

# Ship Design Services

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Preliminary Design



ROMV® | PRELIMINARY DESIGN SERVICES

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ROMV CORPORATE MANAGEMENT SYSTEMS S.A.

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## Ship Design Philosophy

### Constraints

Every ship design must satisfy a purpose and this is usually defined in the Shipowner's Requirements. While the shipowner's requirements are not really constraints they set the boundaries for the design. *"Physical constraints might be applied to the design itself for any one of three reasons: the need to build the ship in a specific shipyard and then get it to sea, the need to maintain the ship during its service life, and the need for the ship to visit specific ports"*.

### Philosophy

A design philosophy is a weighted list of desired design/ship attributes that is used in the evaluation of design alternatives. Examples of such attributes include:

- First cost,
- Operating cost,
- Manning,
- Producibility,
- Operability,
- Maintainability,
- Reliability,
- Mission capability,
- Sustainability,
- Supportability, and
- Risk (cost, schedule and technical).

### Degree of Uniqueness

Contemporary designs cover the gamut in terms of their uniqueness. Some new designs are very similar to existing ships with modest changes, for example, somewhat more or less propulsion power or payload. Other designs reflect significant changes from current practice in specific respects, the propulsion plant type might be an example, but in all other respects they are not unique. At the extreme, and quite rare, is the design that is very different from anything considered before. The rare unique design is not only an exciting challenge for the naval architect but it affects the approach to early stage design as well. This, in turn, might require a major effort to assess the anticipated hydrodynamic loads on the structure. The point designs, once they have been developed, can be used as parents to explore the effects of parametric variations in other, second order parameters. For the unique design, early stage design progress is slower, more difficult, and the design results are much less certain, that is, there is a higher degree of risk in the results of early stage studies of unique designs.

## Ship Design Scope of Work

### Naval Architecture & Marine Engineering Assignments

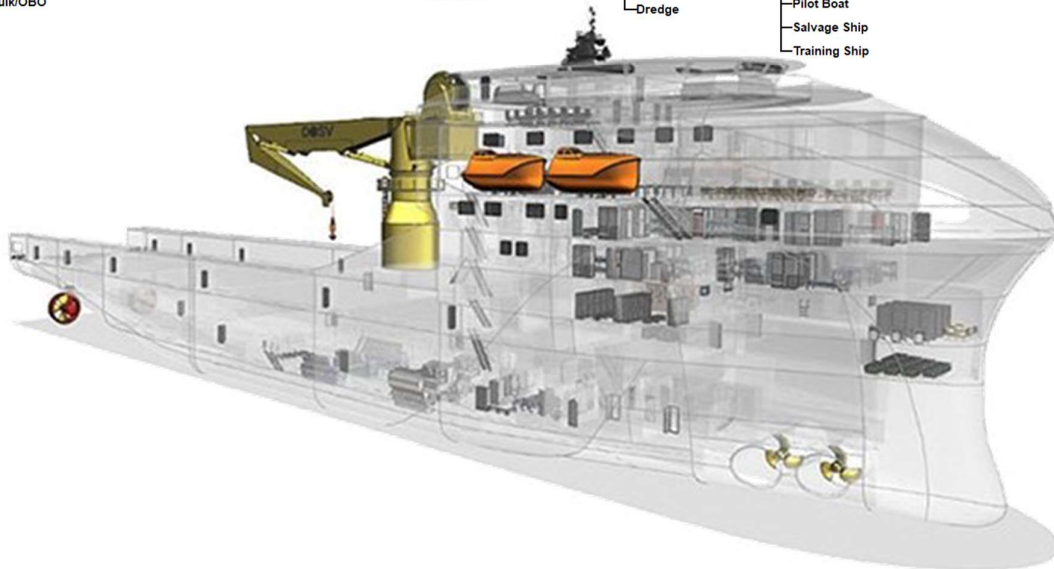
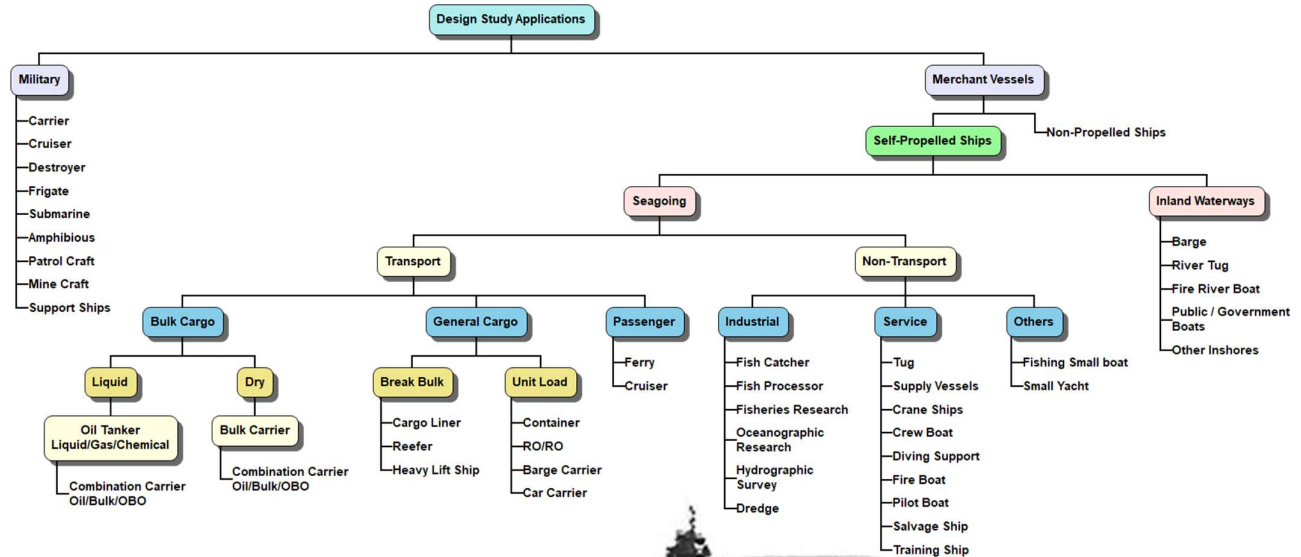
To perform all work on a design project, we consider the following activities as included in our design services:

- Technical analyses including analyses of shipboard systems and structures to determine applicability and optimize use of equipment and space and vibration analyses.
- Calculations in support of submitted designs in the form of reports and sketches will be indexed and stamped by a professional engineer for record keeping and filing with the customer regulation.
- Design of shipboard electrical and mechanical systems and structure including but not limited to the following:
  - Electrical systems including ventilation, steering, air conditioning, vehicle, passenger and crew space lighting and electrical support systems, ships navigation electrical systems including navigation lights, radios, radars, and depth finding systems, electrical systems for habitability systems including galley equipment, and various electrical motors and systems including boat davits, winches and anchoring systems, boat handling equipment, and mooring and anchoring equipment, corrosion control cathodic protection, machinery automation and monitoring and alarm systems, steering controls, propulsion controls, propeller controls, and generator controls.
  - Vessel structure including shell plating, frames, strength members, hull lines, vessel stability, habitability features for passenger and crew spaces, and boats and lifesaving equipment.
  - Mechanical systems including vessel main engines, generators, steering systems, heating, ventilation, air conditioning, firefighting, compressed air, hydraulics, freshwater, sanitation systems, boat handling equipment, and mooring and anchoring equipment.
- Ship checks to ascertain existing conditions in preparation for design development.
- Feasibility studies to determine efficacy and and/or cost benefit of various engineering approaches to solutions of problems or dealing with situations requiring attention, correction, or improvement.
- Drawing and specification preparation in support of Ship Preservation, Improvement, Life Extension, New Construction, and Repair and Maintenance work.
- Cost estimate reports for design work and/or production work for implementation of designs.
- Design support during Ship Preservation, Improvement, Life Extension, New Construction, and Repair and Maintenance work.
- Public involvement: Coordinate, plan, prepare for, and attend coordination, progress, or presentation meetings with the customer and/or other representational officials, groups and/or individuals as may be requested.
- Co-location: Provide on-site technical and non-technical personnel to participate in project design teams led by our managers or other consultant project managers according to custom project methodologies.
- Perform other related assignments as requested by the customer.

## Ship Design Study Applications

### Categories

For the **scope of work**, we classify all ships based on floating structures Military and Merchant, later non propelled and self-propelled, seagoing and Inland Waterways, finally Transport and Non-Transport. transport and non-transport, with three and four sub-categories, respectively. Our process description applies to all of the sub-categories. We incorporate simplified and effective design exploration models with the ability to quickly generate ship characteristics corresponding to various combinations of payload and speed. Our models estimate the capital and operating costs for each alternative. Optimization techniques may be applied to the major variables to compare alternatives and search for the optimum or graphical output of performance metrics shown for the study option space so that a human decision-making selection can be made at the customer side.



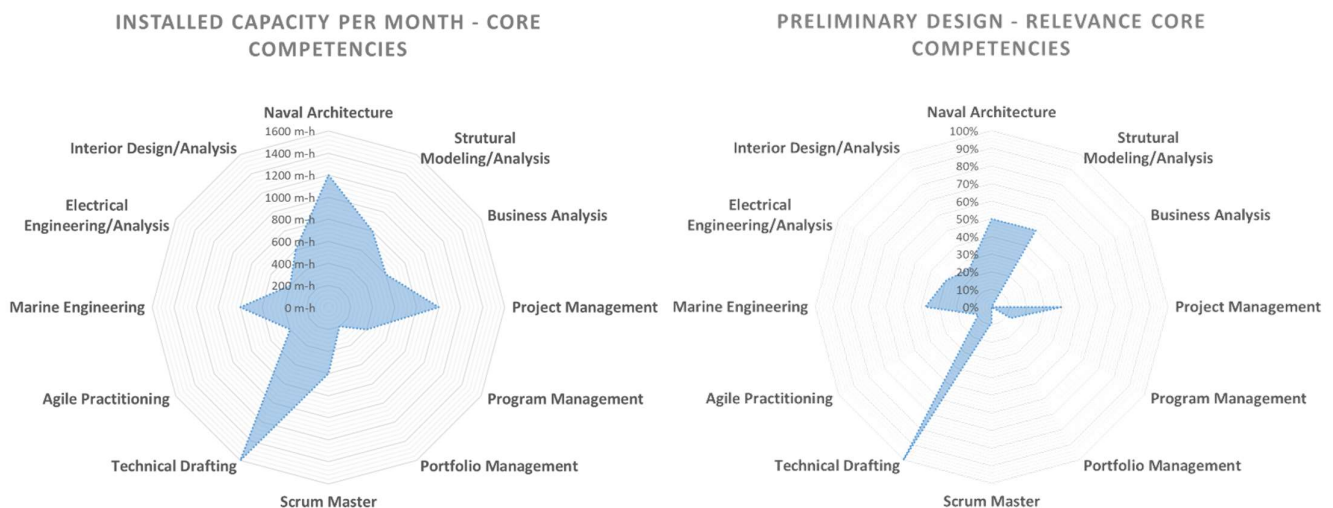
# Ship Design Services

Preliminary Design

## Our Team

### Competencies Radar

As a project must be well conceived and adequately financed, our resources are specialists, and experienced consultants, skillfully coordinated and managed to reach **project success** as customer it defines. We know the larger and more complex the project, the more critical this overall management function becomes, for that reason and based on our research, **we have identified twelve core competency** areas strictly considered in our services. These knowledges area have three pillars. **The first pillar** contains general management skills such as leadership, negotiation, communication, team building and other human resource management skills that are necessary in any management position. **The second pillar** contains knowledge of the accepted project management areas including the tools used in ten knowledge areas (such as project scope, time, cost, quality, resources, procurement, communication, risk, stakeholder, and integration management). **The last pillar** contains naval architecture and marine engineering specific management knowledge, such as lifecycle management and product development methodologies. We have an **Installed Capacity** of 8600-man hours each month distributed in two physical offices, Guayaquil and Duran, Ecuador, and we dedicate partial of the capacity for **Preliminary Design Service accordance to Relevance Core Competencies**:



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# Preliminary Design Products

## Deliverables

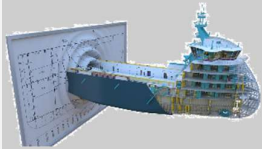
Our preliminary design service leads to provide a greater level of detail, especially identifying and defining those features, which have a significant effect on other characteristics of the ship, including cost. For example, a calculation of the longitudinal strength of the hull and the development of the midship section permit us a more accurate calculation of the weight and center of gravity of the vessel. This, in turn, not only permit us a more accurate calculation of draft, deadweight capability and stability, etc., also should provide sufficient detail to permit us the verification of both the technical and economic feasibility study of the ship. Since the eventual cost and performance will be established largely by the end of the preliminary design phase, since the beginning of this phase the feasibility study or concept design input information satisfied the performance requirements developed and available at this time, and this forms the starting point for our preliminary design effort. Finally, during this phase, formal tradeoff studies are performed on design issues that will have a major effect on ship size, overall configuration, performance, cost, or risk, and the issues that do not have a major impact on these parameters will be deferred to the following phases. The products of a single preliminary design may include the following items:

1. Performance specification
2. Lines drawing and appendage sketch.
3. Area/volume report (required vs. actual)
4. General arrangement drawings
5. Topside arrangement drawing
6. Line of sight analysis
7. Payload definition
8. Descriptions of principal ship systems and features
9. Weight report (3-digit level, KG and LCG)
10. Structural midship section
11. Preliminary scantling drawings
12. Propulsion system analysis
13. Machinery arrangement drawings
14. Shafting arrangement
15. Preliminary propulsor design
16. Electric load analysis
17. HVAC load analysis
18. One-line electrical diagrams
19. Typical space arrangements
20. Deck systems arrangements
21. Ship control and communications systems analysis
22. Preliminary Master Equipment List (MEL)
23. Preliminary ship manning analysis
24. Stability analysis, intact and damaged
25. Speed-power curves
26. Endurance fuel analysis
27. Seakeeping and maneuvering analyses
28. Model test plan
29. Other performance estimates, as required, for example, radiated noise.
30. Preliminary availability analysis
31. Maintenance concept
32. Supportability concept
33. T&E plan (draft)
34. Preliminary safety analysis
35. Build strategy (draft)
36. Shipyard production specification (Policy)
37. Cost estimate
38. Technical risk assessment and risk management plan

## Preliminary Design Cost Estimation

### About Ship Application

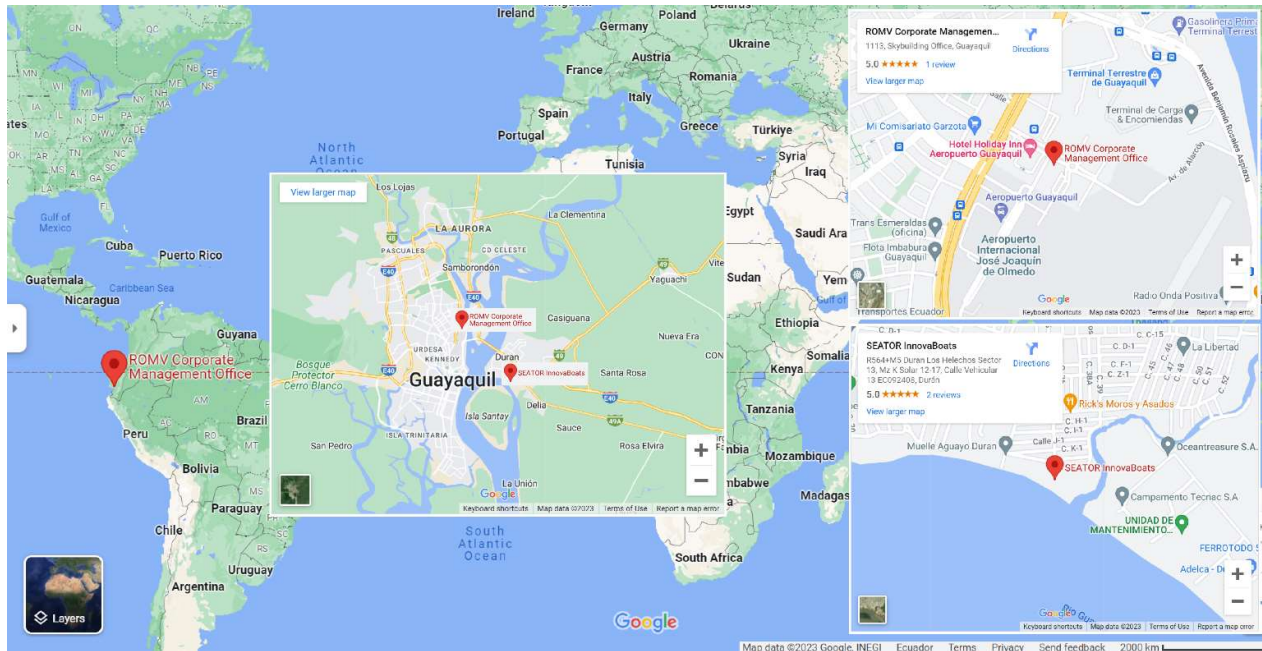
Our cost estimation during **preliminary design** activities is at a very high level and makes rather broad assumptions about the ship design, its general mission, and its physical and operational characteristics. We dedicate experienced consultants making broad assumptions about the general methods and organization of the design, engineering, and construction processes, and as a rough order of magnitude we prepared this cost estimation for floating structures applications, Merchant Vessels, and Naval Vessels, grouped by their size:

Design Code	Objectives	Time/Cost Estimation
<p>ROMVSDCI_PD Preliminary Design Service</p> 	<p>1. <u>Provide a greater level of detail, especially identifying and defining those features, which have a significant effect on other characteristics of the ship, including cost</u></p>	<ul style="list-style-type: none"><li>○ Merchant Ships<ul style="list-style-type: none"><li>● Us\$49476</li><li>● Us\$15.23/man-hour</li><li>● 15-16 Weeks</li><li>● 3248 man-hours</li></ul></li><li>○ Naval Ships<ul style="list-style-type: none"><li>● Us\$54777</li><li>● Us\$15.23/man-hour</li><li>● 16-18 Weeks</li><li>● 3596 man-hours</li></ul></li></ul>

# Ship Design Services



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**Outfit & Furnishings . Integration & Engineering**  
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