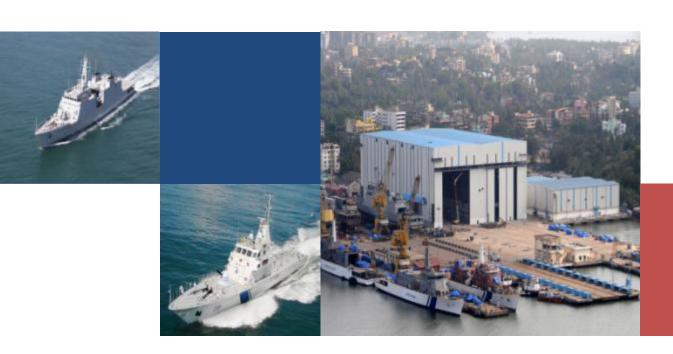


Goa Shipyard Limited





Best Performing DPSU Shipyard of MoD



<u>Uttar Pradesh Defence Expo - 2018</u>

At **Kanpur**

14th -16th November 2018



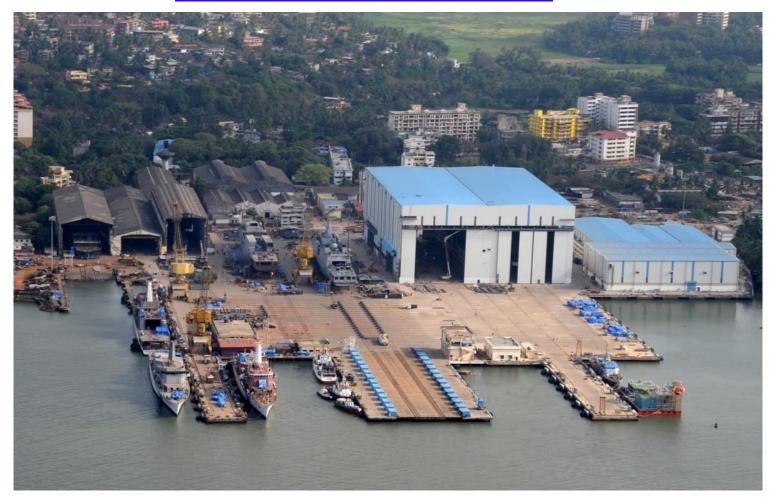








GSL - INTRODUCTION



- Strategically located on the banks of the River Zuari, just 2 miles from Mormugao Port
- World Class contemporary facility with State of Art Technology

Web address of Goa Shipyard Limited

www.goashipyard.in



Goa Shipyard Limited

Passion for Excellence

Celebrating

STRENGTHS

- Strong R&D with in-house design
- Sophisticated CAD-CAM facility knit seamlessly with ERP
- State of the art infrastructure for Shipbuilding
- Fastest growing Shipyard in the country with more than 40% YoY growth in VoP (turnover)
- Excellent MoU rating for 2016-17 & 2017-18 with 100% score
- Largest exporter of Defence Vessels from South Asia
- Unique track Record of before time deliveries
- Consistent track record of 'Quality' products



















PRODUCT PROFILE











PRODUCT PROFILE - OPVs













Goa Shipyard Limited

PRODUCT PROFILE



35 Kn FPV STS Mauritius FPV









Damage Control Simulator SMB COP 1000T Barge **SSTF** 12m Boat **SBTF**

DIVERSIFIED PRODUCTS

Over 20% VoP from Diversified Products

Boats of Various Sizes and Types



12 T Interceptor Boat



12 T Modified Patrol Boat



05 T Interceptor boat



19 m FRP Patrol Boat









12 M FRP RHIB

PROVEN TRACK RECORD IN SHIPBUILDING

Total Deliveries as on date	371
 Naval Vessels 	66
 Coast Guard Vessels 	28
• Export	35
• Others	86
 High Speed FRP Interceptor Boats 	157

Only Shipyard in the country with consistent track record of delivering ships ahead of schedule











Six CG OPV Project – May 2012 to Nov 2017



- •Highly successful Project with all deliveries ahead of contractual schedule
- •06 OPVs delivered within 2 years, with interval of 05 months between two deliveries
- •Reduced 'Build Period' of 36 months as against 67 months for NOPVs
- •62% indigenous content
- •Superior in all performance parameters including speed, endurance, turning circle etc.



EXPORTS











Export of Defence Products

Sri Lanka

2 X 105 m AOPV

(1st AOPV delivered on 22 Jul 2017)

Project 2014 - 18





Mauritius

- > 2 X 50 m, 35 Kn FAC (Delivered)
- > 11 Fast Interceptor Boats (Delivered)

Project 2014 – 7- Completed





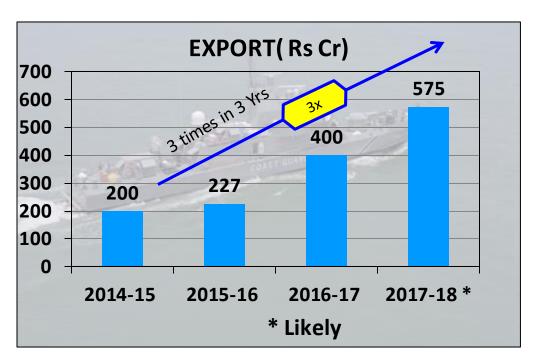
Myanmar

One Damage Control Simulator

(Delivered)

Project 2014-16: Completed

EXPORTS IN LAST 3 YEARS





- Emerged as largest exporter of ships/vessels, with 40% of Turnover from Exports
- Awarded RM's Award for 'Best performance in Exports' amongst all DPSUs' - 2014-15

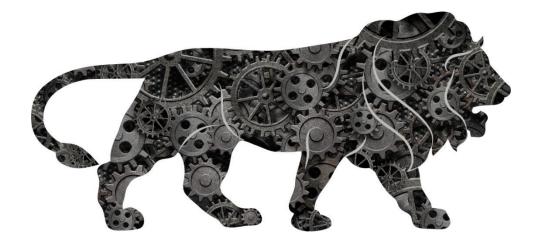












MAJOR FUTURE PROJECTS

Make in India



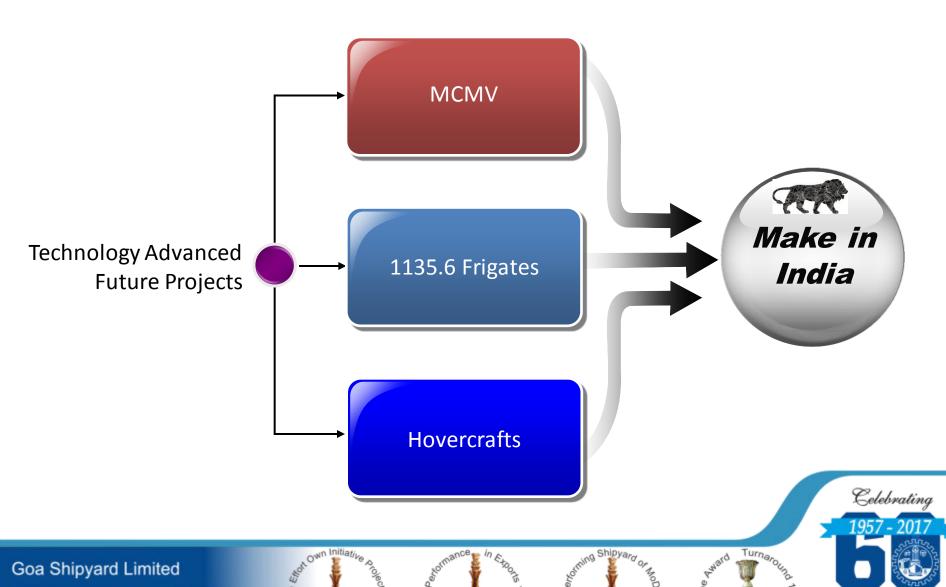








FUTURE PROJECTS - IMPORT SUBSTITUTE



Glorious Vears

Mine Counter Measure Vessels (MCMV)



- Qty -12 ships
- Only Shipyard in Indian Subcontinent to construct MCMV with Technologically Advanced GRP Hull











PROJECT 1135.6



- Construction of 02 Advanced Missile Frigates under ToT from Russia – significant indigenous content
- Production expected to commence by Mid 2020
- Highly weapon intensive platforms













INDIGENIZATION EFFORTS

Make in India



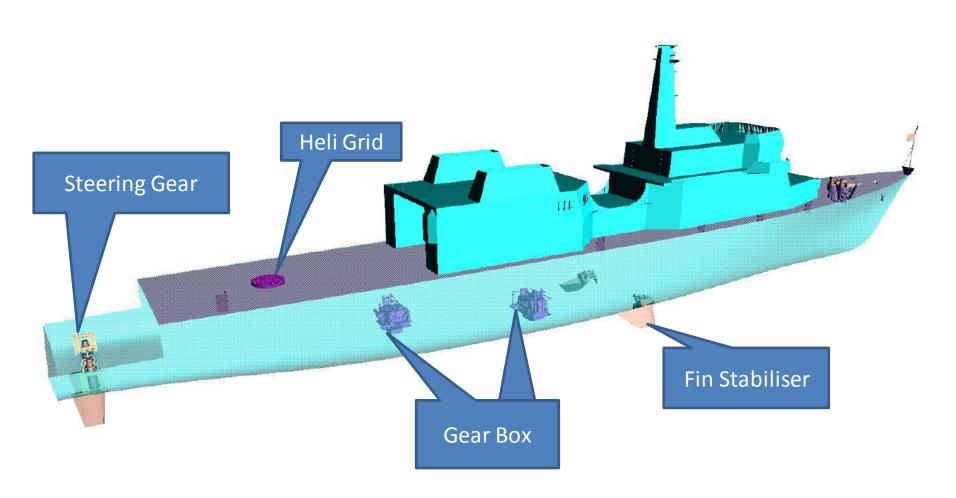








GSL'S INDIGENIZATION EFFORTS ONGOING 05 CG OPV PROJECT



GSL'S INDIGENIZATION EFFORTS (10 YEARS)

Float

- Steel Plates (Essar Steel)
- Doors (Water tight& Weather tight)
- Boat
- Helo landing Grid
- Scuttles
- Modular Accommodation
- Accommodation Ladder
- Anchor Chain

Move

- Gear Box
- Steering Gear system
- Fin Stabilizer
- Winch for Bulwark
- Stern Gear
- Mooring Capstan
- Anchor Windlass
- Window wiper
- Anchor

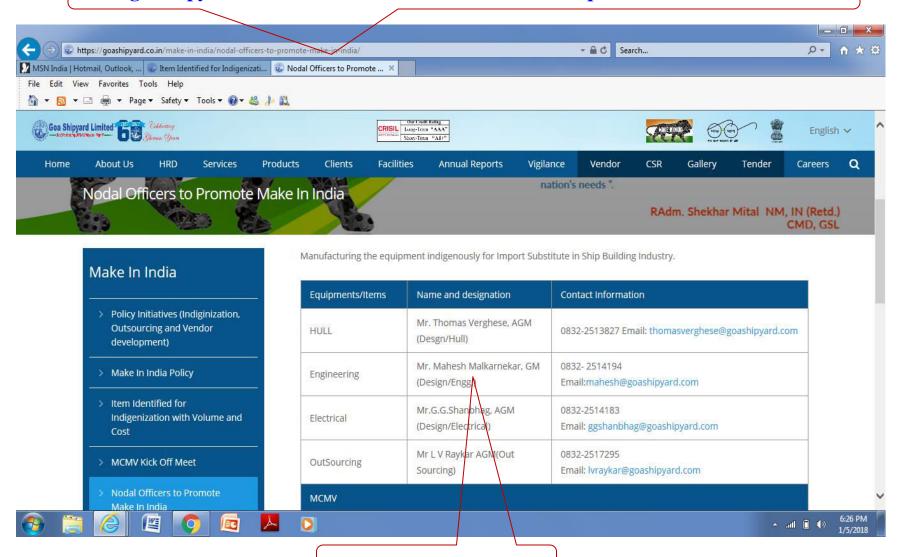
Fire

- SRGM Gun- BHEL
- Kavach Launcher-GCF
- CRN91 Gun OFB
- SOP MKII BEL
- EON 51 BEL
- HMG & MMG Gun OFB
- AK 630 Guns GSF
- ESM Sanket –BEL
- WeaponTransformer -
- CTD -BEL
- Frequency Convertor – KEC

GSL will make efforts to improve indigenisation inline with MoD directives promulgated on 02nd Aug 2018

INDIGENIZATION

www.goashipyard.co.in/make-in-india/nodal-officers-to-promote-make-in-india



Nodal Officer's details

INDIGENIZATION POLICIES

- ➤ Items identified for indigenization as part of "Make in India"
 - List of <u>37 items</u> published on GSL website <u>www.goashipyard.co.in/make-in-india/</u>
- ➤ Implemented Purchase preference policy in line with Public Procurement Order (Preference to Make in India) 2017 dated 15 June 2017 giving preference to Indian Manufacturers over Foreign Vendors by way of incentive to promote Indigenization.
- Assuring Orders to vendors successfully developing import substitute.
- Promulgated Start-up Policy in line with Gol guidelines.











INDIGENIZATION POLICIES

- ➤ MoD notified two separate lists of 30 items and 4 items reserved for indigenization for surface ships in line with preference to Make in India Policy. The same will be implemented by GSL progressively.
- Payment terms to Domestic firms including MSEs relaxed for
 - Enhanced liquidity
 - Level playing field vis-à-vis Foreign vendors

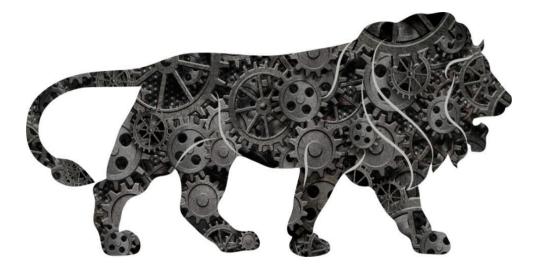












INITIATIVES TO ENCOURAGE MSES











INITIATIVES TO ENCOURAGE MSES

- Provisions of M/o of MSME Order, PPP-2012 implemented
- >Additionally following initiatives taken to promote MSEs
 - SD Exemption for MSEs registered with NSIC for supply of goods.
 - Liberalised Payment Terms.
 - Advance Payment.
 - Payment through Trade Receivable Electronic Discounting System (TReDS).
 - Mechanism to track and monitor timely payment to MSEs.
 - Reserved <u>18 Shipbuilding items</u> for exclusive procurement from MSEs over and above list of 358 items.

Visit GSL website: www.goashipyard.co.in.











GSL'S EFFORTS TO ENCOURAGE MSEs

- Purchase Preference over non MSEs
- Published tentative annual demand for procurement from MSEs on GSL website.
- Collaborative arrangement with NSIC for enhanced procurement from MSEs.
- 10 % discount for "Type Approval" Certification by IRS to MSEs owned by SC/ST entrepreneurs.
- Procurement of commonly used Goods & Services through GeM platform.











PROCUREMENT THROUGH MSEs

Year	2016-17	2017-18	2018-19	Rolling Average for 2015-18
% increase	33.39	30.41	45.8*	39.38

* As on. Sept. 2018

Progressive increase of procurement from MSE vendors during last 3 years (in %)

In pursuance of MSME order 2012, GSL persistently procuring Goods and Services from MSE vendors, exceeding minimum mandatory procurement target of 20%













VENDOR DEVELOPMENT











VENDOR DEVELOPMENT

- > Regular conduct of vendor meets.
- ➤ Active participation in vendor meet at Regional as well as National level.
- ➤ Facilitating yard visit for vendors for interaction with stakeholders at GSL and understand requirement.
- ➤ Association with MSME Goa, NSIC and nearby industrial cluster.
- > Imparting training on TReDS to MSEs.











VENDOR DEVELOPMENT

- > Instituted inland LC for domestic vendors.
- ➤ Provision of advance payment to MSEs against security.
- ➤ Outsourcing Policy for core and non-core activities.
- ➤ Handholding of local firms.
- ➤ Unleashed incentive of exemption from Security Deposit to MSEs registered under NSIC for supply of goods.











Defence Expo Goa, Mar 2016





Vendor meet Belgaum , July 2018

MSME Vendor meet , Goa Aug 2017





Expo &
Seminar by
NSIC
Coimbatore,
Aug 2016











MSME Expo, Thrissur, Feb, 2018



Vendor meet by DPSU, Chennai, Apr 2018

MSME meet , Margaon, Jul 2017





MSME meet , Margaon, Aug 2017















GSL participated at Special Vendor Development Program arranged by National SC-ST Hub at Kolhapur; 28 July 2018













National Vendor Development Program for MSEs owned by SC/ST Entrepreneurs at GSL, Goa;16 June 2017











GLIMPSE OF VENDOR DEVELOPMENT PROGRAM



Training on TReDS, GSL, May 2018











GLIMPSE OF VENDOR DEVELOPMENT PROGRAM



Vendor Development Program, GSL, 1st Nov. 2018

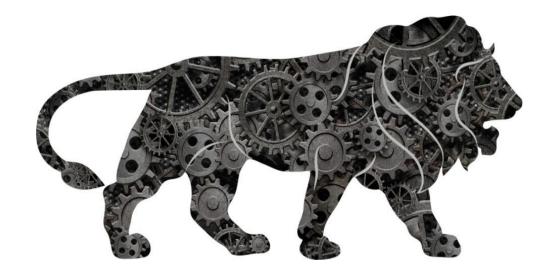












VENDOR REGISTRATION PROCESS









ONLINE VENDOR REGISTRATION PROCEDURE



Document

Submission

Evaluation Stage

Approval

Company particulars

 Confirmation regarding registration with DPSU



• Catalogue, Financials, QAP Process, Experience etc

Evaluation by GSL

- Approval by GSL
- Issue of registration certificate

STAGE - I Submission of Vendor profile (Online) **STAGE - II Uploading of** documentation (Credentials)

GSL website

http://www.goashipyard.co.

Scrutiny of applications Commercial **Technical** QA&R **Planning Finance Management Approval Award of Registration Certificate**

Contact: Ms. Asmita Prabhu Dessai, Manager (Commercial)

Email: asmitaprabhudessai@goashipyard.com Phone: 0832-2500456

Goa Shipyard Limited









Celebrating

ONLINE VENDOR REGISTRATION PORTAL



Click here for Vendor Registration

Goa Shipyard Limited



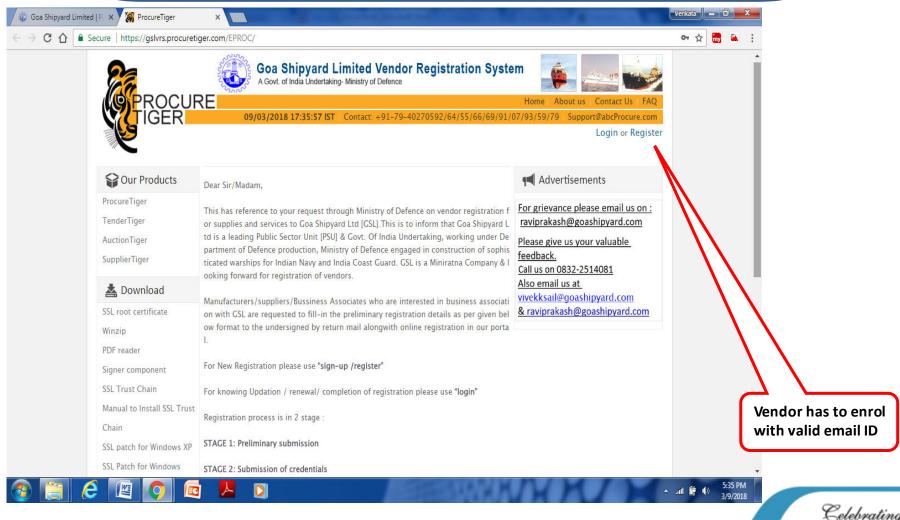


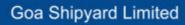






ONLINE VENDOR REGISTRATION PORTAL







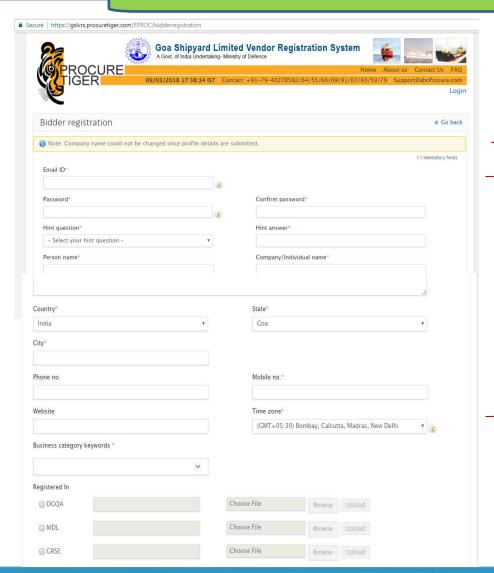








ONLINE VENDOR REGISTRATION





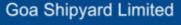
Firm has to fill complete details

Basic Details of Firm

Registration details, if registered with any other DPSUs or DGQA, CGHQ,IHQ

Contd..



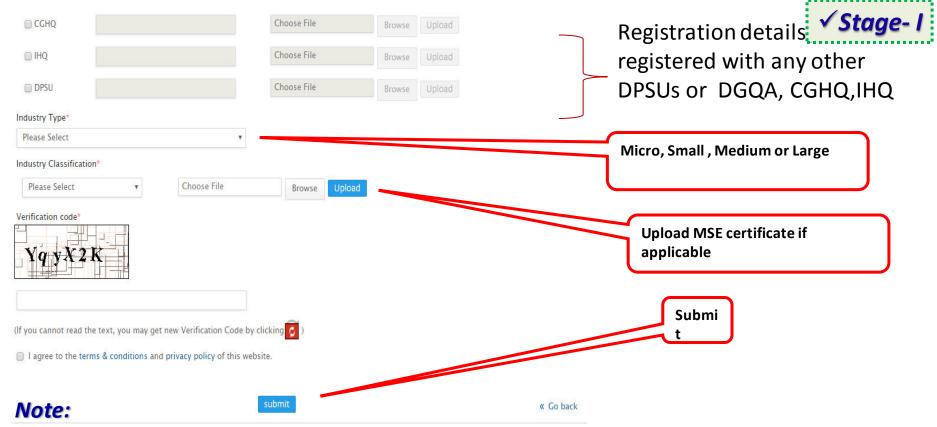








ONLINE VENDOR REGISTRATION



- 1. Foreign vendors willing to do registration with local authorized channel partners have to send authorization and contact details for pursuance.
- 2. Vendors already registered are requested to refer vendor code & DSC registrated details for vendor augmentation and updation of categories











DEEMED REGISTRATION & RENEWAL

- Firm registered with any other DPSUs, DGQA, IHQ, CGHQ, NSIC will be Deemed to be registered with GSL for respective category.
- The registration fee will not be applicable to such vendors for direct deemed registration
- > Renewal on self certification

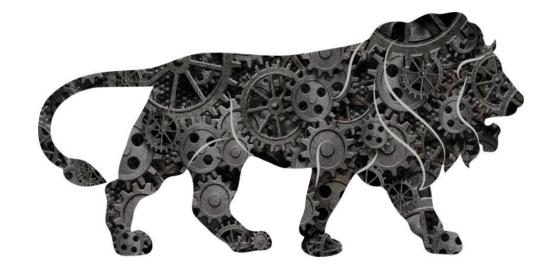












OPPORTUNITY FOR DOMESTIC VENDORS











KEY AREAS OF PROCUREMENT

Goods	Core Equipment
	• Hull
	•Engineering
	•Electrical
	•Weapons & Sensors
	Non-Core items
	Outfitting items, Yard material, Spares &
	Consumables , P&M
Services	Outsourcing of Core activities
	Block Fabrication,
	Hull Construction etc.
	Outsourcing of Non-Core activities
	AMC, BRC, Housekeeping, Security etc.

ITEM IDENTIFIED FOR INDIGENIZATION

Steel & Aluminium Ships

Hull	Engineering	Electrical
A-60 Class Window	Main Propulsion Engine	Multi Cable Transit
Electro Hydraulic Articulated Folded Crane	Gearbox	Long Range Acoustic Device
8 Men Capacity Inflatable Boat	CPP Stern Gear System	Binoculars Night Vision
Rigid Inflatable Boat	Integrated Machinery Control System	Optical Binocular
Probe receiver system	External Fire Fighting Pump	Haandheld Uncooled Thermal Imager
	Tunnel Thruster	Emergency Position Indicating Radio Beacon
	Oily Water Separator	Search And Rescue Transponder
	Incinerator	Infra Red Internal Communication System
	Air Whistle	GPS Compass Celebra











INCINERATOR



Annual requirement:
Approx 2 nos. per year

Sr No.	Technical Description	
1	Marine incinerator should have following characteristics:	
1.1	Having a thermal capacity of minimum 1,80,000 KCAL/HR.	
1.2	Capable of burning all shipboard waste, including galley garbage.	
1.3	Capable of burning solid waste and sludge simultaneously. Incinerator will be batch loaded for solid waste; however sludge will be fed continuously.	
1.4	The incinerator should have IMO certificate and should satisfy the requirements from the major classification societies, IMO and other Maritime Authorities.	
1.5	Incinerator should be of sturdy, compact design and high performance. Incinerator should be of automatic control type with PLC controller and should be supplied as a complete "package" consisting of all the components mounted on a common base frame.	
2	Scope of supply generally consists of	
2.1	Sludge circulating pump and heater.	
2.2	Main combustion chamber.	
2.3	Spark arrestor, flue gas fan and flue gas damper.	
2.4	Diesel oil tank, (having approx. capacity of 400 lit.).	
2.5	Electrical control panel with all necessary safety systems, alarms, instrumentation.	

The use I application of the product:

To burn all shipboard waste including galley garbage, solid waste and sludge within the vessel meeting Annex V of MARPOL 73/78 regulations.

Goa Shipyard Limited











AIR WHISTLE



Annual requirement: Approx 2 nos. per year

Sr No.	Technical Description
1	Air whistle should meet SOLAS 1974 regulation and its amendments and international regulations of prevention of collisions at sea (IMCO) 1972.
2	Air whistle complete with solenoid electric operation for 24V DC and 230V AC input voltage.
3	Suitable to operate on compressed air at inlet pressure of 30 kgs/cm2
4	Robust construction to withstand tropical climatic conditions.
5	Type approved by Class Viz. ABS/LRS
6	Air whistle should be equipped with a lever for manual operation.
7	Scope of supply generally consists of
7.1	Air whistle unit consisting of 1. Horn with main body, 2. Diaphragm (stainless steel), 3. Solenoid valves one each for 230 V.A.C. and 24 V.D.C supply. 4. Heater
7.2	Heavy duty air filter with moisture separator.

The use *I* application of the product:

Used for signalling purpose during navigation of vessel











QUICK CLOSING VALVE



Annual requirement:

Approx 25 nos. per year

On No	Tackwisel Description
Sr No.	Technical Description
1	Quick closing valve (QCV) and Cabinet for Pneumatic Control should have following characteristics:
1.1	Quick closing valve should be suitable for fuel oil, Lub oil and Avcat oil tanks with pneumatic release system. The system shall be type approved by ABS
1.2	QCV Material: Body: Cast steel to GGG-40, Disc, seat ring, spindle, piston rod: S.S. to AlSI 304, hand wheel: Cast steel to GG25 End connections (Flange): OD, PCD, No. of bolt holes and Dia. of holes conforming to DIN ND10 STD. The valves will be of different sizes like 15 NB to 80 NB
1.3	Cabinet for Pneumatic Control / Release system complete with adequate capacity air bottles (capacity to be indicated in the offer) sufficient to close all connected valves twice, actuating levers, pressure gauges, low air pressure alarm alongwith buzzer, non return valve adjacent to the air receiver in the supply line and other associated fittings required for proper functioning of the system shall be supplied.

The use *I* application of the product:

Used for signalling purpose during navigation of vessel











A-60 CLASS WINDOW



Annual requirement:
Approx 2 nos. per year

Sr No.	Technical Description
1	A-60 class Window (with bolted deadlight) type approved by Classification Society.
2.	A-60 windows are to be fitted on Mild steel watertight sub division bulkhead below freeboard deck between engine rooms & MCR and MCR aft bulkhead. The frame of the window should be suitable for welding on to MS bulkhead conforming to Class Rule.
3	RULES & REGULATION, MATERIAL & CERTIFICATION: as applicable as per Rules & Regulations of Classification Society







A, B & C FIRE CLASS DOORS



Annual requirement:

Approx 120 nos. per year



Sr I	No. Technical Description
1	A-0, A-60, B-0 and C-Class Fire Class Doors complete with Frame and Accessories for fitment onboard ship
2.	Fire class Doors are provided on board ships to achieve fire class integrity as per class requirement as required between fire pro zone and other compartments. Frames are Doors should suitable for welding/bolting on the Mild steel & Fire Class Panels
3.	RULES & REGULATION, MATERIAL & CERTIFICATION: as applicable as per Rules & Regulations of Classification Society
4.	Brief Specification
4.1	Door frames should be suitable for welding/bolting on the steel bulkheads/25mmthick B-O Class panels/Aluminum plane panel 4.0mm thick as indicated in the Drawing (Drawing will be attached). In case of bolting, necessary neoprene rubber packing, stainless steel fasteners with 10% extra, and any other fittings required for fixing the doors are to be supplied with each door.
4.2	The doors should be water resistant and resistant of harboring of vermine
4.3	All the doors are to be provided with decorative laminate fixed to the door blade on both sides. The colour of decorative laminate should be of pure white suede finish
4.4	Doors should be capable of being opened from either side. Suitable locking arrangement, key, handles etc. are to be provided for each door
4.5	All the doors should be provided with Master Keys
4.6	All doors are to be provided with Hydraulic Door Closers, Retaining Hooks and Cylindrical Mortise (CM) lock and handle.
4.7	Doors to be fitted on the 25mm thick B-0 panels should be supplied with counter frame suitable for B-0 panel with fasteners.
4.8	All B-O and some C-class doors are to be provided with Kickout Panels with Ventilation Louvers.
4.8	Class type approval certificates for the A-0, A-60, B-0, and C-class shall be provided as per requirement of Regulations
	loilly and the second s

Glorious Vears

A, B & C FIRE CLASS PANELS



Annual requirement:
Approx 500 Sqm.
per year

Sr No.	Technical Description	
1	25mm thk. B-0 class self-standing partition Bulkhead of 600x2400mm with all necessary-joining profiles	
2.	Fire class panels are provided on board ships to achieve fire class integrity as per class requirement between fire prone zone and other compartments. Panels are sandwich type construction with fire class insulation at centre cladded with mild sheet or aluminium sheet as per the requirement fire integrity.	
3.	RULES & REGULATION, MATERIAL & CERTIFICATION: as applicable as per Rules & Regulations of Classification Society	
4.	Brief Specification	
4.1	The B-0 Class panels are to be supplied with suede finish pure white colour decorative laminates on both sides .	
4.2	The surface finish of all the profiles except Top & Bottom Profiles and Spline profiles should be PVC coated or vinyl coated or powder coated to pure white colour.	
4.3	All profiles are to be supplied at a length of 2400mm each.	
4.4	The thickness of panel should be 25mm and panel should be suitable to be used as self-standing bulkhead panel.	
4.5	The panel should be suitable to hold the weight of normal bulkhead mountings such as cabin fan, switch, sockets, book shelves (weighting approx. 25 kgs.) etc.	
4.6	Details/ information's are to be provided like Type approval certificate of B-Class panels from ABS.Drawings/sketches of all the Documentary evidence/ proof of whether	
	the firm is having ISO 9000 certification	











WATER TIGHT HYDRAULIC SLIDING DOOR



Annual requirement:

Approx 2 nos. per year

Sr No.	Technical Description	
	Electro-Hydraulic watertight horizontal sliding door with local operation and remote control operation	
1	from wheel house .The doors should be complete with all accessories, installation material and control panel meeting latest SOLAS rules Clear opening of the doors should be 1500mm (height) X 600mm (width).	
	Provided between Machinery compartment and other compartments below water line to achieve water	
2.	tight integrity as per Class requirement. Provision shall be made to operate Doors remotely from Wheel house as per class requirement	
	RULES & REGULATION, MATERIAL & CERTIFICATION:	
3.	Electro Hydraulic water Tight sliding doors should be complying SOLAS regulation and should be	
	type approved by Classification society.	
4.	Brief Specification	
4.1	The item should essentially consist of doors, cleats, wheels, rollers, track way, cylinder, hand	
4.1	pumps, tanks, tanks piping bhd./deck/tee connections manoeuvring valves, clamps to suit pipes etc.	
	W.T sliding doors should be operable from both the sides of bulkhead on which it is	
4.2	fitted as well as from the remote station. Remote operation station for both doors will be be in the wheelhouse, hand pump, oiltank and visual alarm for remote operation of both doors will be fitted in	
	the wheelhouse.	
4.3	The maneuvering valve for choosing between opening and closing motion is to be capable of being	
	controlled from all three places i.efrom either side of the door and from remote station.	
4.4	Doors frame should be suitable for welding on 7.0 thk. ABS GR'B' mild steel bulkhead. Clear opening	
	of the doors should be 1500mm (height) x 600mm (width).	
	The door should be capable of being closed and opened by means of each double acting pump and	
4.5	should conform to latest SOLAS & Class rule requirement. The time necessary for complete closure of	
	the door should be as required by latest SOLAS & Class rule requirement	
4.6	The required hydraulic piping and connections for the remote operation 1957 - 2017	
own Initi	per ship shall be provided along with door.	

Glorious Vears

ELECTRO HYDRAULIC ARTICULATEDFOLDED CRANE

(KNUCKLE BOOM TYPE)

CAPACITY:

No.



	SWL of 2.0 tonnes at 4.0 m steplessly increasing to tonnes at 9.0 m.
	Minimum outreach should be 2.0 metre.
	Maximum outreach should be 9 metre
2	Hoisting Speed (any load) = 0-16 m/min
	Luffing time = 24 sec
	Slew factor(without limitation) = 400deg
	Slewing speed = 0 to 1.4 rpm
	Lowering speed (stepless) = Hydraulically equal to Hoisting speed (ie 0-
•	16 m/min)
	RULES & REGULATIONS & CERTIFICATION : Classification Society
3	RULES & REGULATIONS & CERTIFICATION: Classification Society as per Code of Lifting appliances in Marine Environment.
3	1
3	as per Code of Lifting appliances in Marine Environment.
3	as per Code of Lifting appliances in Marine Environment. TECHNICAL SPECIFICATION:
3	as per Code of Lifting appliances in Marine Environment. TECHNICAL SPECIFICATION: Electro Hydraulic Articulated (knuckle boom) Crane with following
3	as per Code of Lifting appliances in Marine Environment. TECHNICAL SPECIFICATION: Electro Hydraulic Articulated (knuckle boom) Crane with following operational parameters:
3	as per Code of Lifting appliances in Marine Environment. TECHNICAL SPECIFICATION: Electro Hydraulic Articulated (knuckle boom) Crane with following operational parameters: • Power pack ,Motor starter ,Slewing machinery
3	as per Code of Lifting appliances in Marine Environment. TECHNICAL SPECIFICATION: Electro Hydraulic Articulated (knuckle boom) Crane with following operational parameters: • Power pack ,Motor starter ,Slewing machinery • Hoisting machinery with eyes and hooks

Technical Description

Electro Hydraulic Articulated folded crane (Knuckle boom type)

Annual requirement:

Approx 2 nos. per year





Starter Panel

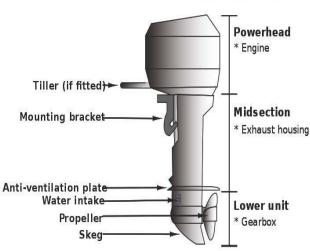






OUTBOARD MOTOR (OBM)





Sr No.	Technical Description
1	To be fitted on Rescue Boat/Life Boat & work Boats as propulsion device as per speed and capacity requirement
2	Engine. Outboard motor should of power 65 to 75 HP and shall be controlled from the helmsman position. Both remote and local manual starting arrangements should be provided. Fuel System. The engine shall draw fuel from fixed fuel tank of sufficient capacity to meet the endurance requirements. The fuel tank shall be constructed of stainless steel and of the size to meet endurance specified. The tank shall be provided with cover plate for cleaning. A
	endurance specified. The tank shall be provided with cover plate for cleaning. A calibrated dipstick shall also be provided which shall be stowed on top of this tank.

Annual requirement:

Approx 2 nos. per year











OPTICAL BINOCULAR



Annual requirement:

Approx 10 nos. per year

Sr No.	Technical Description	
	7 x 50 Optical Binocular complete with carrying case and strap	
1	Magnification	7x
2	Field of View	120m @ 1000m
3	Diopter adjustment	-5 dptr to +7 dptr
4	Objective Dia	50 mm
5	Focus Method	Centre Focussing i.e. Adjust both lenses at the same time
6	Lens of Optical Binocular to be multi-coated	
7	Optical Binocular to be water proof and fog proof	











BINOCULARS (NIGHT VISION)



Annual requirement:

Approx 2 nos. per year

C.	1		
Sr No.	Technical Description		
1	Nickay/inica Diagonal annith accessories commining of Nickay/inica Diagonal annith League		
1	Night Vision Binocular with accessories comprising of Night Vision Binocular with Image		
	Intensifier tube of third generation, Lens cap, Eye cup (2 pieces), Eye piece cap and Neck		
	strap, Demist shield for eyepiece, Day light filter, Rechargeable alkaline battery 1.5 Volts,		
	Rechargeable lithium battery 2.8 Volts, Dummy battery , Transport case, pouch with		
	accessories consisting of lens tissue and lens brush with tube, Battery charger for alkaline		
	battery 1.5 Volts, Battery charger for lithium battery 2.8 Volts.		
2.1	Magnification	3x	
2.1	Iviagriffication	- 3x 	
2.2	Field of View	=/> 12.5°	
2.3	Focusing Range	10m to infinity	
2.4	E!'-C	 	
2.4	Eye relief	25 mm	
2.5	Eyepiece (Binocular)	f=25.4 mm	
		5	
2.6	Eye base	56mm to 72 mm	
2.7	Diopter adjustment -6 dptr to +2 dptr		











HANDHELD UNCOOLED THERMAL IMAGER



Annual requirement: Approx 1 nos. per year

Sr No.	Technical Description	
1	Type: Uncooled Microbolometer	
2	Material:	Amorphous Silicon (ASi)
3	Frame rate:	Min 9 Hz
4	Resolution:	160x120 pixel
5	Continuous Operation:	Min 2 hours.
6	Battery Type:	Lithium Ion
7	Spectral Range:	8 ~14 μm
8	Field Of View:	3.5° (H)
9	Type of Viewfinder:	OLED Microdisplay
10	Thermal Sensitivity:	0 50mK
11	Pixel Size(Pitch):	Approx 25 μ
12	Recognition Range Approx):	Approx 650m
13	Operating Temperature	-20°C To +60°C (-4°F To 140°F)
14	Long Term Storage -20°C To +60°C (Camera)	
		-10°C To +50°C (Battery)
15	Sealing	Waterproof (IP65)*
16	RoHS	Compliant
17	Safety	IEC 60950-1 and related national standards











INFRA RED INTERNAL COMMUNICATION SYSTEM





Annual requirement:
Approx 1 nos. per year

Sr No.	Technical Description	
	The infra-red communication shall provide communication in both directions between the mobile operator unit and a fixed base station by digitally encoded data. Two way wire-free communication shall be achieved between the mobile units and the fixed antennae by digitally encoded infra red. The mobile units shall be small, light weight, noise attenuating and battery powered, while the fixed base unit shall employ several infra red antennae located throughout the area covered for communication.	
1	Infra Red Antenna	
2	Base station	
3	Mobile unit noise attenuating	
4	Mobile unit Aural Type	
5	Battery pack for noise attenuating mobile & Aural Type	
6	Battery charger 230vac 50/60 Hz.	
7	Auto Change-Over Power Supply Unit	
8	Auxiliary Power Supply	
9	Audio, Data and Power Supply cables	











GPS COMPASS



Annual requirement: Approx 1 nos. per year

Sr No.	Technical Description		
1	GPS Receiver Type GNSS L1 Compass		
2	Channels Two 270- channel, parallel tracking		
3	SBAS tracking	tracking 2-channel, parallel tracking	
4	Update rate	1-20 Hz (position and heading)	
5	Horizontal accuracy	<1.0 m 95% confidence (DGPS)	
		<4.0 m 95% confidence (autonomous)	
6	Heading accuracy	<0.5 deg RMS	
		Normal operation: GPS	
		Coasting (no GPS): Gyro	
7	Heave accuracy < 30 deg RMS		
		Normal operation: GPS	
		Coasting (no GPS): None	
8	Pitch accuracy	< 1 deg RMS	
		Normal operation: GPS	
		Coasting (no GPS): Inertial sensor	
9	Roll Accuracy	< 1 deg RMS using accelerometer	
		Normal operation: Inertial sensor	
		Coasting (no GPS): Inertial sensor	
10	Timing (1 PPS) accuracy	50 ns	
11	Rate of turn	90 deg/s maximum	







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LONG RANGE ACCOUSTIC DEVICE (LRAD



Sr No.	Technical Description			
1	LRAD shall provide long range communication and a highly effective			
	hailing and warning capability .The superior voice intelligibility and			
	clarity of LRAD shall provide a directional audio beam so that it can			
	communicate with high intelligibility over 88 dB of background noise			
	beyond 650 meters and shall be capable of communicating over			
	1500/2000 metres away in a benign environment. LRAD operator shall			
	have the ability to issue clear, authoritative verbal commands, followed			
	with powerful deterrent tones to enhance response capabilities.			
2	ACOUSTIC PERFORMANCE:-			
2.1	Maximum	145 dB SPL at 1	148 dB SPL at 1 meter	
	Continuous	meter		
	Output			
2.2	Beam Width	+/-15° @ 1 kHz/-3dB	+/-15° @ 1 kHz/-3dB	
2.3	Communications	Highly intelligible	Highly intelligible speech	
	Range	speech transmissions	transmissions over 2000	
		over 1500 metres.	metres.	

Annual requirement:

Approx 1 nos. per year











SEARCH AND RESCUE TRANSPONDER (SART)



Annual requirement:
Approx 4 nos. per year

Sl. no.		Technical Description	
1	Frequency 9.2 GHz to 9.5 GHz		
2	Antenna Characteristics Vertical beamwidth at least +/- 12.5 degree relative		
		the horizontal plane of the radar transponder. Azimuthal	
		beamwidth omni-directional to +/- 2dB	
3	Sweep Rate	5 usec per 200 MHz nominal	
4	Response Signal	12 forward and return sweeps through the	
	range 9.2-9.5GHz		
5	Form of sweep	Forward \rightarrow 7 usec	
		Reverse → 0.4 usec	
6	Minimum recovery time less than 10μs		
7	Pulse emission	100 usec nominal	
8	Rx Sensitivity	Better than - 50 dBm	
9	Operating Temp	- 20°C to +55°C	
10	Radiated Power (ERP)	Not less than 400mW (+26dBm)	
11	Effective Antenna Height	1 metre or greater	
12	Duration of Operation	96 hours in standby condition followed by a minimum 8	
	hours of transmission while being continually		
		interrogated with a pulse repetition frequency of 1kHz	











EMERGENCY POSITION INDICATING RADIO BEACON



Annual requirement:
Approx 2 nos. per year

SI. No.	Technical Description			
	EPIRB (Emergency Position Indicating Radio Beacon) shall be used to alert search and rescue			
	services in the event of an emergency. It shall transmit a coded message on the 406MHz			
	distress frequency. This message shall be relayed via satellite and earth station to the			
	nearest rescue co-ordination centre.			
	EPIRB shall be fully compatible with the Cospas-Sarsat and Global Maritime Distress and			
	Safety System (GMDSS) regulations and meet the requirements A810 (19) of the			
	International Maritime Organisation (IMO).			
	The EPIRB shall also have a secondary distress transmitter. This shall transmit on 121.5MHz			
	and shall be used for "homing" purposes. When the rescue services get close, this shall allow			
	them to direction f	em to direction find on the signal. To cater for searches at night, the EPIRB shall have a		
	bright flashing ligh	ng light that aids final visual location.		
1	406 MHz Tx	Operating Freq.	406.5MHz +/- 1 KHz	
		Power Output	5 W	
		Modulation	Phase	
2	121.5 MHz	Operating Freq.	121.5MHz +/- 3.5KHz	
	Homing Tx	Power Output	50 mW ERP	
		Modulation	AM swept tone	
3	Strobe Light	Туре	high intensity LEDs	
4	Battery	Operating Life	48 Hrs	
		Shelf Life	5 yrs	





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