

1. DEFINITIONS

Party/Parties: refers to Naval-DME, the client and the BWMS maker, as the case may be.

Customer/client: denotes the company, entity or individual described in the contract as the purchaser of Naval-DME consulting services.

Draft Bill of Materials (BOM): a list of the equipment that may be subjected to changes until the final version is issued.

2. 3D LASER SCANNING

3D laser scanning is the procedure to record the 3D dimensional space in (x,y,z) coordinates. This is achieved using laser equipment by trained Naval Architects. In order to perform the 3D laser scanning, the following procedure has to be implemented. The customer has to state his intention to scan the vessel at least **20 weeks before the scheduled dry dock**. The duration of the scan varies and is depended on the ship type. The number of scans increase, when other areas apart from the engine room are deemed to be scanned. Thus, the days on board the vessel will be communicated before the scanning survey on the specific vessel with the client. For that reason, Naval-DME requests a set of specific drawings to specify the areas of interest and consequently the scanning duration.

The scanning procedure is highly affected, by the sea state the vessel is in, during the survey. It is preferable, that during the scanning survey the vessel is in protected waters, because the movement of the vessel will induce inaccuracies on the collected data. This will have an impact on the engineering phase. The scanning procedure is also affected by the ambient conditions on the vessel. High temperatures and extensive vibrations will force the equipment to shut down. If the protected water condition is not feasible, the client will be informed before the survey for all the possible delays, as well as also during the survey.

Before the survey the client will be informed for all the preparatory actions, that need to be done by the crew members (removal of floor panels etc.) and if a crew member must be present along with the Naval architects performing the scanning survey. The surveyors will ask for relevant information and they will take photos, while they are on board.

Prior to the survey, the surveyors will request an electronic copy of all the relevant drawings, that will be used later during the engineering process. Finally, an attestation letter will be signed, before the surveyors depart from the vessel stating their names, the duration of the survey and any other kind of additional remarks.

When the collected data reach Naval-DME premises, they will be processed and in ten (10) calendar days a scanning report will be delivered to the client depicting captured data for the client's overview and comments.

3. FEASIBILITY STUDY / CONCEPT DESIGN

Feasibility study is the design procedure, that will assess the operational and the mechanical soundness of a proposed project. The feasibility study will start after the scanning survey, as soon as the client states his proposal for one or more equipment makers, which will be examined. If the client proposes for assessment one maker only, then the study becomes a concept design.

If the client provides to Naval-DME 3D scanning data acquired by another company/office, Naval-DME will process the data to determine the compliance with its standards. Failing to meet the standards Naval-DME will analytically inform in written the client.

At the beginning of the study, Naval-DME under the authorisation of the client will contact the selected makers/maker to obtain all the required technical documents, specs and 3Dmodels. Any delays imposed by the maker to deliver the forementioned documents, will be added to the final delivery date of the study. The client will be informed during the delay via email correspondence.

The duration of the study for a BWMS installation is four (4) weeks for the first maker and five (5) additional working days for each extra, if more than one is selected. The above duration is generic and usually is mutually agreed between Naval-DME and the client.

The scope of work of the study would be to model the complete main piping and the relevant components, and install the selected system considering the following criteria: minimise structural modifications, fulfil the makers requirements and the Classifications societies rules, as well as design according to an optimum shipbuilding practice.

At the end of the feasibility study/concept design Naval-DME will deliver to the client a feasibility study/concept design report. The report will include illustrated images from the modeled configuration for the client's ease of understanding. At the same time a teleconference meeting is suggested for the analysis of the feasibility/concept design report. After the delivery of the report the client has the right to submit **comments and remarks within ten (10) working days**. Client's comments will be taken into consideration and discussed in detail. The proposed modifications, as may be raised by the client, will be applied on the basic model after mutual agreement. **The basic model will be modified once**. Any additional modification, that does not comply with the above, can be applied only after mutual agreement (pricing, delivery time etc.) on a case-by-case basis.

4. ENGINEERING STUDY

When the configuration proposed by Naval-DME along with the comments/remarks, the technical details and the material choice for piping are finalised, the engineering study will begin. The scope of work for the engineering study is the following:

- Prepare the final 3D assembly configuration to be submitted to the maker for approval
- Produce all the documents/drawings for Class approval
- Prepare all the construction drawings and the technical specification for the installation

The estimated time until class submission is ten (10) weeks for a standard project. Special projects to be discussed.

Naval-DME will deliver to the client a **Draft Bill of Materials** four (4) weeks after the beginning of the engineering study in a table format to facilitate the client. **The Final Bill of Materials will be delivered after Class approval**. If the client wishes different delivery times for the BOM, this has to be communicated at the beginning of the engineering study.

Naval-DME will submit the 3D assembly configuration and all relevant documentation to the maker of the equipment to be installed for approval. The client would be in copy to the correspondence and any delays may arise, would be added to the delivery time of the study. The same will imply if the maker fails to deliver technical documents and technical information in due time.

If the client uses the Draft bill of materials for purchasing reasons, he should inform Naval-DME and provide all the data sheets of the equipment before the purchase, in order Naval-DME to verify that the equipment in question is according to specification.

Naval-DME must be informed at the beginning of the engineering study for any other installations of equipment that may impose limitations to the study (piping, installation area).

At the end of the engineering study Naval-DME will deliver a technical specification to the client. The technical specification will present all necessary modifications and will describe all the specification for the materials relevant to the installation. The technical specification will not provide details regarding the staging of the installation.

After the submission for Class approval, Naval-DME considers the proposed configuration as Final. After this point, any modifications at owner's request, would be considered as a separate study.

5. ATTENDANCE

The attendance as a service is provided by Naval-DME upon agreement with the customer. The attendance duration must be agreed before the start of the installation procedure. If otherwise, Naval-DME cannot guarantee recourses to be available at the requested time. The purpose of the attendance is to secure, that the installation is according to the specification and the Class Rules. For any deviation from the delivered technical specification / construction drawings due to customer's on-site changes, Naval-DME holds the right not to participate to the subsequent actions and thus cannot be held accountable for the resultant consequences.

6. DRAWINGS AND TECHNICAL DOCUMENTATION

Prior to the scanning survey Naval-DME will request from the client drawings and technical documentation from the vessel. The drawings have to be in electronic format (pdf, dwg etc.). Any other format (pics, photos) is accepted for information only.

If any of the drawings are not available onboard, they can be obtained from classification society.

The information and drawings shall be in English.

Below a list of relevant drawings is cited for ease of reference:

MECHANICAL PART:

1. E/R & Hull piping specification booklet
2. E/R & Hull Valve specification booklet
3. Ballast PnID
4. F.W. Cooling PnID
5. Compressed & Control Air PnID
6. Fire & G.S. pump System PnID
7. Bilge System PnID
8. S.W. Cooling System PnID
9. Ballast Pumps specification booklet/drawings with curve
10. Ballast Eductor specification booklet/drawing with curve
11. Capacity Plan
12. G.A.
13. Ballast Water Management Plan
14. Engine Room Arrgm./Layout
15. Ballast piping orientation plan (if exists)
16. Trim & Stability Booklet
17. Hazardous areas Plan
18. Fire & Safety Plan
19. Remote Control Valve Box system documentations/drawings
20. E/R Ventilation duct/pipes arrgm. & Drawings
21. Air pipes from/to Tanks plan

22. E/R & Hull Insulation Plan

23. Loading Manual

CONSTRUCTION DRAWINGS:

1. Engine Room Construction drawings
2. Double Bottom Construction drawings
3. Upper Deck & C.H. constr. drawings
4. Construction Profile and Deck Plan
5. Midship Construction drawings
6. Shell Expansion Plan
7. Sea Chest Arrgm. & Construction drawings
8. E/R & Hull Outfitting detail drawings
9. E/R & Hull Overboards arrgm. & Drawings

ELECTRICAL PART:

1. Electric Load Analysis
2. MSB & Power wiring diagram
3. AMS wiring diagram /plan
4. Control & Instrumentation System Plan
5. Short Circuit Plan/Calculations
6. Wiring diagram of Electric Power System
7. Wiring diagram of Control Instrumentation System
8. Electric Connection diagram
9. Electric Power equipment arrangement
10. Wiring diagram of Cargo Control Console