

# PROJECT MANAGEMENT OFFICE




**ASTINAVE** *EP*  
*ASTILLEROS NAVALES ECUATORIANOS*

## ***Technical Report Requirement for the Acquisition of Elements of the Propulsion Lines for the ZEUS Project***

INF-ZEU-101

DECEMBER / 2024

 <b>ASTINAVE</b> <small>EP</small> <small>ASTILLEROS NAVALES ECUATORIANOS</small>	<b>TECHNICAL REPORT REQUIREMENT FOR THE ACQUISITION OF ELEMENTS OF THE PROPULSION LINES FOR THE ZEUS PROJECT</b>	<b>INF-ZEU-101 FOR-GLO-002</b>
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## 1. BACKGROUND

The Ecuadorian Navy, committed to the Defense and Security of our Territorial Sea, in accordance with articles 22 of the Organic Law of the National Public Procurement System -LOSNC- and 43 of its General Regulations -RGLOSNC-, the Annual Procurement Plan of the General Directorate of Material, contemplates the **"RECOVERY OF THE GALAPAGOS, EL ORO AND ESMERALDAS CORVETTES"**.

Through Official Letter No. **ARE-DIRLOG-PRY-2022-0026-O** dated March 18, 2022, the Ecuadorian Navy requests ASTINAVE EP, a commercial proposal for the Recovery of the 03 Corvettes, which is sent through **"DOC-PMO-186-R ROM Commercial Proposal Recovery of the Galapagos, El Oro and Esmeraldas Corvettes"** to the ECUADORIAN NAVY, in response to the request submitted by said institution.

On **December 6, 2022**, Contract No. **COGMAR-COT-001-2022** was signed, corresponding to the **"RECOVERY OF THE GALAPAGOS, EL ORO AND ESMERALDAS CORVETTES"**, freely and voluntarily, through which the parties expressly declare their acceptance of everything agreed in the aforementioned contract and submit to its stipulations.

With Memorandum No. **GDP-PMO-0122-2023** of January 3, 2023, the **"ZEUS"** Project is established with the scope of "Recovering the operability of the systems and equipment of the Galápagos, El Oro and Esmeraldas Corvettes in the construction groups established in Contract No. **COGMAR-COT-001-2022**; in order to have renovated operational units with a useful life of at least 15 years."

"By means of Official Letter No. **ARE-CPFG-EMT-OGE-2023-0001-O** dated **January 17, 2023**, the Administrator of **Contract No. COGMAR-COT-001-2022** notifies the General Manager of ASTINAVE EP of the payment of the advance"


By means of Official Document No. **ARE-DIRLOG-PRY-2024-0174-O** signed on May 14, 2024, the report of acceptance of the extension to Phase II was received from the Administrator of Contract No. **COGMAR-COT-001-2022**. The extension moves Phase II of the aforementioned contract to August 16, 2024.

Consequently, the ZEUS Project requires the **"ACQUISITION OF COMPONENTS OF THE PROPULSION LINES FOR THE ZEUS PROJECT"**, to satisfy our client's requirements regarding maximum sustained speed within the deadlines established in the contract.

## 2. COMPETENCES AND ATTRIBUTIONS

Article 225 of the Constitution of the Republic of Ecuador establishes that the public sector in the country is made up of the agencies and departments of the Executive, Legislative, Judicial, Electoral, and Transparency and Social Control functions; the entities that make up the decentralized autonomous regime; the agencies and entities created by the Constitution or the law for the exercise of state power, for the provision of public services or to develop economic activities assumed by the State. In this last point, the so-called public companies are regulated.

Article 226 of the Constitution of the Republic of Ecuador establishes that: "The institutions of the State, its agencies, departments, public servants and persons who act by virtue of a state power will exercise only the powers and faculties that are attributed to them in the Constitution and the law. They will have the duty to coordinate actions for the fulfillment of

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their purposes and to make effective the enjoyment and exercise of the rights recognized in the Constitution.”

Article 227 of the Constitution of the Republic of Ecuador establishes that: “Public administration constitutes a service to the community that is governed by the principles of effectiveness, efficiency, quality, hierarchy, decentralization, coordination, participation, planning, transparency and evaluation.”

Article 233 of the Constitution of the Republic of Ecuador establishes in its first paragraph: “No public servant shall be exempt from liability for acts performed in the exercise of their functions or for omissions, and they shall be administratively, civilly and criminally responsible for the management and administration of public funds, assets or resources.”

Article 315 of the Constitution of the Republic states that: “The State shall establish public companies for the management of strategic sectors, the provision of public services, the sustainable use of natural resources or public goods and the development of other economic activities...”

Article 425 of the Constitution of the Republic of Ecuador states that: “The hierarchical order of application of the norms will be the following: The Constitution; international treaties and agreements; organic laws; ordinary laws; regional norms and district ordinances; decrees and regulations; ordinances; agreements and resolutions; and other acts and decisions of the public powers.”

### **ORGANIC LAW OF THE NATIONAL PUBLIC CONTRACTING SYSTEM**

Art. 4 of the Organic Law of the National Public Contracting System establishes: “Principles.  
- For the application of this Law and the contracts derived from it, the principles of legality, fair treatment, equality, quality, technological validity, opportunity, concurrence, transparency, publicity; and national participation shall be observed”.

Art. 23 of the Organic Law of the National Public Contracting System establishes: “Studies.  
- Before starting a pre-contractual procedure, according to the nature of the contract, the entity must have complete, definitive and updated studies and designs, plans and calculations, technical specifications, duly approved by the corresponding authorities, linked to the Annual Contracting Plan of the entity”.


Article 99 of the Organic Law of the National Public Procurement System establishes in its third paragraph: “The highest authority of the entity, as well as the officials or employees of the same who have intervened in any of the stages of the pre-contractual procedures of preparation, selection, contracting as well as in the execution of the contracts themselves, will be personally and financially responsible for non-compliance with the provisions of this Law, without prejudice, if applicable, to any criminal liability that may arise.”

### **GENERAL REGULATIONS OF THE ORGANIC LAW ON THE NATIONAL PUBLIC PROCUREMENT SYSTEM**

According to the General Regulations of the Organic Law on the National Public Procurement System, it establishes the following:

Art. 42.- Preparatory phase. - The requesting administrative body of the contracting entity, in order to satisfy and comply with the institutional objectives, goals and demands, in

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accordance with its competencies and powers, will carry out the specific, detailed, clear and concrete identification of the need for contracting.

Art. 44.- Determination of the need. - The determination of the need will incorporate an analysis of benefit, efficiency or effectiveness, considering the need and the installed institutional capacity, which will be reflected in the report on the need for contracting, which will be prepared by the requesting unit, prior to starting a contracting procedure.

### **EXECUTIVE DECREE 116 OF MARCH 26, 2012**

By Executive Decree No. 1116 of March 26, 2012, published in the Official Register 680 of April 11, 2012, Astilleros Navales Ecuatorianos (ASTINAVE EP) was created as a public company, with legal status, its own assets, endowed with autonomy and attached to the Ministry of National Defense.

Article 2.- The corporate purpose of Astilleros Navales Ecuatorianos – ASTINAVE EP- includes:

1. The repair, maintenance, careening, transformation, design and construction of Naval Units for the National Defense sector and for the national and foreign private shipping activity.
2. Repair. Maintenance, design and construction of Dry docks with transfer yard and Docks for defense and private sector vessels.
3. Implementation of new or existing cutting-edge technologies and promotion of improvement or creation of designs related to shipbuilding and commercial construction.
4. Manufacture, maintenance and repair of structures, silos, tanks, propellers, stern tubes, steel and aluminum pipes, and special metallurgical processes.
5. Maintenance and repair of motors, pumps, valves and hydraulic systems; construction of water treatment plants and provision of services for water transport and the shipping industry.
6. Production, marketing, repair and maintenance of electronic, computer and intelligence systems for naval, military, air and civil applications, originated by Research and Development Centers or our own.
7. Work or provision of services for the metallurgical industry in general in the public and private sector provided for in this article and other new ones that it enters, according to its operational, technical and economic capacity.

### **ORGANIC STATUTE OF PROCESS MANAGEMENT OF ASTINAVE EP**

#### **4.2.1 PROJECT, RESEARCH, DEVELOPMENT AND INNOVATION MANAGEMENT**

It is represented by the Project, Research, Development and Innovation Manager.


##### **4.2.1.1 MISSION**

Initiate, plan, execute, control and close the projects that have been agreed with clients due to the company's business line, and/or those of research, development and innovation necessary for the continuity of the company, complying with international standards and regulations for defense, security and for naval, maritime and industrial activity.

##### **4.2.1.2 DUTIES AND RESPONSIBILITIES**

1. Initiate the execution of projects in the company's business lines;



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2. Prepare the technical project proposal and the Project Plan in the company's business lines in coordination with the Commercial Management, the Operations Management and the Strategy Directorate;
3. Develop the projects approved by the client in accordance with the provisions of the Project Plan and the respective agreement, in coordination with the Operations Management;
4. Plan and develop the research, development and innovation projects approved for the company;
5. Coordinate with the Operations Management the execution of the work of the projects related to the plant's workshops;
6. Evaluate the progress and control the projects in a timely manner to prevent and correct deviations in any of the baselines;
7. Manage the configuration and control the changes during the execution of the projects in accordance with the policies and criteria established in the company;
8. Close the projects once the solution or product established in the agreement has been delivered to the satisfaction of the clients;
9. Coordinate with the Human Talent Administration Department the hiring of personnel according to the planning of the projects;
10. Coordinate with the Logistics Management the timely provision of the materials and supplies necessary for the execution of the projects;
11. Comply with the established regulations regarding safety and comprehensive protection;
12. Coordinate with the Quality Assurance Unit the verification of the work executed;
13. Coordinate with the Commercial Management and the Operations Management the availability of human talent and technological resources for the sale of projects;
14. Execute the attention of guarantees to clients approved by the Commercial Management in coordination with the Operations Management;
15. Comply with the international standards, norms and classifications for the construction, recovery and modernization projects of vessels;
16. Comply with the international standards and norms for Defense and Security Systems;
17. Maintain a portfolio of projects suitable for the sustainable development of the company.

### 3. SPECIFIC, DETAILED, CLEAR AND CONCRETE IDENTIFICATION OF THE REQUIREMENT FOR THE PROCUREMENT

The Ecuadorian Navy has the Galapagos, El Oro and Esmeraldas missile corvettes, which are inoperative due to new developments found in their different construction groups, including Group 200, in accordance with contract No. COGMAR-COT-001-2022.

According to contract No. COGMAR-COT-001-2022, section 4.3 Recovery of Group 200 – Propulsion System, which details: “The recovery of the propulsion system of the Galapagos, El Oro and Esmeraldas Corvettes will be carried out...”, and after the disassembly and inspection work of the components of the propulsion line of the different units, it was found that they exhibited excessive wear attributable to the prolonged period of operation.

From a technical point of view, this procedure, which corresponds to the third contractual phase and which aims at the “**ACQUISITION OF PROPULSION LINE COMPONENTS FOR THE ZEUS PROJECT**”, will allow the replacement of worn components of the corvettes to begin, which have deteriorated due to their prolonged operation time, according to the needs required by the client. The acquisition of new propulsion line components, such

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as tail shafts, bearings, seals, hydraulic joints, the propeller, etc. are critical to guarantee the optimal performance of the vessel in terms of speed and efficiency, thus being able to meet the contractual requirements for speed and performance.

The ZEUS project requires the acquisition to comply with the replacement of the necessary components according to the needs required by the client, as described in contract No. COGMAR-COT-001-2022, clause three, section 4.3.3.2 Replacement of propulsion line components, table 4.5 Replacement of propulsion line components, components: "Tail shafts, bronze sleeves, bearing housings, bearings, clamping handles, seals, hydraulic joints, hydraulic pumps, bronze and rubber spools, propeller and brakes".

Due to the aforementioned background, there is a need to carry out the **"ACQUISITION OF ELEMENTS OF THE PROPULSION LINES FOR THE ZEUS PROJECT"** in order to provide an adequate service complying with the requirements of our demanding client as described in contract No. COGMAR-COT-001-2022 and in this way with one of the business and strategic goals of Astilleros Navales Ecuatorianos ASTINAVE – EP.

#### **4. DETERMINATION OF REQUIREMENT**

##### **4.1 BENEFIT ANALYSIS**

The contracting of the **"ACQUISITION OF COMPONENTS FOR THE PROPULSION LINES FOR THE ZEUS PROJECT"** will allow Astilleros Navales Ecuatorianos ASTINAVE EP, in the lines of business that the institution manages, the benefit of being able to obtain and provide its clients, in the naval and industrial sector, to comply with the agreement of terms as established in Contract No. COGMAR-COT-001-2022 and as contemplated in the accepted proposal for the development of the agreement, in addition to completing the designated works within the required deadlines, avoiding any type of penalty for non-compliance in the delivery of the vessels.

The contracting of **"ACQUISITION OF PROPULSION LINE COMPONENTS FOR THE ZEUS PROJECT"** for the maintenance and repair of the CORGAL, CORORO, and CORESM Missile Corvettes of the Ecuadorian Navy offers multiple benefits for Astilleros Navales Ecuatorianos ASTINAVE EP, the Ecuadorian Navy, and the general operation of the vessel. These benefits include:

**1. Continuous Operation:** The installation of new propulsion line elements will allow the **CORGAL, CORORO, and CORESM** Missile Corvettes to resume their operation, ensuring that the vessel can continue its operations and will allow optimal operation of all propulsion systems and associated systems.

**2. Risk Reduction:** The replacement of propulsion line elements reduces the risks of critical failures in the engines and transmission systems, as well as significantly reducing the probability of serious mechanical and structural incidents. This will contribute to maintaining ASTINAVE EP's reputation as a reliable provider of naval services.

**3. Resource Optimization:** By making acquisitions, institutional resources are optimized by avoiding higher costs associated with emergency repairs or the acquisition of more expensive components in the event of a major failure. In addition, the useful life of the equipment is maximized, making the most of the investment made; The new systems influence greater energy efficiency, with optimized fuel management systems, which reduces fuel consumption and prolongs the operational autonomy of the corvettes. This leads to a reduction in daily operating costs, while maximizing the durability of the components.

**4. Compliance with Contractual Obligations:** Ensuring the operability of the **CORGAL, CORORO and CORESM** Missile Corvettes allows ASTINAVE EP to comply with its contractual obligations with the Ecuadorian Navy, avoiding sanctions for non-compliance and strengthening long-term business relationships.

In short, the contract for the "**ACQUISITION OF COMPONENTS FOR THE PROPULSION LINES FOR THE ZEUS PROJECT**" offers a comprehensive solution that not only guarantees the operability and efficiency of the vessels; **CORGAL, CORORO AND CORESM** Missile Corvettes, but also contributes to sustainable growth and customer satisfaction with the services provided by Astilleros Navales Ecuatorianos ASTINAVE EP.

#### **4.2 EFFICIENCY OR EFFECTIVENESS ANALYSIS**

According to article 44 of the General Regulations of the Organic Law of the National Public Procurement System: Determination of need.- The determination of **need will incorporate an analysis of benefit, efficiency or effectiveness**, considering the need and the installed institutional capacity, which will be reflected in the contracting need report, which will be prepared by the requesting unit, prior to starting a contracting procedure, for which the validity of the applicable regulations on the date of preparation of the technical need report must be verified.

The contracting of "**ACQUISITION OF COMPONENTS FOR THE PROPULSION LINES FOR THE ZEUS PROJECT**" will allow ASTINAVE EP to achieve significant improvements in terms of efficiency and effectiveness of its services in the fairing line. The efficiency and effectiveness analysis is described below.

##### **4.2.1 EFFICIENCY ANALYSIS**

By contracting the "**ACQUISITION OF COMPONENTS FOR THE PROPULSION LINES FOR THE ZEUS PROJECT**", Astilleros Navales Ecuatorianos ASTINAVE EP will be able to provide an efficient service, allowing the institution to carry out the schedule of activities planned for the development of the ZEUS project without delay that implies fines for non-compliance with the agreed terms. With the acquisition of these materials, it will be guaranteed that the personnel of Grupo 200 has the necessary components according to the client's technical specifications for the replacement of the propulsion lines in the vessels within the deadlines established in contract No. COGMAR-COT-001-2022.

##### **Reduced Downtime:**

Improvements to propulsion line elements add reliability and durability of new components (such as low-friction bearings and advanced lubrication systems) reduce the frequency of unplanned stops for corrective maintenance, ensuring that the vessel is available for loading and unloading operations in a minimum time. This is critical to avoid delays in the transport of goods to the Galapagos Islands.

##### **Optimization of Financial Resources:**

The modernization of the propulsion systems has a direct impact on the optimization of the use of financial resources with a guarantee of high durability and exact specifications requested by the client, the Ecuadorian Navy. ASTINAVE EP ensures that not only current needs are met, but also future maintenance or replacement

expenses are minimized, thus optimizing the use of financial resources.

#### **Reduction in Operating Costs:**

Optimized systems allow for less wear on propulsion-related components, such as transmission systems and propellers, which reduces replacement costs and prolongs the useful life of the equipment. In addition, the reduction in fuel consumption generates substantial savings on long-duration missions.

#### **Personnel Productivity:**

With CORGAL, CORORO and CORESM Missile Corvettes operational and reliable, operators and the crew in general can carry out their work without interruptions, which increases the overall productivity of naval security and surveillance operations.

#### **Speed of Execution:**

The replacement of elements of the propulsion lines will allow naval security and surveillance operations to be carried out more quickly, in addition, the reduction of maintenance downtime will improve the operational efficiency of the CORGAL, CORORO and CORESM Missile Corvettes.

### **4.2.2 EFFECTIVENESS ANALYSIS**

#### **Operational Sustainability:**

The replacement of elements of the propulsion lines will allow the operation of the CORGAL, CORORO and CORESM Missile Corvettes to be maintained, ensuring that naval security and surveillance operations are maintained without interruptions. The reliability and durability of the new propulsion systems will prolong the useful life of the corvettes, contributing to the operational sustainability of the client.

#### **Regulatory Compliance:**

The “ACQUISITION OF COMPONENTS OF THE PROPULSION LINES FOR THE ZEUS PROJECT” will be carried out under the technical specifications required by the Ecuadorian Navy in compliance with maritime safety regulations, ensuring that ASTINAVE EP's operations comply with legal standards and avoid sanctions by the client and the corresponding control bodies.

#### **Improved Service Quality:**

With the CORGAL, CORORO and CORESM Missile Corvettes operational, naval security and surveillance operations will be more efficient, which will improve customer satisfaction. Ecuadorian Navy, the replacement of propulsion line elements will reduce the frequency of failures, increasing customer satisfaction, by offering a more reliable, continuous operation with fewer unplanned interruptions.

#### **Impact on Institutional Reputation:**

The success in the continuous and efficient operation of the CORGAL, CORORO and CORESM Missile Corvettes will positively contribute to ASTINAVE EP's

reputation as a reliable maritime services provider. Rigorous compliance with deadlines and quality standards, together with improved performance of the vessels, will strengthen the confidence of the Ecuadorian Navy and other potential customers in ASTINAVE EP's ability to deliver highly technically complex projects.

#### **4.3 STORAGE CAPACITY, DISTRIBUTION AND INSTALLATION**

**Storage:** For the acquisition of the propulsion line components, the institution has planned to use the warehouses assigned to the project as temporary storage space until the goods are installed in the Missile Corvettes.

### **5. SELECTION OF THE TYPE OF PROCUREMENT**


Organic Law of the National Public Procurement System in its pertinent articles, regarding the special regime of specific line of business provides: "Art. 2.- Special Regime.- the pre-contractual procedures of the following contracts shall be subject to the specific regulations issued for this purpose by the President of the Republic, the General Regulations of this law, under selectivity criteria: (...) 8.- ...Also the contracts entered into by public sector entities or public companies or companies whose subscribed capital belongs at least fifty (50%) percent to public law entities, or their subsidiaries, with companies in which the states of the international community participate in at least fifty (50%) percent, or their subsidiaries. The special regime provided for in this numeral for public companies or companies whose subscribed capital belongs, at least fifty (50%) percent, to public law entities or their subsidiaries would apply only to the specific line of business; Regarding the common line of business, the common regime provided for in this law will apply. The determination of the specific and common line of business will be the responsibility of the Executive Director of the National Institute of Public Procurement;"

By resolution No. RE-ASTINAVE EP-GGE-DJU-046-2024 of December 2, 2024; the General Manager of ASTINAVE EP; issues the NEW REGULATION OF CONTRACTS BY SPECIFIC BUSINESS LINE OF ECUADORIAN NAVAL SHIPYARDS -ASTINAVE EP; which comes into force upon its granting and publication on the Institutional Portal of the National Public Procurement Service and the institutional website of ASTINAVE EP. In this regard, Article 5 of the aforementioned Regulation, in TITLE II, CHAPTER I: Types of contracting, mentions:

(...)

"The contracting of goods and/or services, including those of consultancy, carried out by Astilleros Navales Ecuatorianos -ASTINAVE EP- through a specific line of business will be carried out according to the following types of contracting:

1. Direct contracting for amounts whose amount does not exceed the value that results from multiplying the coefficient 0.0000004 by the Initial State Budget.
2. Contracting through proformas for amounts whose amount exceeds the value that results from multiplying the coefficient 0.0000004 up to the coefficient 0.000015 of the Initial State Budget.
3. Contracting through private competition for amounts whose amount exceeds the value resulting from multiplying the coefficient 0.000015 of the Initial State Budget up to the coefficient 0.00003 of the Initial State Budget.
4. Contracting through public competition for amounts whose amount exceeds the value resulting from multiplying the coefficient 0.00003 of the Initial State Budget.
5. Exceptional direct contracts.

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## 6. Framework Agreements.”

The present object of contracting corresponds to goods that have been determined as part of the business of ASTINAVE EP, by SERCOP, in accordance with the authorization granted in letter No. SERCOP-SERCOP-2018-0815-OF dated July 5, 2018. The registered CPC is:

### Goods:

435701115	Shafts
432530018	Bearings
4127809116	Metal expansion joint
4315100115	Oil pump
435701117	Brake System
432530018	Bearing
429980011	Propeller

## 6. TECHNICAL SPECIFICATIONS

### 6.1 DETAIL OF THE TECHNICAL SPECIFICATIONS

The following technical specifications are established:

No.	CPC	Goods	Quantity	Unit	Technical Specification Detail: Characteristics, Functional or Technological Requirements.
1	435701115	Tail shaft - length: 11352,5 mm with 04 bronze sleeve epoxy resin protection.	12	UND	Detailed section in aspect 6.1.1 Tail shaft
2	432530018	Bearing with temp control - Similar to FAG TUZ940K150389 - Shaft Diam 191 mm.	24	UNID	Detailed section in aspect 6.1.2 Bearing
3	4127809116	Water lubricated sealing - shaft sleeve diameter: 190,5 mm.	12	UNID	Detailed section in aspect 6.1.3 Water lubricated sealing
4	4127809116	Hydraulic coupling - Shaft diam 190 mm/high strength steel.	18	UNID	Section detailed in aspect 6.1.4 Hydraulic coupling.
5	4315100115	Pump Hydraulic Coupling.	6	UNID	Section detailed in aspect 6.1.5 Pump hydraulic coupling.
6	435701117	Hydraulic Caliper.	12	UNID	Detailed section in aspect 6.1.6 Hydraulic Caliper.
7	432530018	Flanged bronze bushing/ bushing elastomer bi-parted o similar.	48	UNID	Detailed section in aspect 6.1.7 Flanged bronze bushing/ bushing elastomer bi-parted o similar.

No.	CPC	Goods	Quantity	Unit	Technical Specification Detail: Characteristics, Functional or Technological Requirements.
8	429980011	Propeller - 4 Blades, Diam: 1400 mm	12	UNID	Sección detallada en el aspecto 6.1.8 Hélice.

**Table 6.1.- Technical specifications of the propulsion elements.**

### 6.1.1 TAIL SHAFT

Tail shaft with 04 bronze sleeve, with shaft key and protection with epoxy resin between sleeves which must be machined as detailed in the attached plan (See Annex A), which are technical specifications provided by the original manuals and plans of the Italian Fincantieri Navali, Shipyard Constructor of the corvettes.

The technical specifications of each of the tail shaft components are detailed below:

#### Shaft and shaft key characteristics

Dimensions, chemical composition and mechanical properties of the shaft and shaft key are detailed below. Additionally, the certification of the material, origin and results of the tests carried out on the specimens that the factory elaborated is required.

##### a. Dimensions:

**Lenght mm:** see drawing Annex "A"

**Outside diameter mm:** see drawing Annex "A"

##### b. Chemical Composition:

The percentage of the alloy of forged steel nickel – molybdenum Class 1 or similar should be in the following range:

CHEMICAL COMPOSITION OF NICKEL STEEL - MOLYBDENUM											
C	Mn		P	S	Si	Ni		Cr	Mo		V
Máx	Mín	Máx	Máx	Máx	Máx	Mín	Máx	Máx	Mín	Máx	Máx
0,28	0,15	0,45	0,020	0,015	0,35	2,75	3,50	0,50	0,25	0,60	0,08

**Table 6.2.- Chemical composition of the shaft and shaft key.**

##### c. Mechanical Properties:

It must meet the MIL-S-23284 A or similar standard required for this type of steel.

MECHANICAL CHARACTERISTICS OF NICKEL STEEL - MOLYBDENUM			
Tensile strength (Lb/in <sup>2</sup> )	Yield strength (Lb/in <sup>2</sup> )	Elongation (%)	Hardness Brinell (HB)
95000/115000	75000	20	190

**Table 6.3.- Mechanical properties of the shaft and shaft key.**

#### Characteristic bronze sleeve

Dimensions, chemical composition and mechanical properties of the sleeve are detailed below. Additionally, the certification of the material, origin and the results of the tests carried out on the specimens that the factory elaborated is required.

##### a. Dimensions:

The location, dimensions, installation adjustment and surface finish of the bronze sleeve installed on the tail shaft are detailed in the attached drawing annex "A".



DIMENSION OF REQUIRED SLEEVE PER TAIL SHAFT				
Qty	Sleeve Location	Outside Diam. (mm)	Inside Diameter (mm)	Length (mm)
1	Stuffing box	190,5	See adjustment in annex drawing "A"	950
1	Stern	190,5	See adjustment in annex drawing "A"	500
1	Strut 1	190,5	See adjustment in annex drawing "A"	500
1	Strut 2	190,5	See adjustment in annex drawing "A"	800

**Table 6.4.- Dimension and location of tail shaft sleeve.**

**b. Chemical Composition:**

The chemical composition must be a copper alloy and must be in the following composition ranger or higher than that of the elements that make it up:

CHEMICAL COMPOSITION OF THE BRONZE SLEEVE						
Cu		Sn		Pb	Zn	
Min	Max	Min	Max	Max	Min	Max
86,00	89,00	9,00	11,00	0,30	1,00	3,00

**Table 6.5.- Chemical composition of tail shaft sleeve.**

**c. Mechanical Properties:**

The mechanical properties of bronze sleeve must at least meet the standard required for this type of alloy:

MECHANICAL CHARACTERISTICS OF THE BRONZE SLEEVE			
Tensile Strength Mpa (Ksi)	Yield strength Mpa (Ksi)	Elongation (%)	Hardness (HB)
276 (40.03)	124 (17.98)	20	80

**Table 6.6.- Mechanical properties of tail shaft liners.**

**Protection with epoxy resin of the shafts**

Tail shafts must include protection with epoxy resin or an equivalent product that complies with environmental protection standards in the sectors indicated in the original drawing, sectors A – B – C – D. see annex "A" tail shaft treatment scheme. The minimum thickness of the tailshaft liner shall be 2 mm.

Material certification is required, 12-month technical warranty.

**Documentation to be delivered prior to receipt of the partial/total delivery certificate**

The results of the tests carried out on the specimens made by factory elaborated are required, as indicated in annex "B" of the MIL-S-23284 A (SHIPS) standard, the required reports are:

- Chemical analysis
- Mechanical test result.
- Grain size.
- Microscopic test result.
- Nonmetallic inclusion test result.
- Dimensional test results.



- Visual test results.
- Ultrasonic test results.
- Magnetic particle results.

Epoxi resin coating

- Ceramic Coating Application Procedure
- Certification of installed epoxy material
- 12-month technical warranty of ceramic coating

Additionally, the following tests must be performed:

- Pneumatic pressure tests on bronze sleeves.
- Verification of the settlement between the propeller cone and the shaft cone greater than 90%.
- Verification of the sleeve settlement due to interference.

**Note:** Detailed plan of the tail shaft will be delivered once the process has been awarded.

### 6.1.2 BEARING/PILLOW BLOCK

Bearing/Pillow Block with bearing housing, cylindrical tapered roller bearings and linner for shaft to 191 mm diameter, similar to FAG TUZ940K150389, as indicated in Annex "C". The dimensions, material and characteristics of each of the components are detailed below:

#### Bearing housings

The features are detailed in the detailed table below:

<b>Dimensions</b>	According to drawing Annex "C" "SOPPORTO FAG PER LINEA D' ASSI"
<b>Material</b>	Cast Steel
<b>Instrumentation</b>	Continuous temperature control.
<b>Lubrication</b>	No forzada
<b>Work temperature</b>	Lubrication up to 100 °C.

Table 6.7.- Technical specifications of bearing housings.

#### Cylindrical roller tapered bearing.

The features are detailed in the detailed table below:

<b>Dynamic capacity</b>	310 Kn
<b>Static Capacity</b>	310 Kn
<b>Weight</b>	9 Kg
<b>Inside diameter</b>	200 mm
<b>Conical hole</b>	taper 1:12
<b>Outside diameter</b>	280 mm
<b>Height</b>	56 mm
<b>Radial clearance</b>	C3
<b>Cage material</b>	Bronze

Table 6.8.- Technical specifications of cylindrical roller tapered bearing.

#### Linner

The features are detailed in the table below:

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<b>Shaft diameter</b>	191.0 mm
<b>Outer diameter for bearing race</b>	200.0 mm
<b>Taper</b>	1:12
<b>Height</b>	98.0 mm
Should include bushing, nut y washer	

Table 6.9.- Technical specifications of liner

### Documentation to be delivered prior to receipt of the partial/total delivery certificate

Manufacturing Certification  
ISO Certificate

#### 6.1.3 SHAFT MECHANICAL SEAL

The mechanical seals will be located on the bronze sleeve of the tail shaft having a diameter of 190.5 mm, with the following characteristics detailed below:

- Water-cooled seal for propulsion lines which must have an inflatable emergency seal.
- The seal design shall be appropriate for the tail shaft to work at 850 RPM.
- Solid base construction in NAB nickel, bronze and aluminum alloy.
- The compression bellows must withstand large axial movements without changing the pressure in the shape of the seal.
- The contact area of the seal must allow the absorption of possible axial and radial misalignments.
- Seal rings must be made of silicon carbide or similar, wear-free and suitable for shafts with a diameter of 190.5 mm.
- They will be lubricated with water in the elbow tube, and will be maintenance-free.
- Seal length should not be more than 246 mm.
- Permissible misalignment 2 – 4 mm

### Documentation to be delivered prior to receipt of the partial/total delivery certificate

Type Approval certification, for naval use

#### 6.1.4 HYDRAULIC COUPLING

The joints make it possible to connect 02 shaft of the propulsion system. They must have a hydraulic actuation mechanism, based on the principle of holding down an outer conical sleeve on an inner conical sleeve in order to generate a radial force and at the same time increase the frictional force that will be able to maintain the union between the shafts and the coupling.

<b>Type</b>	Mechanical connection of two propulsion shafts (shaft – shaft)
<b>Shaft Diameter</b>	190 mm
<b>Material</b>	High-strength steel
<b>Mounting/disassembling system</b>	Hydraulic
<b>Motion Transmission</b>	Oil-free
<b>Coefficient of friction</b>	minimum 0.3
<b>Torque</b>	220 KNm
<b>Inner diameter</b>	190 mm
<b>Outer diameter</b>	Until 286 mm

Maximum Length	Until 530 mm
Maximum weight	140 kg
Polar Moment of Inertia	Until 2.04 Kgm <sup>2</sup>

Table 6.10.- Technical specifications of hydraulic coupling.

### Documentation to be delivered prior to receipt of the partial/total delivery certificate

Type approval Certification for naval use  
Manufacturing certification

## 6.1.5 HYDRAULIC PUMPS

The hydraulic pumps will allow the coupling/decoupling of the hydraulic joints described in **ITEM 6.1.4**, which will be manually operated and will include the accessories and connectors to work with the joint.

### Required Documentation

Manufacturing and Origin certification.

## 6.1.6 HYDRAULIC CALIPER

The hydraulic caliper must provide the propulsion lines with a deceleration without the forces of the main engines until their final stop is achieved, in order to prevent their movement due to the inertia that is created by the flow of water.

The caliper must work as a drum on the flange of the countershaft, this element will be installed on a base that is already mounted on the boat as detailed in the attached plan see Annex "D". Below is the data of the characteristics of the brake:

TECHNICAL DATA OF HYDRAULIC CALIPER	
Braking force max.:	28 Kn
Brake pressure:	100 bar
Braking torque:	5000 Nm
Max. oil volume.:	78 cm <sup>3</sup>
Dimensions	According to the plan attached in Annex "D"

Table 6.11.- Technical specifications of the hydraulic caliper.

The specific physical characteristics and dimensions can be found in Annex "D" to this report.


The supplier will ensure that the brakes are mounted on the structures (bases) that are already inside the vessel, or failing that, the elements that allow their correct installation and operation.

### Required Documentation

Manufacturing Certification  
ISO Certificate

## 6.1.7 FLANGED BRONZE BUSHING/BUSHING ELASTOMER BIPARTED O SIMILAR

Flanged bronze bushing with bipartite elastomeric bushing or similar with easy to disassemble clamping method with the shaft installed on site. The Flanged bronze bushing/bushing elastomeric biparted or similar shall be designed to withstand the loads exerted by the tail shaft.

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These bushing will be located on stuffing box, Stern and struts which must comply with the technical specifications, dimensions, physical and mechanical properties detailed below:

#### Technical Specifications

The bronze bushing should be flanged and have at least the technical equal to or higher than those detailed in **Table 6.12**:

EQUIVALENCES FOR FLANGED BRONZE BUSHING			
Material	UNI	UNS	MIL
Naval Bronze	BZn 4 UNI 1701 + 2% Ni	C85700	MIL-C-15345, ALLOY 3 or similar

**Table 6.12.- Technical specifications of the flange bronze bushing material.**

The biparted elastomeric bushing or similar naval type must have a low coefficient of friction, lubricated with water and be adjusted with interference in the bronze bushing with some type of element so that they can be disassembled, inspected and reinstalled with the tail shaft in place.

The bushings must meet at least the following technical specifications:

Coefficient of friction(dry)	Until 0.35
Swell in water (%) @ 20°C	Maximum 1.3%
Minimum Operating Temperature Limit	60°C

**Table 6.13.-Technical specifications of the elastomeric bushing.**

#### Quantities and dimensions per corvette

Whereas, such bronze bushing and elastomeric bushing shall be installed on (02) strut, stern and stuffing box. The following table shows the measurements of flange bronze bushing and bushing elastomer below:

FLANGE BRONZE BUSHING / BUSHING ELASTOMER BIPARTED					
Quantity	Length	Ø sleeve of Tail shaft	Ø inside of strut	Ø Outer flange	Flange thickness
Unit	Mm (inch)	Mm (inch)	Mm (inch)	Mm (inch)	Mm (inch)
8	432 (17)	191,5 (7 1/2)	244,47(9 5/8)	323,8(12 3/4)	14,3 (9/16)
4	432 (17)	191,5 (7 1/2)	244,47(9 5/8)	360 (14 3/16)	14,3 (9/16)
4	844 (33 1/4)	191,5 (7 1/2)	244,47(9 5/8)	323,8(12 3/4)	14,3 (9/16)

**Table 6.14.- Quantities and dimensions of flange bronze bushing/ bushing elastomer finished.**

#### Mechanical properties of flanged bronze bushing

The mechanical properties of flanged bronze bushing must at least comply with the parameters detailed in **Table 6.15** below:

MECHANICAL CHARACTERISTICS OF THE ALLOY C-85700			
Tensile strength Mpa (Ksi)	Yield strength Mpa (Ksi)	Elongation (%)	Hardness BHN (500 kg)
276 (40)	97 (14)	15	75 (500Kg)

**Table 6.15.- Mechanical properties of flanged bronze bushing.**

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Certification of the material, origin and results of the tests carried out on the specimens produced by the factory is required.

### Required Documentation

Chemical composition of the elastomer bushing.  
 Certification of the material of the flanged bronze bushing.  
 Certificate Type Approval of the elastomer bushing.  
 Mechanical test results of the elastomer bushing.

## 6.1.8 PROPELLER

Fixed-pitch propellers with bishop nut with protector are required, of which 6 must rotate clockwise and the other 6 counterclockwise. The propeller offered shall be designed to have sufficient thrust to enable the vessel to achieve a speed 22.5 knots maximum sustained speed and to comply with the technical specifications detailed in **Table 6.16**:

PROPELLER TECHNICAL SPECIFICATIONS	
Diameter (mm)	1400
Number of blades	4
Approximate Weight (Kg)	485
Material	G-CuAlMn8, C-CuAL10Ni or similar
Manufacturing Tolerance	ISO 484/2 Class S

**Table 6.16.- Technical specifications of the propeller.**

The propellers must be shipped ready to be installed, dynamically balanced of seat test of tail Shaft – Propeller.

Note:

- The data required for the calculation of the optimal propeller will be provided to the supplier once the process has been awarded.
- 2D drawing of nut and cap to be provided to supplier.


### Required Documentation

Photographic record of seat test of tail Shaft - propeller  
 Dynamic balancing report.  
 Material certification  
 Chemical analysis  
 Mechanical Test Results  
 Propeller casting quality testing with penetrating inks and ultrasound  
 2D and 3D drawing of the propeller  
 IACS certification  
 ISO 484/2-dimensional inspection  
 Verification of the settlement between the propeller cone and the shaft cone at 90%  
 Verification of the adjustment of the keys

## 6.2 REQUEST NUMBER AND WORK ORDER

Considering that the requested items correspond to materials from different units, and these in turn are linked to different work orders, the distribution of material by vessel is detailed in the following table:

No.	Vessel	OT	Request	Quantity	Unit	Detail of the Technical Specification: Characteristics, Functional or Technological Requirements.
1	CORGAL	11MD005P222000	35489	4	unit	Tail shaft - length: 11352,5 mm with 04

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No.	Vessel	OT	Request	Quantity	Unit	Detail of the Technical Specification: Characteristics, Functional or Technological Requirements.
	CORORO	11MD004P222000	35487	4		bronze sleeve epoxy resin protection
	CORESM	11MD006P222000	35490	4		
2	CORGAL	11MD005P222000	35489	8	unit	Bearing with temp control - Similar to FAG TUZ940K150389 - Shaft Diam 191 mm
	CORORO	11MD004P222000	35487	8		
	CORESM	11MD006P222000	35490	8		
3	CORGAL	11MD005P222000	35489	4	unit	Water lubricated sealing - shaft sleeve diameter: 190,5 mm.
	CORORO	11MD004P222000	35487	4		
	CORESM	11MD006P222000	35490	4		
4	CORGAL	11MD005P222000	35489	6	unit	Pump Hydraulic Coupling
	CORORO	11MD004P222000	35487	6		
	CORESM	11MD006P222000	35490	6		
5	CORGAL	11MD005P222000	35489	2	unit	Pump Hydraulic Coupling
	CORORO	11MD004P222000	35487	2		
	CORESM	11MD006P222000	35490	2		
6	CORGAL	11MD005P222000	35489	4	unit	Hydraulic Caliper
	CORORO	11MD004P222000	35487	4		
	CORESM	11MD006P222000	35490	4		
7	CORGAL	11MD005P222000	35489	16	unit	Flanged bronze bushing/ bushing elastomer bi-parted o similar.
	CORORO	11MD004P222000	35487	16		
	CORESM	11MD006P222000	35490	16		
8	CORGAL	11MD005P222000	35489	4	unit	Propeller, Diam:1400 mm
	CORORO	11MD004P222000	35487	4		
	CORESM	11MD006P222000	35490	4		

Table 6.17.- Distribution of goods according to OT and application number.

## 7. CONTRACTUAL CONDITIONS

### 7.1 DELIVERY TIME

The delivery time for the goods is 365 calendar days from the day following written notification by the contract administrator of the availability of the advance payment, to the bank account provided by the contractor. Partial deliveries will exist as shown in Table 7.1 Method of Delivery of Goods.

### 7.2 DELIVERY FORM

The delivery of the goods will be partially carried out through INCOTERM 2020, CIF-Port of Guayaquil. The times detailed in Table 7.1.- Method of delivery of goods, **this period already includes the shipping time from the port of origin to the port of Guayaquil.**

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Item	Term (calendar)	Description	QUANTITY	Unit
1st delivery	260 calendar days	Tail shaft - length: 11352,5 mm with 04 bronze sleeve epoxy resin protection.	4	unit
		Bearing with temp control - Similar to FAG TUZ940K150389 - Shaft Diam 191 mm.	8	unit
		Water lubricated sealing - shaft sleeve diameter: 190,5 mm.	4	unit
		Hydraulic coupling - Shaft diam 190 mm/high strength steel.	6	unit
		Pump Hydraulic Coupling.	2	unit
		Hydraulic Caliper.	4	unit
		Flanged bronze bushing/ bushing elastomer bi-parted o similar.	16	unit
		Propeller - 4 Blades, Diam: 1400 mm	4	unit
2nd delivery	365 calendar days	Tail shaft - length: 11352,5 mm with 04 bronze sleeve epoxy resin protection.	8	unit
		Bearing with temp control - Similar to FAG TUZ940K150389 - Shaft Diam 191 mm.	16	unit
		Water lubricated sealing - shaft sleeve diameter: 190,5 mm.	8	unit
		Hydraulic coupling - Shaft diam 190 mm/high strength steel.	12	unit
		Pump Hydraulic Coupling.	4	unit
		Hydraulic Caliper.	8	unit
		Flanged bronze bushing/ bushing elastomer bi-parted o similar.	32	unit
		Propeller - 4 Blades, Diam: 1400 mm	8	unit

**Table 7.1.- Partial Delivery plan of goods.**

### 7.3 PLACE OF DELIVERY

The bidder must deliver all the equipment contracted through INCOTERM 2020, CIF-Port of Guayaquil.

### 7.4 METHOD AND CONDITIONS OF PAYMENT


ASTINAVE EP, will pay the contract for the "**ACQUISITION OF COMPONENTS OF THE PROPULSION LINE ELEMENTS FOR THE ZEUS PROJECT**", as follows:

**ADVANCE:** 50% of the advance, for which the awarded supplier will provide a GUARANTEE of good use of the advance. Due to the nature of the contracting process, it must also provide the guarantee of faithful performance of the contract prior to the signing of the contract.

**FIRST PAYMENT:** 20% against PARTIAL delivery of the goods. This will be cancelled with the prior authorization of the contract administrator, *once the goods have been delivered through the CIF Puerto de Guayaquil modality*. The enabling documents for payment are:

- Commercial invoice.
- BL or shipping document
- International insurance
- Notification of cargo arrival at the port of Guayaquil and.
- Necessary documentation detailed in **ITEM 6.1.1** Tail shaft.



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- f. Type approval certificate for naval use of the seal elements, hydraulic joints, elastomeric cylinder.
- g. Certificate of manufacture and origin and ISO certificate of the bearing, hydraulic caliper, hydraulic pump.
- h. Necessary documentation detailed in **ITEM 6.1.7** Flanged bronze bushing //bushing elastomer biparted o similar.
- i. Documentation required in **ITEM 6.1.8** Propeller.
- j. Technical guarantee.
- k. Partial receipt delivery certificate

**SECOND PAYMENT:** 30% upon TOTAL delivery of the goods. This will be cancelled with the prior authorization of the contract administrator, *once the goods have been delivered through the CIF Puerto de Guayaquil modality*, The enabling documents for payment are:

- a. Commercial invoice.
- b. BL or shipping document
- c. International insurance
- d. Notification of cargo arrival at the port of Guayaquil and.
- e. Administrator's acceptance report of the partial contract
- f. Necessary documentation detailed in ITEM 6.1.1 Tail shaft.
- g. Type approval certificate for naval use of the seal elements, hydraulic joints, elastomeric cylinder.
- h. Certificate of manufacture and origin and ISO certificate of the bearing, hydraulic caliper, hydraulic pump.
- i. Documentation required in the ITEM **6.1.7** Flanged bronze bushing/bushing elastomer biparted o similar.
- j. Documentation required in ITEM 6.1.8 Propeller.
- k. Technical guarantee.
- l. Partial receipt delivery certificate

Note: The bid price must cover all activities and costs necessary for the bidder to comply with the purpose of this process, to the full satisfaction of ASTINAVE EP. The price is fixed and unchanging. There will be no price adjustments and they are the sole responsibility of the offeror, and in accordance with Art. 75.- "... In order to receive the advance, it must first provide guarantees for the same value of the advance, which will be reduced in the proportion that the advance is amortized or the works, goods or services are provisionally received...", the amortization of the advance paid by ASTINAVE EP will proceed in the subsequent payments.

## 7.5 TECHNICAL GUARANTEE

The awarded bidder, in compliance with the requirements and other general and specific conditions for the "**TECHNICAL REPORT REQUIREMENT FOR THE ACQUISITION OF COMPONENTS OF THE PROPULSION LINES FOR THE ZEUS PROJECT**", will ensure that all the goods requested comply with the specifications, chemical composition of the requested material and IACS certification, as appropriate in what is described in the Technical Specifications.

The term of the technical guarantee will be 12 calendar months for the elements of the first delivery and 18 calendar months for the elements of the second delivery, counted from the date of signature of the certificate of delivery and receipt. The technical warranty will validate that the goods are completely new from the factory, of optimal quality, that they are free of defects and manufacturing defects, and that they comply with the technical specifications,

manufacturing standards and requirements demanded by ASTINAVE EP.

During the term of validity of the Technical Warranty, if ASTINAVE EP requests the replacement of parts, or parts of the contracted good that have been considered defective, these will be replaced by new ones of the same quality and condition, at no additional cost to ASTINAVE EP within a maximum period of 90 days, counted from its notification.

## **7.6 GARANTÍA DE ANTICIPO Y DE FIEL CUMPLIMIENTO**

**"Art. 74.- Faithful Performance Guarantee.** - For security of contract compliance and to respond for the obligations incurred in favor of third parties, related to the contract, the successful bidder, before or at the time of signing the contract, will render guarantees for an amount equivalent to five (5%) percent of its value. In the contracts of works, as well as in integral contracts for a fixed price, this guarantee will be constituted to guarantee compliance with the contract and the obligations contracted in favor of third parties and to ensure the proper execution of the work and the good quality of the materials, thus ensuring the repairs or changes of those parts of the work in which construction present defects, poor quality or non-compliance with specifications, attributable to the bidder, are discovered. In works contracts or in the contracting of non-standardized services, if the financial offer awarded is less than the referential budget by a percentage equal to or greater than ten (10%) percent of it, the guarantee of faithful performance must be increased by one amount equivalent to twenty (20%) percent of the difference between the referential budget and the amount of the contract."

**"Art. 75.-Advance Payment Guarantee.** -If, due to the form of payment established in the contract, the Contracting Entity should grant advances of any nature, whether in cash, sight drafts or another form of payment, the contractor, in order to receive the advance payment, must previously render guarantees of equal value of the advance, which will be reduced in the proportion that it is amortized or in the proportion that works, goods or services are received. Letters of credit will not be considered an advance payment if their payment is conditional on the delivery-receipt of the goods or works that are the subject of the contract. The amount of the advance payment will be regulated by the Contracting Entity in consideration of the nature of the contract."

Contractors may render any of the guarantees established in Article 73, Law of the National System of Public Procurement.


## **7.7 FINES**

For each day of delay in the delivery of goods and/or provision of services or non-compliance with contractual obligations, ASTINAVE EP will impose a fine equivalent to 1x1000, which will be calculated on the percentage of the obligations that are pending execution in accordance with the provisions of article 71 of the LOSNCP, in accordance with Article 292 of the General Regulations to the Organic Law of the National Public Procurement System, currently in force. The fines caused will be deducted from the outstanding payments, as established in article 293 of the General Regulations to the Organic Law of the National Public Procurement System.

## **8. MINIMUM REQUIREMENTS**

### **8.1 GENERAL OR SPECIFIC EXPERIENCE**

For technical convenience and to safeguard the interests of the company, the bidder is

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required to comply with the following **General Experience**:

Type of experience	Temporality to accredit experience	No. of Permitted Contracts and Projects	Minimum amount to demonstrate in experience in relation to reference budget	Minimum amount per contract or project
General experience in the sale of products and services in the naval area.	15 años	1 o más	\$ 2.040.308,34	\$ 510.077,08

**Table 8.1.- General Experience.**

The General or similar experience will be validated with the submission of the following supporting documents:

- Contracts,
- Purchase orders or
- Invoices.

For technical convenience and to safeguard the interests of the company, the supplier is required to comply with the following **Specific Experience**:

Type of experience	Temporality to accredit experience	No. of Permitted Contracts and Projects	Minimum amount to demonstrate in experience in relation to reference budget	Minimum amount per contract or project
Experience in engineering projects or sales of goods related to the Propulsion System.	15 years	1 or more	\$ 1.020.154,17	\$ 255.038,54

**Table 8.2.- Specific Experience.**

The Specific or similar experience will be validated with the submission of the following supporting documents:

- Contracts,
- Purchase orders or
- Invoices.

For specific experience, they may be cumulative by submitting several documents of the offeror's choice. There is no maximum limit for the submission of documents. The offeror may present experience with public or private sector entities or a combination of both.

With the presentation of a contract or instrument that accredits the minimum specific experience, the supplier meets the minimum amount requested for the minimum general experience, this contract or instrument will be considered as valid to accredit the two types of experiences.

## 8.2 OTHER MINIMUM REQUIREMENTS

The supplier must present the following documentation (add other minimum requirements):

- Data sheet of bearing
- Data sheet of water lubricated sealing
- Data sheet of Hydraulic joint

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- Data sheet of hydraulic caliper
- Data sheet of the elastomer
- Propeller Material Data Sheet
- Tail shaft Material Data Sheet
- Tail shaft bronze sleeve material data sheet
- Flanged bronze bushing material data sheet
- 2D diagram of the bushing and bushing holder assembly (elastomer)

### 8.3 QUALIFICATION PARAMETERS

To evaluate the bids submitted by the participating bidders, the minimum qualification parameters that must be complied are the following:

Parámetro de calificación	Cumple	Fail
Completeness of the offer (forms)		
General experience		
Specific experience		
Technical specifications		
Referential budget		
<b>Total:</b>		

**Table 8.3.- Qualification parameters comply/fail.**

Those bids that fully meet the minimum requirements will go to the stage of evaluation of bids with scoring, otherwise they will be disqualified.

The "By Score" methodology is used when the objective is to establish better technical or economic conditions or capabilities among bidders that have previously accredited a minimum required condition or capacity.

The following is a description of the scoring parameters:

Qualification Parameter	Score
Economic offer	50
General experience	15
Specific experience	30
Additional improvements	5
<b>Total:</b>	<b>100</b>

**Table 8.4.- Qualification parameter by score.**

#### **Economic offer (50 points):**


*The bid whose total amount is the lowest of all the bids submitted will be qualified with the highest score, the other economic bids submitted will be scored in an inversely proportional manner, based on the bid of the lowest amount.*

#### **General experience (15 puntos)**

*The bidder will receive points for the amount of their additional overall experience. In the event that this value is the highest of all bidders, it will be credited with the entire score, otherwise it will be credited with the proportional value in relation to the highest.*

*For the qualification of this experience, the following criteria will be observed:*

1. *The maximum amount that will be awarded to the bidder will be the result of multiplying the factor of 1.25 by the amount of the Reference Budget.*
2. *If the bidder submits contracts with amounts higher than the minimum required*

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*for the overall experience, the score will be awarded in proportion to the surplus presented, in accordance with the formula indicated.*

**Specific experience (30 points):**

*The bidder will receive points for the amount of their additional specific experience. In the event that this value is the highest of all bidders, it will be credited with the entire score, otherwise it will be credited with the proportional value in relation to the highest. For the qualification of this experience, the following criteria will be observed:*

- 1. The maximum amount that will be awarded to the bidder will be the result of multiplying the factor of 1.25 by the amount of the Reference Budget.*
- 2. If the bidder submits contracts with amounts higher than the minimum required for the specific experience, the score will be awarded in proportion to the surplus presented, in accordance with the formula indicated.*

**Additional improvements (5 points)**

*It is considered as additional improvement the extension of the technical guarantee, tool kit for basic maintenance, equipment installation courses, spare parts kit for annual maintenance, advice on installation of equipment, earthing device system, aluminium anode, etc.*


*Each additional improvement has (01) one point.*

**9. REFERENCIAL BUDGET**

In accordance with the Market Study carried out by report No. INF-ZEU-099, it is determined that the reference budget is US\$ **4.08.616,64**

Breakdown of the reference budget:

No.	Description of the item	Quantity	Unit	Unit Price	Subtotal
1	Tail shaft - length: 11352,5 mm with 04 bronze sleeve epoxy resin protection.	12	Unit	\$105.453,11	\$ 1.265.437,32
2	Bearing with temp control - Similar to FAG TUZ940K150389 - Shaft Diam 191 mm.	24	Unit	\$12.800,00	\$ 307.200,00
3	Water lubricated sealing - shaft sleeve diameter: 190,5 mm.	12	Unit	\$12.771,06	\$ 153.252,72
4	Hydraulic coupling - Shaft diam 190 mm/high strength steel.	18	Unit	\$21.561,28	\$ 388.103,04
5	Pump Hydraulic Coupling.	6	Unit	\$13.007,28	\$ 78.043,68
6	Hydraulic Caliper.	12	Unit	\$13.033,75	\$ 156.405,00
7	Flanged bronze bushing/ bushing elastomer bi-parted o similar.	48	Unit	\$21.060,95	\$ 1.010.925,60

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No.	Description of the item	Quantity	Unit	Unit Price	Subtotal
8	Propeller - 4 Blades, Diam: 1400 mm.	12	Unit	\$60.187,44	\$ 722.249,28
<b>TOTAL</b>					<b>\$ 4.081.616,64</b>

**Table 9.1.- Reference Budget break Down.**

The bid price shall cover all activities and costs necessary for the bidder to comply with the purpose of this process, to the full satisfaction of ASTINAVE EP. The price is fixed and unchanging. There will be no price adjustments and they are the sole responsibility of the offeror.

The **multi-year** referential budget shall be given as follows per year:

Year	Payments	Values
2025	Advance	\$ 2.040.808,32
2025	1st delivery	\$ 1.224.484,99
2026	2nd delivery	\$ 816.323,33
		<b>\$ 4.081.616,64</b>

**Table 9.2.- Multi-year budget.**

## 10. DEFINITIONS AND ACRONYMS

### 10.1 ACRONYMS

<b>ZEU</b>	ZEUS.
<b>SERCOP</b>	NATIONAL PUBLIC PROCUREMENT SERVICE.
<b>ASTINAVE</b>	ASTILLEROS NAVALES DEL ECUADOR.

## 11. ANNEXES

Anexo A	Original drawing of the tail shaft.
Anexo B	Norma MIL – S - 23284A.
Anexo C	Sopporto Fag per Linea B´ASSI
Anexo D	Freno E Blocco líneas D´ASSI