Form and Financial Form requested if such a form has already previously been completed and sent either to EMSA or any EU Institution. In this case the tenderer should simply indicate on the cover letter the bank account number to be used for any payment in case of award.

Part A: All the information and documents required by the contracting authority for the appraisal of tenders on the basis of the points **13, 14.2** and **14.5** of these specifications (part of the exclusion criteria).

Part B: All the information and documents required by the contracting authority for the appraisal of tenders on the basis of the **Economic and Financial capacity** (part of the Selection criteria) set out under point **14.3** of these specifications.

Part C: All the information and documents required by the contracting authority for the appraisal of tenders on the basis of the **Technical and professional capacity** (part of the Selection Criteria) set out under point **14.4** of these specifications.

Part D: All the information and documents required by the contracting authority for the appraisal of tenders on the basis of the **Award Criteria** set out under point **15** of these specifications.

Part E: Setting out **prices** in accordance with **point 12** of these specifications.

12. Price

a) Prices shall be quoted for the entire study as defined in section 2 above.
b) Prices for the study shall include all the required meetings and travel deemed necessary for the completion of the study.
c) Prices must be quoted in Euro.
d) Prices must be fixed amounts, non-revisable and remain valid for the duration of the contract.
e) Under Article 3 and 4 of the Protocol on the privileges and immunities of the European Union, EMSA is exempt from all duties, taxes and other charges, including VAT. This applies to EMSA pursuant to the Regulation (EC) No 1406/2002. These duties, taxes and other charges can therefore not enter into the calculation included in the bid. The amount of VAT must be shown separately.

13. Joint Offer

Groupings, irrespective of their legal form, may submit bids. Tenderers may, after forming a grouping, submit a joint bid on condition that it complies with the rules of competition. Such groupings (or consortia) must specify the company or person heading the project and must also submit a copy of the document authorising this company or person to submit a bid.

Each member of the consortium must provide the required evidence for the exclusion and selection criteria. The exclusion criteria will be assessed in relation to each economic operator individually. Concerning the selection criteria the evidence provided by each member of the consortium will be checked to ensure that the consortium as a whole fulfils the criteria.

If awarded, the contract will be signed by the person authorised by all members of the consortium. Tenders from consortiums of firms or groups of service providers, contractors or suppliers must specify the role, qualifications and experience of each member or group.

14. Information concerning the personal situation of the service provider and information and formalities necessary for the evaluation of the minimum economic, financial and technical capacity required

14.1. Legal position – means of proof required

When submitting their bid, tenderers are requested to complete and enclose the **Legal Entity Form** and requested accompanying documentation, available in the Procurement Section (Legal Entity Form) of EMSA's website (www.emsa.europa.eu).

14.2. Grounds for exclusion - exclusion criteria

To be eligible to participate in this contract award procedure, a tenderer must not be in any of the following exclusion situations**:**

a) it is bankrupt, subject to insolvency or winding up procedures, its assets are being administered by a liquidator or by a court, it is in an arrangement with creditors its business activities are suspended or it is in any analogous situation arising from a similar procedure provided for under national legislation or regulations;
b) it is subject to a final judgement or a final administrative decision establishing that it is in breach of its obligations relating to the payment of taxes or social security contributions in accordance with the law

of the country in which it is established, with those of the country in which the contracting authority is located or those of the country of the performance of the contract ;

c) it is subject to a final judgement or a final administrative decision establishing that it is guilty of grave professional misconduct by having violated applicable laws or regulations or ethical standards of the profession to which the person belongs, or by having engaged in any wrongful conduct which has an impact on its professional credibility where such conduct denotes wrongful intent or gross negligence, including, in particular, any of the following:
    i. fraudulently or negligently misrepresenting information required for the verification of the absence of grounds for exclusion or the fulfilment of selection criteria or in the performance of a contract;
    ii. entering into agreement with other persons with the aim of distorting competition;
    iii. violating intellectual property rights;
    iv. attempting to influence the decision-making process of the contracting authority during the award procedure;
    v. attempting to obtain confidential information that may confer upon it undue advantages in the award procedure ;
d) it is subject to a final judgement establishing that the person is guilty of any of the following:
    i. fraud
    ii. corruption
    iii. participation in a criminal organisation
    iv. money laundering or terrorist financing
    v. terrorist-related offences or offences linked to terrorist activities
    vi. child labour or other forms of trafficking in human beings as defined in Article 2 of Directive 2011/36/EU of the European Parliament and of the Council
e) the person has shown significant deficiencies in complying with the main obligations in the performance of a contract financed by the Union's budget, which has led to its early termination or to the application of liquidated damages or other contractual penalties, or which has been discovered following checks, audits or investigations by an Authorising Officer, OLAF or the Court of Auditors;
f) it is subject to a final judgement or a final administrative decision establishing that the person has committed an irregularity within the meaning of Article 1(2) of Council Regulation (EC, Euratom) No 2988/95
g) for the situations of grave professional misconduct, fraud, corruption, other criminal offences, significant deficiencies in the performance of the contract or irregularity, the applicant is subject to:
    i. facts established in the context of audits or investigations carried out by the Court of Auditors, OLAF or internal audit, or any other check, audit or control performed under the responsibility of an authorising officer of an EU institution, of a European office or of an EU agency or body;
    ii. non-final administrative decisions which may include disciplinary measures taken by the competent supervisory body responsible for the verification of the application of standards of professional ethics;
    iii. decisions of the ECB, the EIB, the European Investment Fund or international organisations;
    iv. decisions of the Commission relating to the infringement of the Union's competition rules or of a national competent authority relating to the infringement of Union or national competition law; or
    v. decisions of exclusion by an authorising officer of an EU institution, of a European office or of an EU agency or body.

14.3. Economic and financial capacity – Selection criteria

14.3.1. Requirements:

The tenderer must be in a stable financial position and must have the economic and financial capacity to perform the contract

14.3.2. Evidence:

a) Financial statements or their extracts for the last three years for which accounts have been closed.
b) Statement of the overall turnover and, where appropriate, turnover relating to the relevant services for the last three financial years available.
c) Tenderers are exempt from submitting the documentary evidence if such evidence has already been completed and sent to EMSA for the purpose of another procurement procedure and still complies with the requirements. In this case the tenderer should simply indicate on the cover letter the procurement procedure where the evidence has been provided.
d) If, for some exceptional reason which EMSA considers justified, a tenderer is unable to provide one or other of the above documents, he may prove its economic and financial capacity by any other document which EMSA considers appropriate. In any case, EMSA must at least be notified of the exceptional reason and its justification in the tender. EMSA reserves the right to request at any moment during the procedure any other document enabling it to verify the tenderer's economic and financial capacity.

14.4. Technical and professional capacity – Selection criteria

14.4.1. Requirements:

The successful tenderer shall have a strong background in risk analysis, in particular related to IMO's FSA procedure and cost benefit analysis, but also technical expertise on issues related to fire safety of passenger ships, and the capacity to produce feasible RCOs with their relevant maintenance and operational costs. Furthermore, there shall be clear demonstration of relevant experience and expertise on fire extinguishing tests and on relevant CFD calculation tools.

In order to prove this technical capability, the tender shall include professional CV's of the team members proposed for the project, examples of the successful completion of similar technical projects by the company and other relevant studies.

14.4.2. Evidence:

The following information shall be provided:

i. A list of the resources to be used for the study, including technical equipment and available data sources especially regarding the cost of RCOs;

ii. The details of educational and professional qualifications of the persons providing the services, proving a relevant in-depth knowledge of the subjects of this tender;

iii. A list of the relevant projects in the past 5 years proving previous achievement and experience in the field of risk analysis;

iv. A list of major projects concerning fire safety carried out in the past 5 years;

Evidence of the knowledge and experience in the fields mentioned above shall be provided on the basis of a list of related services in which the tenderer has participated and worked. This shall include a description of the services with indication of the objectives, contracting parties, duration and budget.

14.5. Evidence to be provided by the tenderers

For this purpose the Declaration of Honour available on the Procurement Section of EMSA's website (www.emsa.europa.eu) shall be completed and signed.

Please note that **upon request** and within the time limit set by EMSA the tenderer shall provide information on the persons that are members of the administrative, management or supervisory body, as well as the following evidence concerning the tenderer or the natural or legal persons which assume unlimited liability for the debt of the tenderer:

For exclusion situations described in (a), (c), (d) or (f) of point 14.2 above, production of a recent extract from the judicial record is required or, failing that, an equivalent document recently issued by a judicial or administrative authority in the country of establishment of the tenderer showing that those requirements are satisfied.

For the exclusion situation described in (a) or (b) of point 14.2 above, production of recent certificates issued by the competent authorities of the State concerned is required. These documents must provide evidence covering all taxes and social security contributions for which the tenderer is liable, including for example, VAT, income tax (natural persons only), company tax (legal persons only) and social security contributions. Where any document described above is not issued in the country concerned, it may be replaced by a sworn statement made before a judicial authority or notary or, failing that, a solemn statement made before an administrative authority or a qualified professional body in its country of establishment.

If the tenderer already submitted such evidence for the purpose of another procedure, its issuing date does not exceed one year and it is still valid, the person shall declare on its honour that the documentary evidence has already been provided and confirm that no changes have occurred in its situation.

If the tenderer is a legal person, information on the natural persons with power of representation, decision making or control over the legal person shall be provided only upon request by the contracting authority.

When the tenderer to be awarded the contract has already submitted relevant evidence to EMSA, it remains valid for 1 year from its date of submission. In such a case, the reference of the relevant project(s) should be mentioned and the tenderer is required to submit a statement confirming that its situation has not changed.

15. Award criteria

Only the tenders meeting the requirements of the exclusion and selection criteria will be evaluated in terms of quality and price.

The contract will be awarded to the tenderer who submits the most economically advantageous bid (the one with highest score) based on the following quality criteria and their associated weightings:

1. **Quality criterion 1: Proposed methodology for assessment of the costs and benefits.** This criterion shall be evaluated based on a separate section in the tender referring to all parts requiring an assessment of costs and benefits especially by providing the intended methodology for the estimation of costs. ($W_1 = 10\%$)
2. **Quality criterion 2: Proposed methodology of part 1.** This criterion shall be evaluated based on a draft list of contents of the report and an outline of the methodology proposed for the first part of the study described in section 2.1. ($W_2 = 20\%$)
3. **Quality criterion 3: Proposed methodology of part 2.** This criterion shall be evaluated based on a draft list of contents of the report and an outline of the methodology proposed for the second part of the study described in section 2.2. ($W_3 = 20\%$)
4. **Quality criterion 4: Proposed methodology of part 3.** This criterion shall be evaluated based on a draft list of contents of the report and an outline of the methodology proposed for the second part of the study described in section 2.3. ($W_3 = 10\%$)
5. **Quality criterion 5: Proposed methodology of part 4.** This criterion shall be evaluated based on a draft list of contents of the report and an outline of the methodology proposed for the second part of the study described in section 2.4. ($W_3 = 10\%$)

and the price criterion and associated weighting:

6. **Price of the bid** ($W_{Price} = 30\%$).

For all bids evaluators will give marks between 0-10 (half points are possible) for each quality criterion.

The score is calculated as

$$S = SQ + SP$$

where:

The average quality for quality criterion i is

$$Q_i = \frac{1}{number\ of\ evaluators} * \sum_{evaluator} mark\ of\ the\ evaluator\ for\ quality\ criterion\ i$$

The overall weighted quality is

$$Q = \sum_i Q_i * W_i$$

The score for quality is

$$SQ = \frac{Q}{Q\ of\ the\ bid\ with\ highest\ Q} * 100 * \sum_i W_i$$

The score for price is

$$SP = \sum_i \frac{lowest\ Price_i\ of\ all\ bids}{Price_i} * 100 * W_{Price_i}$$

Only bids that have reached a minimum of 60 % for Q_1, Q_2, Q_3, Q_4 .and Q_5 will be taken into consideration when calculating the score for quality SQ, score for price SP and score S.

Only bids that have reached a minimum of 70 % for the score S will be taken into consideration for awarding the contract.

Rejection from the procedure

Contracts will not be awarded to tenderers who, during the procurement procedure, are in one of the following situations:

a) are in an exclusion situation;

b) have misrepresented the information required as a condition for participating in the procedure or have failed to supply that information;

c) were previously involved in the preparation of procurement documents where this entails a distortion of competition that cannot be remedied otherwise.

16. Intellectual Property Right (IPR)

Please consult the contract for IPR related clauses.

If the results are not fully created for the purpose of the contract this should be clearly pointed out by the tenderer in the tender. Information should be provided about the scope of pre-existing rights, their source and when and how the rights to these rights have been or will be acquired.

In the tender all quotations or information originating from other sources and to which third parties may claim rights have to be clearly marked (source publication including date and place, creator, number, full title etc.) in a way allowing easy identification.

Annex

List of abbreviations

BEV: Battery Electric Vehicles
CA CG: Casualty Analysis Correspondence Group (of the FSI Subcommittee)
CBA: Cost-Benefit Analysis
CFD: Computational Fluid Dynamics
ECB: European Central Bank
ECR: Engine Control Room
EIB: European Investment Bank
EMCIP: European Marine Casualty Information Platform
EMSA: European Maritime Safety Agency
EU: European Union
FP: Fire Protection (IMO Subcommittee)
FSA: Formal Safety Assessment
FSI: Flag State Implementation (IMO Subcommittee)
GoE: Group of Experts
HEV: Hybrid Electric Vehicles
IMO: International Maritime Organization
IPR: Intellectual Property Rights
LSA: Life Saving Appliances
MSC: Maritime Safety Committee (IMO)
RCOs: Risk Control Options
SDC: Ship Design and Construction (IMO Subcommittee)
SSE: Ship Systems and Equipment (IMO Subcommittee)