Brief summary of the identified Potential 'Make' Projects

SHQ(Army)

Project No.1

125MM SMOOTH BORE GUN BARREL FOR T-72 & T-90 TANKS WITH MISSILE FIRING AND IMPROVED AMMUNITION

1. **Name of Project**. 125MM Smooth Bore Gun barrel for T-72 & T-90 tanks with missile firing and improved ammunition.

2. **Brief**. The current T-72 & T-90 tank barrels are not capable of firing high penetration APFSDS rounds (above 600mm Depth of Penetration (DoP)) due to limitation of safety margin of 600 Mega Pascals (Mpa). There is a requirement to upgrade a common barrel system and ammunition for existing T-72 & T-90 tanks. Development of ammunition to provide capability of penetration and missile firing capability with these barrels also required to be developed together.

3. **Broad Specification**.

(a) **QRs - Barrel/ Gun Articles**.

S No	Parameter	Capability
(i)	Equipment	Barrel (including gun articles) and associated systems.
(ii)	Integration	With T-90 & T-72 tanks with existing Fire Control System (FCS)
(iii)	Capability	To fire ATGM(Anti tank guided missile) through gun barrel and APFSDS ammunition with DoP $\geq$ 600mm RHA.
(iv)	Ammunition	APFSDS, HE(Fragmentation), HEAT & ATGM.

(b) **QRs - Amn (APFSDS)**.

S No	Parameter	Capability
(i)	Lethality (DoP)	600 – 800mm of RHA.

(ii)	Effective Rg	3000 mtr
(iii)	Consistency	≤.35mils
(iv)	Adaptability	Existing FCS & AFVs Sights. Current/ new barrel or Gun Article of T-72 & T-90 tanks. Change in barrel metallurgy & designs (improved).
(v)	Permissible	Alteration auto loader, CLM and BCU/TPU of T-72 & T-90 tanks.

(c) **QRs-Msl**. Existing msl (9M119 – UBK20) to be integrated with the barrel system.

4. **Quantity**. 1000 Nos (minimum).

5. **Time Lines**. Prototype & trial eval by 2019. Production & sup by Dec 2020.

6. **Additional Info**. All future upgrades & improvements may be offered by vendor as part of contractual obligations (incl AMC & life time product support)

SHQ(Army)

Project No.2

1000HP ENGINE WITH ASSOCIATED PERIPHERALS

(FOR TANK T-72 & ITS VARIANTS)

1. **Name of Project**. 1000HP Engine with associated peripherals for T-72 tanks & its variants.

2. **Brief**. There is a need to upgrade the engine of the T-72 tanks, the power to weight ratio needs to be upgraded from the existing 17hp/ton. There is a need to integrate a newly developed power pack with associated peripherals in T-72.

3. **Broad Specifications**.

(a) **QRs**.

Ser No	Parameter	Capability
(i)	Power	1000HP ± 20HP
(ii)	Power to Wt Ratio	Not less than 20 HP/Ton
(iii)	Fuel consumption	Dunal Trn - 750 km X-Country - 650 km ± 10 On Rd - 500 km ± 10
(iv)	Ambient Temp for Ops	All environment condition in sub continent as per JSS/Mil Stds. For eval 40°C to 45°C
(v)	Life of Engine	650 hrs

(b) **Desirable**. Requisite changes to various sub systems like Cooling, Lubrication, Air Cleaning and Transmission System may be under taken to integrate the high powered engine.

4. **Quantity**. 1000 Nos (minimum).

5. **Time Lines**. Prototype development & trial evaluation by 2018. Production & supply by Dec 2019.

6. **Additional Info**. All future upgrades & improvements may be offered by vendor as part of contractual obligations (incl AMC & life time product support).

SHQ(Army)

Project No.3

INDIVIDUAL UNDER WATER BREATHING APPARATUS (IUWBA) FOR TANK T-90

1. **Brief Description**. During the course of their, the T-90 tanks are likely to negotiate a variety of terrain features including water obstacles. T-90 tanks have an ability to undergo deep fording at 5 meters depth under water channels of upto 5 knots. During deep fording, in the eventuality of the equipment stalling/ switching off, there is no alternative for the crew to escape from the fighting/driver compartment and reach the surface of the water, before the tank is completely flooded. Towards this end the IUWBA will ensure complete safety of the T-90 tank crew and ensure survivability.

2. **Broad QRs**.

(a) **Physical Chs**.

(i) The IUWBA (sets) should be able to be worn by tank crews during deep fording in the fighting compartment, in a manner that it does not restrain movement of the crew, foul with other moving parts or hinder functioning of the existing components.

(ii) The IUWBA should provide for positive buoyancy to each crew member during the emergency escape procedure which can be activated on demand.

(iii) The IUWBA should be compact enough to be stowed in the under stream crossing equipment (USCE) tool box of the tank when not in use.

(iv) The IUWBA should be separate for each crew member having a breathing inlet in the form of a Face Mask or Oral Respirator for each crew member.

(v) The weight of the IUWBA should not exceed 5 Kg.

(b) Op and Maint Chs.

(i) Operate in temperature ranges of $+4^0$Cto + 45^0 C.

(ii) The equipment should be capable of operating in environment conditions available in the Indian sub-continent and conform to JSS-55555 standards (as applicable to the equipment).

(iii) The equipment should be dust, moisture and leak proof and retain its efficiency when stored at temperature range from -5^0C to 55^0C.

(iv) The shelf life of IUWBA should be ≥ 7 years.

3. **Tentative quantity to be procured after successful prototype development**. 10,000 Nos.

4. **Tentative Time Line for Induction.** Two to three years.

SHQ(Army)

Project No.4

ENVIRONMENTAL CONTROL UNIT (ECU) FOR TK T-90

1. **Brief Description**. The T-90S/SK tank has state of the art features like Computerised Fire Control System, Thermal Imaging Night Sight, missile firing capability, carriage of missiles etc. This equipment is highly sensitive to adverse weather & dust conditions and get degraded under extreme heat and dust. Although, the tank is designed to operate in temperature conditions up to 50^0C, however, the ambient temperatures in our desert/semi-desert regions rises even beyond that. Resultant to the high temperatures obtaining in the crew compartment the electronic systems/ sub-systems are likely to get degraded. There is thus an imperative requirement of an Environmental Control System for T-90S/SK tanks to avoid detrimental effect to the onboard electronics and opto-electronics.

2. **Broad QRs**.

(a) **Physical Chs**.

(i) **Size and Shape**. The system should be compact and ergonomic **wherein the existing fitment items in the crew compartment should not be removed, however if relocated same should not compromise the operational efficiency of the tank**. The system should not foul with existing features on the tank.

(ii) **Power Supply**. The ECU should be able to operate from the mains, 24V output and also from APU output.

(iii) **Protection**. The system should be protected by **providing a metallic outer casing**.

(iv) **Robustness**. The system should be rugged enough to withstand the hazards of cross country mov in plains and desert terrain.

(v) **Preservation Desired**.The system should comprise sealed units and be water resistant upto tank depth of 1.5 meter while tank is carrying out medium fording operations.

(vi) The system should meet the MIL 461 **E** standards (as applicable for ground forces) **with regard to EMI/EM compatibility**.

(b) **Tech Parameters**.

(i)	AC Type	: Split.
(ii)	Air Circulation	: Closed cycle with air intake from crew Compartment.
(iii)	Final inside temperature desired	: 28^0 ±5 °C (hatches closed) **in an ambient temperature range from -5^0C ± 5^0 C to 45^0 C ± 5^0 C. For temperatures beyond 45^0 C**

ambient a minimum of 15^0 C drop in temperature within the tankmust be effected.

(iv) **The system should be able to achieve the stipulated final temperature inside temperature within 30 minutes.**

(v) Compatibility : **As per JSS -55555 (As applicable).**

(vi) Relative Humidity of cooled air (%) : 30 to 75.

(vii) The system should have a digital counter to measure the temperature (in oC) and humidity. It should be located at an appropriate place in the crew compartment.

(c) **Op and Maint Characteristics**.

(i) The system should be able to operate efficiently in an ambient temperature range from -50^o C + 50^o C to 45^0 C + 50^o C.

(ii) Must be compatible with the main power supply of the AFV with a voltage range from 22V DC to 29V DC (Nominal Voltage 27V DC.

3. **Tentative quantity to be procured after successful prototype development**. 2108 Nos.

4. **Tentative Time Line for Induction.** Two to three years.

SHQ(Army)

Project No.5

AUXILIARY POWER UNIT (APU) FOR TK T-90

1. **Brief Description**. The engine of the tank T-90 is the main source of power for any function, however it is imperative to have an alternate source of power to cater for varied requirements to enhance the engine life of a tank. Therefore, it is essential to install an APU (Diesel Generator) in the tank T-90, which would preserve the main engines life without compromising on the operational capability of the tank T-90.

2. **Broad QRs**.

(a) **Physical Characteristics**.

(i) **Size and Shape**. The system should be compact and ergonomic **wherein the existing fitment items in the crew compartment should not be removed, however if relocated same should not compromise the operational efficiency of the tank**. The system should not change the **overall dimensions of the tank in vertical and horizontal plane,** when viewed from the front. The system should not foul with existing features on the tank.

(ii) **Life**. The APU should be designed to last for minimum 1000 engine hours **for which vendor should provide a certificate**.

(iii) The system should meet the MIL 461 **E** standards (as applicable for ground forces) **with regard to EMI/EM compatibility**.

(iv) **AuxiliaryPower Unit (APU)**.

(aa) Power Rating : Not less than 10 KW at 27.5 ±1V DC

(ab) Compatibility : As per JSS -55555. **(As applicable).**

(b) **APU**.

(i) APU should also be able to concurrently operate the following systems of the tank in silent mode (Main engine of the tank switched off) for at least four hours.

(ii) Not foul with ground/trailer while mounting/ dismounting and lashing the tank on a tank transporter and on MBFU/MBWT.

(iii) The APU should be air cooled/water cooled and DHPP 'A' driven. The APU should preferably use 5W 50 grade engine oil or any other oil which is commercially available in India.

(iv) The APU should have an inbuilt overload protection system.

(v) The APU should have a standby starting system apart from the main starting system ie it should be able to be started by external power source, example another APU/tank.

(c) **Op and Maint Characteristics**.

(i) The systems should have a Built-in Test facility to isolate a defect that has occurred in the system..

(ii) The system should provide for a minimum Mean Time Between Overhaul (MTBO) of 1000 hours for APU for which vendor will give a certificate.

3. **Tentative quantity to be procured after successful prototype development**. 2108 Nos.

4. **Tentative Time Line for Induction.** Two to three years.

SHQ(Army)

Project No.6

ASSAULT TRACK WAY CL-24

1. **Name of the Projects**. Assault Track Way Class -24

2. **Brief of the Projects**. The Assault Track Way Class-24 is envisaged as a light weight track material to be employed in Desert/Semi Desert terrain for mobility of wheeled vehicles of the Indian Army with load class up to Class -24. It is proposed to replace the existing Aluminium Alloy based Assault Track Way Class-12.

3. **Broad Specifications**.

(a) Temp tolerance up to $+50^{0}$c.

(b) The surface finish should be able to blend with the terrain without any shiny surfaces.

(c) It should facilitate ease of laying and recovery with manual effort as well as mechanical aids.

(d) The expected life of the track material should be 10,000 passes of Class -24 vehicles.

(e) Weight of one roll of track material should not exceed 300kgs.

4. **Tentative Quantity**. The total requirement will be approximately 1000 km and the annual requirement will be 20-50 km per year.

5. **Tentative Timelines for Development/Production**. Two - three years.

SHQ(Army)

Project No.7

MANOEUVRABLE EXPENDABLE AERIAL TARGET (MEAT)

1. **Brief Description**. Army AD has a variety of weapon platforms to include missiles of varying ranges and Gun Systems. There is a recurring reqmt of suitable aerial target systems for providing realistic training to the crews during the annual field firing exercises.

2. **Broad QRs**.

Ser No	Parameter	Capability
(a)	Max Speed	Not less than 400 Kmph or more (111 m/s).
(b)	Max Endurance	Not less than 30 minutes or more at Wide Open Throttle (WTOT) at sea level.
(c)	Min Altitude	Not less than 20m or less.
(d)	Max Altitude	Not less than 5000m or more.
(e)	Manoeuvrability	Not less than 2.0 ‘g’ or more in a sustained turn.
(f)	Launch Mode	Ground based.
(g)	Range	X, Ku and Ka Bands
(h)	Employability	Radio Control up to 75 Km or more.
(j)	Likely utilisation per year	Not less than 400 Kmph or more (111 m/s).

3. **Tentative Quantity**. Approx 50 per year.

4. **Tentative Timelines for Development/Production**. Two-three years.

SHQ(Army)

PROJECT NO. 8

ARMOURED FIGHTING VEHICLE PROTECTION AND COUNTER MEASURE SYSTEM FOR T-90 TANK

1. **Brief Description.** Contemporary combat vehicles have on-board protective cum warning systems to warn the crews of impending attacks and create physical interference between the vehicle and the hostile threat, thereby enhancing survival. The existing fleet of 'A' vehicles in service with the Indian Army does not offer the crew, these enhanced protection measures as on date. There is thus a need to install a modern active protection system on all Armoured Fighting Vehicles (more than 3000) of the Mechanised Forces to significantly enhance their survivability

2. **Estimated Quantity**. 1657 Nos.

3. **Operational & Technical Parameters**. The technical data & parameters are as under:-

(a) The system should deflect or destroy hostile attacks to protect against threats from guided missiles, Rocket Propelled Grenade/Rocket Luncher (RPG/RL) and projectiles fired up to velocity of 1000 m/sec. The system should have provision for future upgrades to degrade Kinetic Energy projectiles. The percentage of protection against each type of ammunition must be at least as under:-

(i) RPG/ RL (From a minimum dist of 75 m)-80%.

(ii) ATGM - 80%.

(iii) HEAT round from 125mm tank gun-70%.

(b) Should function when static or on the move and should be capable of all weather, day and night operations.

(c) Should give warning when lased on by incorporation of laser warning devices.

(d) Should provide a protective arc in azimuth of 360 degrees and in elevation at minimum of minus 6^0 to plus 20^0.

(e) Should be capable of detecting more than one direction of attack in case of near simultaneous hostile threat (minimum of 0.4 second gap) and neutralize up to two threats.

(f) Should have multi launcher capability/ auto loading to address threats from different directions simultaneously.

(g) The fitting of the system should not affect sealing of combat vehicle for deep fording and NBC protection.

(h) The system should be capable of continuous operation for at least eight hours.

(j) The system should have high safety against accidental activation and the dangerous zone for dismounted troops operating in the vicinity should not exceed 50m radius from the tank.

(k) The normal power consumption of the system (excluding peaks) should not exceed 1 KW and the operating voltage of the system should be compatible with tank batteries.

(l) Should be light in weight and complete weight should be less than1000 kg.

4. **Tentative Timeline**. As per Chapter III of DPP 2016.

SHQ(Army)

PROJECT NO. 9

MULTI TARGET TRACKING SYSTEM (MTTS) FOR TANKS

1. **Brief Description.** In present day scenario with latest technological development and increased distances between two AFVs during operations, handling more than one target at the same time is a high possibility. To achieve this, it is imperative to develop a high technology tracking system which not only can detect and track multiple targets but also is able to assist commander to prioritise targets and align the prioritised target smoothly with Gunner's Main Sight (GMS) to be able to destroy the target. The commander will have provision to prioritize and queue the desired targets. The commander should be able to take control of the gun and engage targets or hand over the prioritized targets to the gunner main sight which should align to the direction of the target handed over by the commander thus achieving multi target tracking and engagement.

2. **Estimated Quantity and Cost**. Will be ascertained.

3. **Operational & Tech Parameters**. The desired operational and technical parameters are as under :-

(6) Provision for image stitching and image enhancement.

(b) Video of the targets to be acquired to ensure 3600 field of view in azimuth.

€ Detect and track multiple targets.

(d) Provide user interface to prioritise the targets.

€ Provision for aligning the selected target to Gunner's Main Sight (GMS).

(f) Gunner to have an Automatic Target Tracker (ATT) to track the handed over target or an independent target he has acquired.

(g) Target tracking system should able to characterize targets with respect to sensor resolution and distances.

4. **Timeline and Process**. As per Chapter III of DPP 2016.

SHQ(Army)

PROJECT NO. 10

3rd GENERATION MISSILE FOR 125MM GUN BARRELS OF T-90 AND T-72 TANKS

1. **Brief Description.** As the design of the existing INVAR missile has been optimized both in terms of range & Depth of Penetration (DoP), it is imperative to upgrade to next generation missiles with enhanced capability. The envisaged 3rd generation gun launched missiles should achieve a DoP of 800-850mm and be capable of Beyond Line of Sight (BLOS) engagemnt upto 8 Km by day & night with the ability to carry out pre-flight programmed manoeuvres towards a BLOS target. The missile should comprise of two parts; a msl alongwith booster & sustainer charge and the second part should only be a pusher/ propelling device which can be loaded in the carousel auto loader of Tank T-90 S/T-72.

2. **Estimated Quantity**. 3000 Nos.

3. **Operational & Technical Parameters**. The broad QR/specifications are as under:-

(a)	Capability to being fired from 125mm (Smooth Bore) Barrel	-	Existing gun barrels
(b)	Capable of engaging	-	By both day and night
(c)	Type of Target	-	Static and mobile target
(d)	Maximum effective range	-	8 Km.
(e)	DoP	-	>800-850mm
(f)	Shelf Life under controlled conditions	-	10 yrs
(g)	Shelf Life under field conditions	-	5 yrs
(h)	Hit probability on a standard NATO tank target (2.5 x 2.3 m)	-	> 90%

4. **Tentative Timeline**. As per Chapter III of DPP 2016.

SHQ(Army)

PROJECT NO. 11

ADVANCED 30MM CANNON AMMUNITION FOR BMP - 2/2K

1. **Brief Description.** Advanced 30mm Cannon Ammunition is for replacement of existing ammunition being fired by 30mm Cannon fitted on BPM - 2/2K. The ammunition is required for all the BMP-2/2Ks held with Indian Army.

2. **Estimated Quantity**. Nine Lakh rounds/Year.

3. **Operational & Technical Parameters**. The ammunition should be capable of being fired from existing 30mm 2A42 Main Gun without any modification to gun design, feeding mechanism and stowage. The ammunition being offered should have the following characteristics:-

(a) **30mm AP Ammunition**. Minimum penetration requirement of Advanced 30mm AP ammunition to be greater than or equal to 30mm at an angle of 60 degreeat 1000m on Rolled Homogenous Armour/specified target.

(b) **HE Ammunition** . New enhanced HE ammunition to be equipped with proximity fuse to engage targets in defiladed position.

4. **Tentative Timeline**. As per Chapter III of DPP 2016.

SHQ(Army)

PROJECT NO. 12

FUZES FOR ALL VARIANTS OF PINAKA ROCKETS

1. **Brief Description.** Indigenous manufacture of Fuses for all variants of Pinaka Rockets.

2. **Estimated Quantity and Cost**. Will be ascertained.

3. **Operational & Technical Parameters**. The types of fuses required for variants of Pinaka Rockets are given below:-

Ser No	Type of Fuze	Requirements	Used in Rockets	Approx Quantity
(a)	Variable Time (10 m height of burst (HOB))	(i) Modes of Operation:- (aa) RF Proximity. (ab) Point detonation. (ii) HoB – 10 m. (iii) Disruptive output.	HEPF & RHE Rockets	3360 per year
(b)	Variable Time (30 m HoB)	(i) Modes of Operation. (aa) RF Proximity. (ab) Point Detonation. (ac) 30m. (ad) Disruptive output.	HEPF & RHE Rockets	
(c)	Electronic Time	(i) Modes of Operation. (aa) Electronic Time. (ab) Point detonation. (ii) Time Range - 6 to 200 secs. (iii) Resolution - 0.1 (iv) Accuracy -	Area Denial Munitions (ADM) Type 1,2 & 3 Rockets (Under development)	1620 per year for each type

		0.05 (v) Electronic output.		

4. **Timeline and Process**. As per Chapter III of DPP 2016.

SHQ(Army)

PROJECT NO. 13

LIGHT WEIGHT BODY ARMOUR

1. **Brief Description.** The present & future concept of conflicts and challenges faced by a solider dictates him to be equipped with lighter battle load to face the dynamic & swift natured battle field. The Bullet Proof Jackets presently do not provide adequate protection to all the vital organs of a solider. The weight is the biggest challenge in order to enable the soldier to operate in field with maximum efficiency. The threat to the soldier is increased day by day from low to medium and to high velocity projectiles. Therefore there is a need to equip the soldier with light weight Body Armour, so as to have adequate protection against the varied threat levels.

2. **Estimated Quantity**. will be ascertained.

3. **Operational & Technical Parameters**.

(a) **Operational Parameters**.

(i) Cover Vital Organs.

(ii) Protection against latest enemy threat.

(iii) Modular & usable in various operations.

(iv) Light Weight.

(v) Should meet the requirements of all three services for inter service operability.

(b) **Technical Parameters**.

(i) **Protection**.

(aa)	7.62 x 51 mm SLR	-	10m.
(ab)	7.62 x 39 mm AK 47 (Mild steel core)	-	10m.
(ac)	7.62 x 39 mm AK 47 (Hard steel core)	-	10m.
(ad)	7.62 x 54 mm R (Sniper)	-	50m.
(ae)	9 x 19 mm Carbine	-	05m.

(ii) **Surface Area**.

S. No	Components	Min SAP Size	Min HAP Size
(aa)	Small Size Jacket	4560Sq cm	3220Sq cm
(ab)	Medium Size Jacket	4800Sq cm	3395Sq cm

(ac) Large Size Jacket 5190Sq cm 3670Sq cm

(iii) **Weight Size**.

			Weight Not More Than
(aa)	Small Size Jacket	-	4.0 Kgs.
(ab)	Small Size Jacket	-	4.5 Kgs.
(ac)	Small Size Jacket	-	5.0 Kgs

4. **Indigenous Capability**.

(a) Presently the capability with Indian vendors is restricted to Protection NIJ level III.

(b) The current procurement as per latest GSQR 1438 is under way. The trials are in progress. The material used in the BPJs by vendors is UHMWPE & Boron Carbide.

(c) The weight achieved is 10.1 to 11.3 Kgs. The BPJ is modular & covers entire vital organs of the body of the soldier. The weight can be further reduced by research & development. Few of the future technologies available are given as under:-

(i) **Liquid Body Armour**. It consists of Kevlar that is soaked in one of the two fluids i.e either a shear thickening fluid or a magneto geological fluid. Both these fluids show the unique behaviour of behaving like a liquid under low or normal pressure and solid under high pressure applied fields.

(ii) **Carbon Nano Tubes (CNT)**. Due to their unique combination of high elastic module and high strain to failure are capable of elastically storing an extreme amount of energy, which can cause the bullet to be absorbed or be deflected. There is a need to carryout further research in development of Light weight body armour.

(iii) **Thermo Plastic Carbon Fabric Composite (TCF)**. Metals have low density, higher str, higher shelf life with hyper velocity impact properties.

5. **Tentative Timeline**.

(a) **Development of Technology**. The technology to be developed/matured within one year.

(b) The detailed timelines to be worked out subsequently on successful evaluation of the prototype.

SHQ(Army)

PROJECT NO. 14

ROBOTICS SURVEILLANCE PLATFORM FOR RASHTRIYA RIFLES

1. **Brief Description.** Terrorism over the years has evolved to a large extent and as a matter of fact the foot prints of terrorism has extended largely from the jungle/rural areas to the urban areas. The way the situation is evolving, it may just be a matter of time, when security forces (SF) as a whole and Rashtriya Rifles in particular will be facing the threat in the built up and super built up areas. It is hereby proposed that a project for Robotics Platform be taken up as a procurement project under Make category.

2. **Estimated Quantity**. 544 Nos.

3. **Operational & Technical Parameters**. These robotic surveillance platforms can be extensively used by the Rashtriya Rifles forces operational in BUA and Super BUA for gathering of real time input prior to manual insertion. The sub components of the system should be as follows:-

(a) **Surveillance Camera**. This will be the main feeder unit of the system. The camera must be able to provide input in both day and night mode.

(b) **Transmission System**. In built transmission system have to be a part of the platform to provide real time intelligence form the camera to the user. The ideal range should be up to 200 metres.

c) **Weapon Delivery**. The platform must be capable of delivering a suitable ammunition at the intended target, e.g stun grenade.

(d) **Light Wight and Rugged**. Mostly the system will have to be deployed at a short notice in harsh terrain conditions. Otherwise also, the approach to the target area will have to be discreet, i.e on foot to maintain surprise. This calls for the system to be man portable (light weight) and throw able. Also at the same time the system has to be shockproof to withstand the above conditions.

e) **2nd Unit and Remote Operability**. Many a times two or more teams have to operate in conjunction inside a single target area. Thus a 2nd Unit which can be operated alongside the first unit by a single operator with the same remote (having at least dual display screen) should also from part of the system.

4. **Tentative Timeline**. As per Chapter III of DPP 2016.

SHQ(Army)

PROJECT NO. 15

INDIVIDUAL PROTECTION SYSTEM: MULTI APPLICABLE SMART SENSOR BASED IMPACT AND BLAST RESISTANT PROTECTIVE SHIELD

1. **Brief Description.** The threat of extremism and militancy is percolating to a pan India scale level whereby it is imperative that the Rashtriya Rifles have to be more suitably adopted, wherein they can be deployed anywhere according to the need. A vital part of that adoption will definitely constitute individual protection gear of the soldiers. In light of the above, it is proposed that an individual protection project be taken up as a procurement project under 'Make' category.

2. **Estimated Quantity**. 59,825 Nos.

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3. **Operational & Technical Parameters**. The individual protection project is envisaged to be composed of the following:-

(a) **Sensor Based Equipment**. A closer scrutiny of the above reveals that the entire system can be divided into the sensor part (i.e health assessment) and the protection part.

(b) **Human Protection System Sub Components**.

(i) **Ballistic Helmet**. The proposed ballistic helmet will protect entire upper part of the body i.e head and face both. The lightweight headgear will be an integration of many modern devices alongwith protection mechanisms (against ballistics, blasts, heat and noise) into single system for best possible outcomes during modern warfare combats, such as sensors, night vision devices and laser range finders.

(ii) **Ballistic Body Suit**. Ballistic Body Suit will be developed to protect the middle part of the body from the ballistic impact and provide necessary inputs about the vitals of an individual to be controlled.

(iii) **Ballistic Shoes**. Ballistic shoes will protect lower part of the body which consists of leg and foot from ballistic impact. The basic principle will be same as the other component of armour with greater attention to main parts of the boots viz sole, toecap and heel seat.

4. **Timeline and Process**. As per Chapter III of DPP 2016.

SHQ(Army)

PROJECT NO. 16

PROGRAMMABLE, PRE-FRAGMENTED, PROXIMITY AMMUNITION (3 P) AMMUNITION FOR 40 MM L-70 GUN

1. **Brief Description.** With the increase in air threat envelope and multiplicity of air threat platforms, there is a requirement to enhance the lethality and accuracy of the present air defence ammunition of L70 gun system. The ammunition should have multi target handling capability along with capabilities of air burst, proximity, point detonation and variable and programmable provisions.

2. **Estimated Quantity**. Approximately 3,30,000 rds over a period of twelve years.

3. **Operational & Technical Parameters**.

(a) **Operational Parameters**.

(i) **Target**.The ammunition should be suitable for variety of targets, to include aircrafts, Helicopters, UAVs and soft skinned vehicles.

(ii) **Range**.The ammunition should, if possible, enhance the range of the round. It should be capable of achieving 3-6km ranges for the aerial targets**.**

(iii) **Pre-fragmented**. To increase the lethality and hit probability, the munition should be pre-fragmented. The fragments design should be such as to cause maximum damage to the aerial/ground target. The fragments should be of desired metal and shape so as to achieve maximum destruction to the target.

(iv) **Lethality**. The munition should have adequate lethality to damage the intended target (ground or air).

(v) **Programmable**. The ammunition should have a system to ascertain the range and distance of target through its integrated system. It should be able to modify distance to be travelled before the ammunition is armed. The facility of programming the fuze should be with an aim to detonate the munition at the calculated range in the intended area.

(vi) **Proximity**. The proximity feature should be integrated into the munitions to enhance hit probability. The miss distance should be minimum and the fuse should be so designed to at least cover 4m distance from the target.

(vii) **Air Burst**. The munitions should be capable of air burst for neutralising the ground targets. Air burst will ensure damage to target by causing blast in and around it as per the time set on the fuse keeping in mind the nature and size of the target in the operational area.

(viii) **Impact**. Ammunition should be capable to achieve blast on impact. It should have an effective impact fuse.

(ix) **Armour Piercing**. To ensure the multiple use of munitions against varied targets, it should have the armour piercing capability of minimum 100 mm thick armour of the target. This can also be combined with the delayed fuse to achieve penetration.

(x) **Calibre**. The fuze or the programmable munitions should be able to fire from the existing gun calibre i.e 40mm.

(xi) **System Configuration**. The system should be designed to support the programmable ammunition to take inputs of target parameters from Laser Range Finder sight fitted on Upgraded L/70 Guns or from Fire Control Radar.

(xii) **ECM**. The programmable fuze should not be affected by the Electronic Warfare en-route the flight time. Electronic Counter Counter Measures (ECCM) should be inherent in the ammunition fired.

(b) **Tech Parameters**.

(i) **Size**. The pre-fragmented programmable proximity round should be developed for use with the QF 40mm L/70 Gun system. The fuze size should fit the 40 mm calibre of L/70 gun.

(ii) **Type**. Fixed type fuze or screwed type fuze. The programmable projectile fuze should be compatible with the existing L/70 gun ammunition.

(iii) **Dimension**. The dimension of the programmable, pre-fragmented, proximity ammunition should be in accordance to the 40mm L70 Gun.

(iv) **Weight**.The weight of the programmable, pre-fragmented, proximity ammunition should be such, that it should not alter the firing capability of the QF 40 mm L70 Gun.

(v) **Shelf Life**. A minimum shelf life of ten years and above should be provided in its original container.

(vi) **Terrain & Climatic Conditions**. Should be able to withstand the operating and storage extremes in terms of terrain and climatic conditions existing in India.

4. **Tentative Timeline**. As per Chapter III of DPP 2016.

SHQ(Army)

PROJECT NO. 17

ANTENNA ALIGNMENT SYSTEM (AAS) FOR OSA-AK MISSILE SYSTEM

1. **Brief Description.** OSA-AK Missile system is of Russian origin and is employed to provide low level Air Defence cover to the mechanised columns of Armoured Division. There is a requirement to align the antenna of the OSA-AK Combat Vehicles after change from transportation mode to combat mode which is done with the help of an Antenna Alignment System (AAS). Existing vintage Antenna Alignment System (AAS) needs to be indigenized and digitised.

2. **Quantity Required**. 05 Nos.

3. **Operational & Technical Parameters**.

(a) **Transmitter**.

(i) Frequency : Tunable Ku band frequency for Oscillator 1,2, & 3.

(ii) Horn: conical.

(iii) Modulation: Continuous Wave (CW).

(b) **Spatial Coverage**.

(i) Azimuth - ±120 Deg.

(ii) Elevation - (+) 5 to (-) 20 Deg.

(iii) Levelling - ± 12 Deg.

(c) **Antenna System**.

(i) Height of the mast without oscillator 20 Mtr and with Oscillator Unit 20.225 Mtr (Height of Mast from ground – 22 Mtr).

(ii) Collapsible cylindrical section with telescopic retraction type.

(iii) Cable retraction provided.

(iv) Hoist power: Hydraulic / Electro Mechanical or a combination of both.

(v) Oscillator unit movement in three axes through servo system controlled remotely by cable connected with combat vehicle located at 70 Mtr.

(vi) TV Tracker Test Target. Designated for adjusting the optical axis of the TV optical tracker with the electrical axis of the TTR.

(d) **Power Supply**.

(i) 230V ±5% 400Hz AC derived from Combat Vehicle with Power consumption (not over): 0.5kw.

(ii) Alternatively Silent Generator to handle the entire power requirement of AV.

(e) **Operating Conditions**.

(i) Ambient Temperature: -5 to +45^{O}C.

(ii) Relative humidity (20±2^{O}C): 95 to 98%.

(iii) Wind speed: 20 m/s.

(f) **Continuous Operation**. 24 Hrs.

(g) **Transportation**. The system to be trailer mounted four wheeled with assisted braking system suitable to be adapted to prime movers like 6x6 Heavy Mobility Vehicle held with Indian Army. To be suitably designed so as to be able to be transported on existing tank transporters of Indian Army, low bedded Civil Hired Tank Transporters available in open market and by rail on wagons (type BOM).

4. **Tentative Timeline**. As per Chapter III of DPP 2016.

SHQ(Army)

PROJECT NO. 18

1200-1500 HP MODULAR ENGINE FOR TANK T-90 S/SK

1. **Brief Description.** The proposed modular engine for T-90 S/SK tanks will have a variable power output of 1200-1500 HP to cater for high battle field agility mandated with system/ platform level upgrades planned for the T-90S/SK, including its future variants. The system will comprise of a base engine module of 1200 HP with a capability to add-on additional engine modules including associated accessories/peripherals so as to up-rate it to 1500 HP based on operational requirements.

2. **Estimated Quantity**. 2011 Nos.

3. **Operational & Technical Parameters**:-

(a)	BHP		-	1200-1500HP
(b)	Fuel		-	Multi Fuel
(c)	Cross Country Performance:-			
	(i)	Max Gradient	-	30^0
	(ii)	Max Tilt angle	-	25^0
(d)	Compression ratio		-	>15:1
(e)	Engine Weight		-	<1500 Kgs
(f)	Power to weight ratio		-	$\geq$25 HP/Ton

4. **Tentative Timeline**. As per Chapter III of DPP 2016.

SHQ(Navy)

Project No.1

1.	**Name of Potential Project**
	Diesel engines for boats
2.	**BRIEF SPECS**
	▪ For propulsion of various boats used in ***IN*** ▪ The engine is to be supplied with its associated ancillary equipment, pipes, fittings, instrumentation which broadly include the following:- • All piping and fittings forming integral parts of the engine like flywheel, governor, lub oil and fw cooler, engine driven fresh water pump, lub oil pump, sea water pump, hand operated sump drain pump, filters (air, lub oil and fuel oil). • 24 V electric starting equipment along with suitable battery catering to minimum 40 starts of the engine with provision for alternative mechanical / hand start • Exhaust system comprising silencer, manifold (water cooled type) • Engine driven fresh water, fuel oil and lube oil pumps • Instrumentation consisting of ammeter, push button for starting, lo pressure gauge, Low temperature gauge, engine cooling water temp gauge, tachometer with drive, hour meter, gearbox oil temp gauge. The instrumentation panel should be water proof. • The engine should be fresh water cooled which in turn should be cooled by sea water.
3.	**Tentative quantity to be procured after successful prototype development**
	▪ Approx 40 for 2016-17
4.	**Tentative timeline for induction**
	03 to 05 years

SHQ(Navy)

Project No.2

1.	**Name of Potential Project**
	Upper Air Sounding System (UASS)
2.	**Brief Specs:**
	To Record:- ▪ Upper Air Profile for Weather Prediction ▪ Generation of Aviation Met Reports ▪ Assessment of Anomalous Propagation Conditions ▪ Ballistic Correction for Ammunition Firing *Complete system is Integral Part of all Capital Ships, Aircraft Carriers And Air Stations*
3.	**Tentative Quantity to be Procured After Successful Prototype Development**
	Ground Station (Fixed) : 25 Units For ***IN*** Radiosonde (Consumable) : Approx 14000 Per Annum
4.	**Tentative Timeline for Induction**
	24 Months

SHQ(Navy)

Project No.3

1.	**Name of Potential Project**
	High Speed Low Flying Targets
2.	**Brief Specs:**
	Broad Requirement:- ▪ High speed low flying aerial target ▪ Expendable in nature and launched from ship upto Sea State 3 ▪ Speed greater than or equal to 350 Knots ▪ Endurance greater than or equal to 25 min at max speed and 40 min at Economical speed ▪ Flight Altitude 10m to 6000m ▪ Pre-programmed autonomous flight using way point navigation ▪ Target should be capable of being controlled upto 75 Km based on clear Line of sight
3.	**Tentative Quantity to be Procured After Successful Prototype Development**
	▪ 40 per year
4.	**Tentative Timeline for Induction**
	▪ 03 years

SHQ(Navy)

Project No.4

1.	**Name of Potential Project**
	Expendable Under Water Target (EUT)
2.	**Brief Specs:**
	▪ Self-propelled expendable target body ▪ Control console capable of programming trajectory and signature EUT, and undertake testing of EUT prior launch ▪ Hydrodynamic design and battery operated ▪ Lightweight less than 30 kg, capable of being launched manually by lowering from ship's side ▪ Capable of operating between 1 to 8 knots of speed ▪ Operate within depth from 10 m to 150 m ▪ Endurance of more than 4 hrs ▪ EUT should be capable of operated upto Sea State 4
3.	**Tentative Quantity to be Procured After Successful Prototype Development**
	▪ 60 per year
4.	**Tentative Timeline for Induction**
	▪ 02 years

SHQ(Navy)

Project No.5

1.	**Name of Potential Project**
	Winches - Deep Sea Side Scan Sonar Towing Winch
2.	**BRIEF SPECS**
	▪ A self-contained, electro-hydraulic or electro-mechanical, variable speed cable handling system. ▪ Stainless steel hardware protected for marine environment. ▪ Capable of withstanding load on the winch in sea state 3-4 at ship speed of 10 knots. ▪ Size – not more than 5 ft w x 4 ft h x 4ft l ▪ Total weight – less than 1500 kg ▪ Automatically align cable during retraction to avoid fouling of cable. ▪ Remote control operation in addition to local control and manual. ▪ Suitable electrical motor capable of operating on ship's power supply 415 v/ 3 phase/ 50 hz. ▪ The drum should leave atleast 2" in clearance on flange
3.	**Tentative quantity to be procured after successful prototype development**
	▪ Qty – 04 Nos
4.	**Tentative timeline for induction**
	02 years

SHQ(Navy)

Project No.6

1.	**Name of Potential Project**
	Diesel Engines For Propulsion
2.	**BRIEF SPECS**
	▪ The Diesel Engines are required for propulsion onboard Ships. The Engines with Power Rating of 5-10 MW are required to be indigenously developed. ▪ The maximum speed of the ship would be required to be achieved at 85% MCR of the Engine. The Engines are to be capable of 10% overload for a minimum duration of one hour in 12 hours at extreme tropical conditions without incurring any undue wear, maintenance and risk of damage. ▪ The Engine is to be supplied with its associated Ancillary Equipment, Pipes, Fittings, Instrumentation etc. ▪ The materials used in the engine should comply to Defstan 02-313. The broad specifications will be provided on request. ▪ The Engines should be class approved and certified by lRs/ABs or any other suitable agency. The first of the Engine will be type tested. ▪ The Engine emission should meet the latest Nitrogen Oxides (NOX) and Particulate Matter (PM) standards as promulgated by IMO for new Diesel Engines. The Diesel Engine will as a minimum comply with IMO Tier II emission norms.
3.	**Tentative quantity to be procured after successful prototype development**
	▪ The Quantities would be finalised post discussions and based on Induction Plan of Ships for 5-10 MW Power Rating Engines. ▪ Tentative Quantities are 15 Per Year 2020 onwards
4.	**Tentative timeline for induction**
	03 To 05 Years

SHQ(Navy)

Project no. 7

1	**Name of Potential Projects**
	Shafting & Propeller for ***IN*** Ships
2	**Brief Specs**
	Presently shaftlines and components including propellers, stern tube bushes, "A" bracket bushes, plummer block bearing, thrust block and seals largely of import nature the import content is much higher. Therefore, it is proposed to develop in-house expertise for "Shafting and Propellor" for ***IN*** ships.
3	**Tentative quantity to be procured after successful prototype development**
	For projects that include Fleet Support Ships, Landing Platform Dock, Large Survey Vessel, Diving Support Vessel, Multipurpose Vessel, Next Generation Missile Vessel etc. for a propulsion of approximately 1.2 to 18.0 MW, it is envisaged that approximately **37 Nos** shafting system would be required.
4	**Tentative timeline for induction**
	04 to 05 years

SHQ(Navy)

Project no. 8

1	**Name of Potential Projects**
	RAS/FAS Gear for ***IN*** Ships
2	**Brief Specs**
	(a) The objective of underway replenishment is to permit fleet ships to remain at sea for prolonged periods. The fleet tankers and auxiliaries are equipped to replenish ships underway with fuel, provisions, stores and spare parts to achieve this goal. This process of replenishment is termed at 'Replenishment at Sea (RAS)'. (b) The RAS/FAS equipment onboard ships can be broadly classified under two groups, as follows:- (i) Equipment for delivery ships. (ii) Equipment for receiving ships. (c) The RAS/FAS equipment are procured from the manufactured as a combined package which includes several items such as fuelling probes, hose assemblies, fueling rigs, heavy jackstay, light jackstay high points, rigging assemblies, deck fittings and associated connections. The items required onboard vessels vary as per ship's role of delivery or receiving ship. (d) The equipment of RAS FAS however, needs to mandatorily comply to International standards of NATO(ATP-16) specification for uniformity and compatibility with other vessels.
3	**Tentative quantity to be procured after successful prototype development**
	4 Ship sets for 4 Naval Ships
4	**Tentative timeline for induction**
	2018-2020

PSQR RAS/ FAS EQUIPMENT

1. **Introduction** The objective of underway replenishment is to permit fleet ships to remain at sea for prolonged periods. The fleet tankers and auxiliaries are equipped to replenish ships underway with fuel, provisions, stores and spare parts to achieve this goal. This process of replenishment is termed at 'Replenishment at Sea (RAS)'.

2. **Standards** The applicable specifications and standards for RAS FAS equipment are DEF STAN 07-279 (latest revision) and NATO (ATP – 16) standards.

3. **Present Source** Presently the RAS FAS equipment is procured from equipment manufacturers on OTE basis. Some of the manufactures of these equipment are:

(a) M/s Rolls Royce, UK.

(b) M/s Goldring, UK.

4. **Indigenization of RAS/FAS Equipment**

(a) The RAS/FAS equipment onboard ships can be broadly classified under two groups, as follows:-

(i) Equipment for delivery ships.

(ii) Equipment for receiving ships.

(b) The RAS/FAS equipment are procured from the manufactured as a combined package which includes several items such as fuelling probes, hose assemblies, fueling rigs, heavy jackstay, light jackstay high points, rigging assemblies, deck fittings and associated connections. The items required onboard vessels vary as per ship's role of delivery or receiving ship.

(c) The equipment of RAS FAS however, needs to mandatorily comply to International standards of NATO(ATP-16) specification for uniformity and compatibility with other vessels.

5. **Generic performance specifications as per DEFSTAN 07-279**

(a) Receiving Rate

(i) Solids:

(aa) By Heavy Jackstay a minimum of 25 loads per hour in fair weather with Ships 30m apart

(ab) By Heavy Jackstay a minimum of 20 loads per hour in rough weather with Ships 45m apart.

(ii) Liquids:

(aa) To avoid hazards due to static electricity, the rate of fuel transfer is not to be greater than 7 m/s. Thus the maximum permitted volume flow rates are:

Hose Size	Maximum Volume Flow Rate
177mm(7")	626 M^3/Hr
153mm(6")	460 M^3/Hr
64mm(2.5")	80 M^3/Hr

(b) RAS Capstans

(i) The RAS capstan shall be rated for a duty of 1.5 tonnes SWL and is to be tested iaw. BR3027.

(ii) Capstan shall be sized to accommodate a 21mm dia. braidline outhaul and shall be capable of following:

(aa) Raising and lowering a load of 0.75 tonne at approximately 75m per min and 1.5 tonne at approximately 35m per min.

(ab) Brake to hold 2.25 tonne.

(c) Automatic Tension Winches

(i) Automatic Tension Winches which prevent the Jackstay tension rising above 8 tonne, but would be expected to work at approximately 6 tonne.

(aa) Transfer of solids up to a maximum of 2 tonnes in Sea State 6.

(ab) Deploying a liquid transfer rig in up to Sea State 7.

(d) Delivering Ship (Liquids)

(i) Fresh Water Lubricating Oil, Dieso and Avcat shall be transferred from a Delivering Ship using one or more of the following methods:

(aa) Jackstay Fuelling Rig
(ab) Jackstay Probe Fuelling Rig
(ac) Large Derrick Rig
(ad) Crane Rig
(ae) Astern Fuelling Rig
(af) Sliding Padeye

(ii) All rigs and equipment are to be tested in accordance with clause 8.16 of DEFSTAN 07-279.

(e) Delivering Ship (Solids)

(i) Automatic Tensioning Winches shall be fitted on the Delivering Ship for Heavy Jackstay transfer of stores in conjunction with one of the following systems:

(aa) Fixed Highpoints
(ab) Moveable Highpoints
(ac) MK 1A System
(ad) Sliding Padeye Rig

(f) Receiving Ship (Liquids)

(i) Rig Methods

(aa) The Receiving Ship shall be capable of accepting any one of the rigs specified for Delivery Ship.

(ab) Unless the Probe Receiver is kept permanently rigged, and to avoid the duplication of eyeplates, it is possible to accept any of

the abeam rigs at a single station by adopting the Multi Rig Reception arrangement. The Multi Rig Reception point shall be used wherever possible.

(ii) When a probe is not used the connection between the Delivery Ship outboard end and the Receiving Ship for 153mm Dleso hoses shall be made either by a Breakable Spool or a Quick Release Coupling.

(g) Receiving Ship (Solids) The arrangement shall consist of following:

(i) Heavy Jackstay
(ii) Eyeplates
(iii) Drop Reel Traveller and Latch Arm Assembly
(iv) Light Jackstay

(h) Tests and Trials

(i) RAS arrangements including all reception stations and their facilities shall be trialed at sea after the completion of building, modernization or conversion preferably during or as soon as possible after the working up period.

(ii) Where a Jackstay is used for fuelling or storing, the Eyeplate or in the case of Probe Fuelling the Swivel Arm connection shall be tested to 16.256 tonne.

(iii) Outhaul block, lead block or Hanging Off Pendent Eyeplates for Derrick or Jackstay Rigs shall be tested to 4.064 tonne.

(iv) Receiver Swivel Arm and Joint shall be tested to 16.256 tonne and the outhaul block and securing pendant in case of probe fuelling shall be tested to 4.064 tonne.

(v) All materials used on RAS equipment shall be compatible with the marine environment and exposed weather deck positions of the equipment.

(vi) Notch tough materials with Charpy impact value of 47 joules at -20^{o}C shall be used for structure load bearing items.

(vii) Wire ropes for rigging shall have FoS of 6 for standing rigging and a FoS of 8 for running rigging.

(viii) The height of highpoint on a Delivery ship shall be approximately 20m above waterline.

(ix) Clear areas and routes for handling the pallets, stores and hoses shall be provided on the Delivery and Receiving Ship.

6. **Vendors identified for indigenization** Following Indian vendors have been identified based on experience, for indigenization of RAS FAS equipment

(a) M/s Yeoman Marine
(b) M/s Geeta Engineering
(c) M/s H&H Precision Pvt Ltd

7. **Present status** Generic performance requirements are under formulation at the Directorate in consultation with the firms. Post formulation of requirements, the firms would be intimated to ascertain the feasibility of manufacturing the items iaw. requirements. Based on the inputs of the firms a feasibility study would be undertaken for the make project.

SHQ(Navy)

PROJECT NO. 9

ELECTOLYSIS BASED HYDROGEN GENERATOR
DIRECTORATE OF NAVAL OCEANOLOGY AND METEROLOGY

1. **Name of the Equipment**: Electrolysis based Hydrogen Generator.

2. **Brief Specification**. The Indian Navy has for long been using Hydrogen as a consumable for filling balloons for undertaking upper air ascents to record Meteorological data. The requirement of Hydrogen is presently being met by concerned units/ ships through commercially available Hydrogen cylinders procured by respective Material Organisations. However, with increase in the quantity and usage of UASS in *IN*, the requirement of hydrogen gas has increased considerably not only in volume but also across geographical locations too. The transshipment, loading and stowage of these filled cylinders onboard ships and units often pose a serious threat to fire safety and is human intensive.To obviate the above risks, the technology for generation of limited amount of hydrogen gas using electrolysis process is considered appropriate and proposed to be undertaken under 'Make' category. Further, the said technique is considered safe and environmental friendly for hydrogen generation as it offers additional benefits of non-usage of chemicals and non-generation of toxic waste. This technique uses only distilled water for generation of hydrogen and without usage of chemicals. The low volume hydrogen producing units that will meet the requirements of any unit/ ship are presently available in the international market in very compact size and are user friendly.

3. **Tentative Quantity**. A total of 10 hydrogen generators are envisaged for initial procurement.

4. **Tentative timeline for Induction**. Dec 19.

5. **Technology**. The equipment proposed is of Niche technology.

SHQ(Navy)

PROJECT NO. 10

1.	**Name of Potential Project**	**Compact Diesel Generators for Survey Motor Boats**
2.	**Brief About the Project**	Motor boats are an integral part of survey vessels. They are used extensively for survey of the ocean floor for updating Hydrographic charts. The Diesel Generator(DG) onboard a Survey Motor Boat is used for powering various equipment such as the Echo Sounders and other recording instruments. The DGmust be compact, rugged, able to operate efficiently in sustained corrosive environment and meet the designed weight and dimensional criteria. It must be easy to operate with low maintenance. The overall dimension of the integral unit should not be more than 950 x 600 x 860 (mm) and weight should not be more than 320 kgs.
3.	**Tentative Quantity to be Procured after Successful Prototype Development**	28 over a period of 10 years
4.	**Tentative timeline for Induction**	2020
5.	**Technology**	The development challenge lies in compactness and light weight design of the DG. It should have the following features:- (a) Rated power not less than 11KW (230V, 1 phase, 50Hz). (b) Marine diesel engine with standard features such as sea water pump, sea water cooled heat exchangers etc. and an electronic engine management system. (c) Single phase, 4-polesalternator for marine application having Class-H insulation. (d) Integrated electronic controls for engine and alternator. (e) Indigenous control panel with requisite indications (parameters and safety) and switches. (f) Engine/ motor driven ventilation fan for extraction of heat convected by the DG in the DG enclosure.
6.	**EDC for PSQRs**	June 2018

SHQ(Navy)

PROJECT NO. 11

1.	**Name of Potential Project**	**Light Weight Composite Material Portable Diesel Driven Fire Pumps**
2.	**Brief About the Project**	Diesel driven pumps are for used for onboard applications to meet requirements of firemain system during the situations when there is total power failure. These pumps take suction from sea and feed water in fire main system. The pump, along with the engine unit, must be light and ergonomic enough to be carried by two average sized individuals through confined spaces during rough weather.
3.	**Tentative Quantity to be Procured after Successful prototype Development**	100
4.	**Tentative timeline for Induction**	2020
5.	**Technology**	The major components of the pump, including the impeller and the casing, must be made of composite material and require minimum intervention by the handler and maintenance. The engine of the pump is to be indigenous. Other details are as follows:- (a) Capacity – 37 to 40 TPH (b) Weight – not exceeding 85 kgs (c) Dimensions – not exceeding 600 x 600 x 600 (mm)
6.	**EDC for PSQRs**	March 2018

SHQ(Navy)

PROJECT NO. 11

Low Noise Waterjets For Surface Platforms

1. **Name of Equipment.** Low Noise Waterjets

2. **Description**. Combining the elements of existing technologies of conventional screw propellers and water jets can result in a hybrid propulsion system with better efficiency at both high and low speeds. These hybrid propulsion systems are expected to have lower radiated noise levels. The design incorporates a stator in order to redirect the rotor/ screw propeller swirl. The stator is enclosed in stator flow guide vanes and optimized high speed nozzle. The nozzle pressure build-up in front of the rotor will shift the cavitations inception point. The double shelled and stiff nozzle enclosure is to be installed around the rotor to optimize the flow fields and redirect the rotor induced helical flow. The straight inflow on the rudder will reduce rudder excitation and the high rudder inflow speed will improve rudder lift. The impeller is enclosed within the nozzle, which will harness pressure pulsations and hence minimize underwater radiated noise.

3. **Indicative Quantity Required and Proposed Timeline**. Based on feasibility of development (2021-22).

4. **Technology.** Propulsion and Transmission (Waterjet) Technology.

SHQ(Navy)

PROJECT NO.12

DB^2 ST (Digital Beamforming Based Satellite TV)

1. **Name of the Equipment**.DB^2 ST

2. **Description .**Development of Digital Beamforming Based Satellite TV system by firms under the 'Make' category to ensure uninterrupted reception of satellite TV to all ships at sea. With increased tempo of operations and sustained presence of warships out at sea for prolonged durations, the need for the crew to keep abreast of the situation in and around the country cannot be over emphasized. Further, requirement of television at sea is essential to improve the morale of men onboard, Gyro Stabilized satellite TV systems have been fitted onboard in the past decade to ensure seamless reception at sea in spite of course / speed of the ship. Recreational system fitted presently is of imported variety forcing us to be reliant on handful of global vendors for sales and support. Moreover, since the stabilisation is carried out mechanically reception is intermittent during rough seas. Also, the mechanical parts are prone to frequent defects. The development of this equipment would facilitate availability of indigenous alternatives to presently imported hardware while ensuring usage of advanced technology (Digital Beamforming) for obviating the requirement of mechanical parts.

3. **Indicative quantity required: 100**

4. **Proposed Timeline for Induction: 2021-22**

5. **Technology:**High performance satellite tracking using Digital Beamforming Technology, associated RF and baseband equipment.

SHQ(Navy)

PROJECT NO. 13

Conformal Array Line of Sight Communication Antennae

1. **Name of the Equipment**. Conformal Array LoS Communication Antennae.

2. **Description.**Development of Conformal Array LoS (Line of Sight) Communication Antennas under ‘Make’ category for improving the stealth signature of ships by reducing RCS of the ship. In view of the increased requirements of communication, EW and SatCom systems, there has been a quantum increase in the number of antennas fitted onboard. This adds to requirement of additional masts, thereby increasing the Radar Cross Section (RCS) of ships. Conformal antennas for meeting communication requirements would significantly help in RCS reduction and help increase stealth capabilities of naval platforms. This would also help enhance platform EMC.

3. **Indicative quantity required**. 10

4. **Proposed Timeline for Induction**. 2022

5. **Technology.** Conformal antenna design,Array design and fabrication, Common Aerial Working (CAW) technology.

SHQ(Navy)
PROJECT NO. 14

1.	Name of the Equipment	**Generic SmartMulti-Function Display (MFD)**
2.	Brief Specification	Interactive Display fitted in aircraft. Forms a component of glass cockpit and displays navigation route , moving map, weather radar, GPS, TCAS etc. in addition to parameters which are displayed by analog/ digital instrument in conventional aircraft
3.	Tentative Quantity to be procured	Approximately 20
4.	Tentative Timeline for Induction	Less than 5 years
5.	Technology	LCD Displays
6.	EDC for PSQRs	Nov 17

SHQ(Navy)

PROJECT NO. 15

1.	Name of the Equipment	**NVG Adaptation Filters and Image Intensifier**
2.	Brief Specification	The high output of Night Vision Goggles causes a loss of dark adaptation resulting in suboptimal unaided vision. Optical filters are used to mitigate this problem by changing the overall output characteristics of the NVGs.
3.	Tentative Quantity to be procured	NA
4.	Tentative Timeline for Induction	Less than 5 years
5.	Technology	Optical - image processing technology
6.	EDC for PSQRs	Dec 17

SHQ(Navy)

PROJECT NO. 16

1.	Name of the Equipment	**Portable RPA downlink receiver with display**
2.	Brief Specification	Portable receiver which should be able to independently receive RPA downlink, Decrypt the data and display. The entire system should be portable and should be able to be hand carried.
3.	Tentative Quantity to be procured	Above 06
4.	Tentative Timeline for Induction	5 to 10 years
5.	Technology	Data link technology
6.	EDC for PSQRs	Jan 18

SHQ(Navy)

PROJECT NO. 17

1.	Name of the Equipment	**1 phase and 3 phase inverter**
2.	Brief Specification	1 phase and 3 phase inverters with output of high power quantity for use in Aircraft.
3.	Tentative Quantity to be procured	Above 20
4.	Tentative Timeline for Induction	Less than 5 years
5.	Technology	Power Electronics
6.	EDC for PSQRs	Dec 17

SHQ(Navy)

PROJECT NO. 18

1.	Name of the Equipment	**Materials for high pressure fuel pipelines**
2.	Brief Specification	Light weight with high pressure withstanding capacity pipelines.
3.	Tentative Quantity to be procured	Above 50 with different sizes
4.	Tentative Timeline for Induction	Less than 5 years
5.	Technology	Metallurgy
6.	EDC for PSQRs	Nov 17

SHQ(Navy)

PROJECT NO. 19

1.	**Name of Potential Project**
	Proximity, Direct Action and Graze fuzes for 76/62 SRGM Ammunition
2.	**Brief About the Project**
	Super Rapid Gun Mount (SRGM) is one of the main weapons of Indian Navy mounted onboard on front line battle ships. The gun uses 76/62 SRGM ammunition which is fitted with Naval Radio Proximity Fuze designed to be used in operations against sea skimming missiles as well as against aerial targets. In addition it can also be used against surface target and shore establishments.
3.	**Tentative Quantity to be Procured after Successful prototype Development**
	(a) HEDA Fuze- Qty1000Nos (b) HE PF Fuze - Qty 5000 Nos
4.	**Tentative timeline for Induction**
	2020-2021
5.	**Technology**
	The Radio Proximity Fuze is designed to operate in Ultra high Frequency (UHF) range with specially designed antenna which initiate the explosive train when in proximity to aerial targets and sea skimming missiles. The fuze has two modes of operations:- (a) Proximity Function with impact/graze backup and self destruction mode against target size of 0.1 m^2 at a speed upto 3 Mach at a height of ≥ 6m from sea surface. The self-destruction mode should operates at 27±2 sec after firing. The proximity mode functioning should be enabled after 500m safety range from firing platform. (b) Impact/Direct action (Paralysed mode selectable form weapon firing panels prior to firing). The impact function should be armed at a distance of 100m from firing platform. (c) Necessary license for explosive ingredients are required to be obtained by the manufacturers. During development necessary sample are required to be submitted by manufacturer for the fitment, functional trials, QT and ETs etc.
6.	**EDC for PSQRs**
	Mar 2018

SHQ(Navy)

PROJECT NO.20

1.	**Name of Potential Project**
	Detonator N5 Mk 2 for CDSC 0.5 Kg.
2.	**Brief About the Project**
	The Detonator Percussion N5 MK-2 is assembled in Charge Demolition Scare Charge used in Indian Navy to meet the operational requirements. The Detonator is special type of detonator which should be able to provide flash delay of 8.5 to 11.5 seconds before functioning to ensure safety of own platforms
3.	**Tentative Quantity to be Procured after Successful prototype Development**
	Approximate Qty 1,80,000 Nos.
4.	**Tentative timeline for Induction**
	2018-2019
5.	**Technology**
	The Detonator Percussion N5 MK-2 uses special explosive composition in the detonator tube with delay flash composition. The delay flash composition should bedesigned to provide a delay of 8.5 to 11.5 sec which is initiated before dropping the CDSC. On completion of delay the detonator initiates the explosive chain and explodes the main charge TNT.

	Necessary license for explosive ingredients are required to be obtained by the manufacturers.During development necessary sample are required to be submitted by manufacturer for the fitment, functional trials, QT and ETs etc.
6.	**EDC for PSQRs**
	Mar 2018

SHQ(Navy)
PROJECT NO. 21

1.	**Name of Potential Project**
	5.56 mm NEGEV (Ball & Tracer) ammunition for MARCOS
2.	**Brief About the Project**
	5.56 mm Negev (Ball & tracer) ammunition is being used by MARCOS in Indian Navy for day to day action requirements.
3.	**Tentative Quantity to be Procured after Successful prototype Development**
	(a) Approximate Qty 3,00,000 per year (Ball) (b) Approximate Qty 60,000 per year (Tracer)
4.	**Tentative timeline for Induction**
	2021-2022
5.	**Technology**
	The 5.56 mm Negev (Ball & Tracer) ammunition is used in Negev LMG and is required to be manufactured as per NATO standards. Necessary license for explosive ingredients are required to be obtained by the manufacturers.During development necessary sample are required to be submitted by manufacturer for the fitment, functional trials, QT and ETs etc.
6.	**EDC for PSQRs**
	Jun 2018

SHQ(Navy)
PROJECT NO. 22

<table>
<tr><td>1.</td><td>Name of Potential Project</td></tr>
<tr><td></td><td>Limpet Mine “Mark 414” (7 Kg)</td></tr>
<tr><td>.</td><td>Brief About the Project</td></tr>
<tr><td></td><td>The Limpet Mine 7 Kg is required for use in Indian Navy to meet the operational requirements. The hemispherical pressure resistant mine body is made of fiber material with provisions of magnets capable of sticking to ship’s hull and explode with the help of time fuze and detonator.</td></tr>
<tr><td>3.</td><td>Tentative Quantity to be Procured after Successful prototype Development</td></tr>
<tr><td></td><td>Approximate Qty 100 per year</td></tr>
<tr><td>4.</td><td>Tentative timeline for Induction</td></tr>
<tr><td></td><td>2019-2020</td></tr>
<tr><td>5.</td><td>Technology</td></tr>
<tr><td></td><td>The Basic specification of Limpet mine are as mentioned below:-
<table>
<tr><th>S No</th><th>Parameters</th><th>LIMPET MINE 7 Kg</th></tr>
<tr><td>(i)</td><td>Shape</td><td>Hemispherical</td></tr>
<tr><td>(ii)</td><td>Diameter (Base)</td><td>350 mm (max)</td></tr>
<tr><td>(iii)</td><td>Height (with magnet and Tube Clasper)</td><td>200 mm (max)</td></tr>
<tr><td>(iv)</td><td>Weight in Air</td><td>12.0 Kg (max)</td></tr>
<tr><td>(v)</td><td>Weight of Explosive (TNT)</td><td>7 Kg (max)</td></tr>
<tr><td>(vi)</td><td>Weight in water</td><td>< 0.5 Kgs(-ve Buoyancy)</td></tr>
<tr><td>(vii)</td><td>Operating Depth</td><td>30 m (max)</td></tr>
<tr><td>(viii)</td><td>Detonator used</td><td>Detonator Electrical No. 82 Mk N2</td></tr>
</table>
Necessary license for explosive ingredients are required to be obtained by the manufacturers.During development necessary sample are required to be submitted by manufacturer for the fitment, functional trials, QT and ETs etc.</td></tr>
<tr><td>6.</td><td>EDC for PSQRs</td></tr>
<tr><td></td><td>Jun 2018</td></tr>
</table>

SHQ(Navy)
PROJECT NO. 23

<table>
<tr><td>1.</td><td>Name of Potential Project</td></tr>
<tr><td></td><td>Limpet Mine “Mark 430” (15 Kg)</td></tr>
<tr><td>2.</td><td>Brief About the Project</td></tr>
<tr><td></td><td>The Limpet Mine 15 Kg is required for use in Indian Navy to meet the operational requirements. The hemispherical pressure resistant mine body is made of fiber material with provisions of magnets capable of sticking to ship’s hull and explode with the help of time fuze and detonator.</td></tr>
<tr><td>3.</td><td>Tentative Quantity to be Procured after Successful prototype Development</td></tr>
<tr><td></td><td>Approximate Qty 100 per year</td></tr>
<tr><td>4.</td><td>Tentative timeline for Induction</td></tr>
<tr><td></td><td>2019-2020</td></tr>
<tr><td>5.</td><td>Technology</td></tr>
<tr><td></td><td>The Basic specification of Limpet mine are as mentioned below:-
<table>
<tr><th>S No</th><th>Parameters</th><th>LIMPET MINE 15 Kg</th></tr>
<tr><td>(i)</td><td>Shape</td><td>Hemispherical</td></tr>
<tr><td>(ii)</td><td>Diameter (Base)</td><td>420 mm (max)</td></tr>
<tr><td>(iii)</td><td>Height (with magnet and Tube Clasper)</td><td>230 mm (max)</td></tr>
<tr><td>(iv)</td><td>Weight in Air</td><td>20.5 Kg (max)</td></tr>
<tr><td>(v)</td><td>Weight of Explosive (TNT)</td><td>15 Kg (max)</td></tr>
<tr><td>(vi)</td><td>Weight in water</td><td>< 0.5 Kgs(-ve Buoyancy)</td></tr>
<tr><td>(vii)</td><td>Operating Depth</td><td>30 m (max)</td></tr>
<tr><td>(viii)</td><td>Detonator used</td><td>Detonator Electrical No. 82 Mk N2</td></tr>
</table>
Necessary license for explosive ingredients are required to be obtained by the manufacturers.During development necessary sample are required to be submitted by manufacturer for the fitment, functional trials, QT and ETs etc.</td></tr>
<tr><td>6.</td><td>EDC for PSQRs</td></tr>
<tr><td></td><td>Jun 2018</td></tr>
</table>

SHQ(Navy)
PROJECT NO. 24

<table>
<tr><td>1.</td><td>Name of Potential Project</td></tr>
<tr><td></td><td>Float Smoke and Flame A/C 3.5 lbs No.2 Mk2</td></tr>
<tr><td>2.</td><td>Brief About the Project</td></tr>
<tr><td></td><td>The Float Smoke and Flame No.2 Mk 2 are devices which are used by the aircrafts/helicopters to indicate the position at sea. When dropped into water from aircraft they emit smoke and spontaneous inflammable vapour which illuminate the surrounding area.</td></tr>
<tr><td>3.</td><td>Tentative Quantity to be Procured after Successful prototype Development
Approximately Qty 200 Nos per year</td></tr>
<tr><td>4.</td><td>Tentative timeline for Induction
2019-2020</td></tr>
<tr><td>5.</td><td>Technology
The physical characteristics of Float smoke and flame No.2 Mk2 are mentioned below:-
<table>
<tr><th>S No</th><th>Parameters</th><th>Specified Values</th></tr>
<tr><td>(i)</td><td>Length</td><td>17½inches(max)</td></tr>
<tr><td>(ii)</td><td>Diameter</td><td>3¼inches(max)</td></tr>
<tr><td>(iii)</td><td>Diameter over tail fins</td><td>3.9inches(max)</td></tr>
<tr><td>(iv)</td><td>Weight of filling</td><td>14 Ozs</td></tr>
<tr><td>(v)</td><td>Effective duration of burning</td><td>06 min</td></tr>
<tr><td>(vi)</td><td>Terminal Velocity</td><td>300 ft/sec</td></tr>
<tr><td>(vii)</td><td>Height of release</td><td>400 m (max)</td></tr>
</table>
Necessary license for explosive ingredients are required to be obtained by the manufacturers.During development necessary sample are required to be submitted by manufacturer for the fitment, functional trials, QT and ETs etc.</td></tr>
<tr><td>6.</td><td>EDC for PSQRs

Apr 2018</td></tr>
</table>

PROJECT NO. 25
SHQ(Navy)

1.	**Name of Potential Project**
	Detonator 4 Sec and 7 Sec delay
2.	**Brief About the Project**
	The Detonator 4 sec and 7 sec delay is assembled in 36 M Hand Grenadeas required for use in Indian Navy to meet the operational requirements. The Detonator is special type of detonator which should be able to provide delay of 4 sec or 7 sec before explosion to ensure safety of user.
3.	**Tentative Quantity to be Procured after Successful prototype Development**
	Approximate Qty 5,000 Nos each 4 sec and 7 sec delay detonator
4.	**Tentative timeline for Induction**
	2019-2020
5.	**Technology**
	The Detonator 4 sec or 7 sec delay should be designed to provide a delay of 4 sec or 7 sec and on completion of delay the detonator should be able to initiate the explosive chain and explodes the main charge(TNT) of hand grenade. Necessary license for explosive ingredients are required to be obtained by the manufacturers.During development necessary sample are required to be submitted by manufacturer for the fitment, functional trials, QT and ETs etc.
6.	**EDC for PSQRs**
	Mar 2018

PROJECT NO. 26

1.	**Name of Potential Project**
	Chaff payloads for Kavach Rockets LRCR,MRCR and SRCR
2.	**Brief About the Project**
	Indian Navy uses the chaff rockets to protect the ships from incoming threats like enemy aircrafts and missiles by creating a shield of required Radar Cross Section area at a desired distance from the ship. The Chaff rockets of different ranges are fired from the onboard launchers. The project requirement is to develop the Chaff payload/dipoles of varying requirements to be packed in suitable manner and ensuring disbursement of the dipoles in desired form to create desired RCS.
3.	**Tentative Quantity to be Procured after Successful prototype Development**
	(a) SRCR - Approximate Qty 800 Nos per year (b) MRCR - Approximate Qty 600 Nos per year (c) LRCR - Approximate Qty 200 Nos per year
4.	**Tentative timeline for Induction**
	2019-2020
5.	**Technology**
	The Chaff payload should be able to meet the following criteria:- (a) **SRCR**. The payload should be able to produce RCS of more than 1000m^2 within 5 sec of burst with bloom time of less than 5sec and persistent time of more than 15 minutes. (b) **MRCR**. The payload should be able to produce RCS of more than 1900m^2 within 5 sec of burst with bloom time of less than 5 sec and persistent time of more than 15 minutes. (c) **LRCR**. The payload should be able to produce RCS of more than 500m^2 within 5 sec of burst with bloom time of less than 5sec and persistent time of more than 15 minutes. Necessary license for explosive ingredients are required to be obtained by the manufacturers.During development necessary sample are required to be submitted by manufacturer for the fitment, functional trials, QT and ETs etc.
6.	**EDC for PSQRs**
	Jun 2018

SHQ(Navy)

PROJECT NO.27

SHQ(Navy)

1.	**Name of Potential Project**
	Electronic Fuze for Anti-Submarine Rocket RGB-60
2.	**Brief About the Project**
	Fuze RGB-60 is designed to explode the RGB-60 rocket at a preset depth or upon hitting the submarine hull (or any hard surface). The Fuze will also operate due to the explosion of an adjacent A/S Rocket (sympathetic detonation). It is a Time & DA Fuze used for activation of A/S rocket RGB-60 HE.
3.	**Broad Specification/PSQRs which can be shared with the industry**
	(a) Fuze for Anti-Submarine Rocket RGB-60 is designed to operate at depth of 20m to 300m. It should have the facility for setting the operational depth before firing either in local mode or remote mode. The depth setting mechanism should have an accuracy of ±1m. The technical features are available with DGNAI/DAPI. (b) The fuze should have the inbuilt safeties to avoid premature functioning and should function at preset depth only after all the inbuilt safeties have been removed. Depending of the tactical situation, the Fuze should have the capability to function in the following two modes:- (ii) Time Mode/ Self Destruction Mode (iii) Direct Action (Impact)
4.	**Tentative Quantity to be Procured after Successful prototype Development**
	Approx 500 per year
5.	**Tentative timeline for Induction**
	2019-2020
6.	**Any other relevant information**
	Necessary license for explosive ingredients are required to be obtained by the manufacturer. During development, necessary samples are required to be submitted by manufacturer for the fitment, functional trials, QT and ETs etc.

SHQ (Air Force)

Project No.1

1.	**Name of Potential Project**
	Air to Ground Rockets — 70 mm Calibre
2.	**Brief about the project**
	MoD, Gol intends to procure Air to Ground rockets for large number of delivery platforms. The rockets are proposed to be developed and manufactured under the 'Make' category of the DPP. As a preliminary step, Air to Ground Rockets of 70 mm Calibre are intended to be indigenously developed and produced.
3.	**Broad specifications / PSQRs**
	(a) 70 mm rockets must be compatible and capable of being fired successfully without any deterioration in parameters. (b) Types of warhead - HE, AP, AP-T, TP, TP-T etc. (c) High dispersal accuracy. (d) High shelf life (e) Operation, Transportation and storage in Indian conditions.
4.	**Tentative quantity to be procured after successful prototype development**
	(a) Immediate requirement: Around 30,000. (b) Recurring requirement: Around 20,000 per year.
5.	**Tentative timeline for induction**
	2018-21
6.	**Any other relevant information**
	NIL

SHQ (Air Force)

Project No.2

1.	**Name of Potential Project**
	Chaff & Flares
2.	**Brief about the project**
	Chaff is a form of volumetric radar reflecting material that is composed of distributed metalized radar reflecting reflector material. Flares are T designed to be effective against infrared (IR Seeking missile). Presently Chaffs and Flares are being imported for use on various fighter, transport & helicopter fleet of IAF. These are proposed to be developed and manufactured under the 'Make' category of the DPP.
3.	**Broad specifications / PSQRs**
	(a) Chaffs intended to be developed are under three sizes viz 26mm, 50mm & 1"X1 "X8". (b) Flares are to be developed under three sizes viz 26mm, 50mm & 2"x1"x8"
4.	**Tentative quantity to be procured after successful prototype development**
	Around One lakh Chaffs and Two Lakh Flares per year
5.	**Tentative timeline for induction**
	Recurring requirement from year 2019 onwards

SHQ (Air Force)

Project No.3

1.	**Name of Potential Project**
	Long Range Glide Bombs
2.	**Brief about the project**
	MoD, GoI intends to procure Long Range Glide Bombs (LRGBs) to be delivered from different aircraft platforms. The LRGBs are proposed to be developed and manufactured under the 'Make' category of the DPP. As a preliminary step, two classes of LRGBs_viz 125 Kg and 500 Kg, compatible with Su-30 MKI aircraft are intended to be indigenously developed and produced.
3.	**Broad specifications / PSQRs**
	(a) Mai Range should be around 100 km when released from 42000 ft. (b) Types of warhead - Blast fragmentation and Penetration. (c) High accuracy. (d) High shelf life (e) Operation, Transportation and storage in Indian conditions.
4.	**Tentative quantity to be procured after successful prototype development**
	Appr a thousand per year.
5.	**Tentative timeline for induction**
	As soon as trials are successfully completed.

SHQ (Air Force)

Project No.4

1.	**Name of Potential Project**
	Long Range Dual Band Infrared Imaging Search and Track System (IRST)
2.	**Brief about the project**
	MoD, GoI intends to procure IRST for its fighter aircraft. The IRST systems are proposed to be developed and manufactured under the 'Make' category of the DPP-2016. As a preliminary step, IRST is intended to be indigenously developed under Make category for Su-30 MKI aircraft and produced.
3.	**Broad specifications / PSQRs**
	(a) IRST should be able to perform long range IR detection in a large field of view (FoV) (b) IRST should be able to display super narrow IR and EO FoV images to Pilot associated with an automatic tracking of Air-air and Air-Ground targets. (c) IRST should support 3D localization by an eye-safe Laser Range Finder. (d) Should be compatible with existing similar system fitted in Su-30MKI aircraft in terms of mechanical and electrical requirements. (e) IRST should be able to operate as per Su-30 MKI aircraft operating envelope. (f) Transportation and storage in Indian conditions.
4.	**Tentative quantity to be procured after successful prototype development**
	(a) Immediate requirement: Approx 100. (b) Recurring requirement: Spares sets and individual spares as per requirement.
5.	**Tentative timeline for induction**
	2018-21

SHQ (Air Force)

Project No.5, 6&7

1.	**Name Of Potential Project**
	7.62mm & 5.56 mmNATO ammunition
2.	**Brief About The Project**
	Procurement of 7.62mm & 5.56 mm NATO ammunition for Garud Force
3.	**Broad Specifications/ PSQRs**
	(a) 7.62mm NATO Armoured piercing rounds compatible with Galil Sniper Rifle (b) 7.62mm NATO Subsonic rounds compatible with Galil Sniper Rifle (c) 5.56 mm NATO Ammunition compatible with Tavor Assault Rifle (d) 5.56 mm NATO belted/linked Ammunition compatible with Negev LMG
4.	**Tentative Quantity to be procured after successful prototype development**
	(a) 7.62mm NATO Armoured piercing rounds- Appx qty 113000 per year (b) 7.62mm NATO Subsonic ammunition – Appx qty 30000 per year (c) 5.56 mm NATO Ammunition – Appx qty 18,50,000 per year (d) 5.56 mm NATO belted/linked Ammunition – Appx qty 15,00,000 per year
5.	**Tentative timeline for induction**
	2018-2019
6.	**Any other relevant information**
	NIL

SHQ (Air Force)

Project No.8

1.	**Name of Potential Project**
	125 kg bomb (akin to MK-81 Bomb)
2.	**Brief about the project**
	125 kg Bomb is intended to be used for bombing against targets viz industries, fortifications and light armoured vehicle etc. It should be adaptable on existing aircraft of IAF as well as futuristic aircraft. The bomb should have both Retarded Tail Unit (RTU) as well as Non-Retarded Tail Unit (NTU).
3.	**Broad specifications / PSQRs**
	(a) The bomb should have facility for nose fusing as well as tail fusing of the store with fuse AVU-ETM/ETMA and any futuristic fuse. (b) The store should be compatible with Russian as well as Western suspension systems. (c) Shelf life of the bomb should be more than 30 years (d) The bomb should have Pre-fragmented and Thermo-baric variants of warhead. (e) Weight of the bomb should not exceed 125 kg. (f) Net Explosive Quantity should not be less than 40 kg. (g) Store should be compatible for carriage on existing Bomb Racks available with IAF. (h) Bomb should be capable to be stored in open.
4.	**Tentative quantity to be procured after successful prototype development**
	500 per year
5.	**Tentative timeline for induction**
	Immediate
6.	**Any other relevant information**
	Nil

SHQ (Air Force)

Project No.9

1.	**Name of Potential Project**
	(a) Electronic Fuzes with either impact, delay or impact cum delay settings for Aerial Bombs. (b) Proximity Fuze for Aerial Bombs.
2.	**Brief about the project**
	Fuze is the most critical element of any explosive train and hence it should be highly reliable under various conditions to ensure the desired performance of the weapon on its delivery from any weapon platform.
3.	**Broad specifications / PSQRs**
	(a) Should be capable to withstand high speed and 'G' forces during carriage and should be activated only when desired 'G' forces are attained. (b) Should have in built safety measures to take care of any mishandling during transportation and handling of the fuze. Indication system should be available on the body to assess whether the fuze is unsafe or safe. (c) Shelf life of at least 10 years and exposed life of one year when stored at a temperature of 25± 2° C and RH up to 70%. (d) Should be safe for transportation by all modes of transport. (e) For Electronic Fuze, delay mechanism and instantaneous functioning should coexist. Delay mechanism should have a multiple choice (minutes to 48 hours). (f) For Proximity Fuze, the fuze should function at nominal height of 10 metres. The fuze should function in impact mode in case of failure in proximity mode. (g) Electronic fuzes should be adaptable to all conventional bombs of IAF. Proximity fuze should be adaptable to pre fragmented bomb of IAF. (h) Should be EMI/EMC compliant.
4.	**Tentative quantity to be procured after successful prototype development**
	(a) Electronic fuze 3000/Year. (b) Proximity fuze 100/Year.
5.	**Tentative timeline for induction**
	(a) Electronic fuze:- Within 2 years (b) Proximity fuze:- Within 3 years
6.	**Any other relevant information**
	Nil

SHQ (Air Force)

PROJECT NO. 10

1.	**Name of Potential Project**
	Advanced Self Protection Jammer (ASPJ) Pods and Radar Warning Receiver (RWR)
2.	**Brief about the project**
	MoD, GoI intends to procure ASPJ Pods and RWR for fighter aircraft. These systems are proposed to be indigenously developed and manufactured under the Make category of the DPP-2016.
3.	**Broad specifications / PSQRs**
	ASPJ Pods (a) The ASPJ should be able to perform the intended role in the frequency band between 2 and 18 GHz (b) The pods will be mounted externally on the aircraft on two wing and will have capability of jamming front and rear sectors with $\pm$ 60^{o} on each side. (c) The pods should not impose any limitation on aircraft envelope and should allow carefree flying. (d) The pods will interface with the aircraft through 1553B interface bus for transfer of information to and from the aircraft. (e) The pods should have I level testing facility in IAF operating units and D level facilities at designated BRD (f) The pods should satisfy the EMI/EMC requirements of the aircraft in present form in order to ensure interference free operation of other RF systems in aircraft (e.g Radar, RWR, IFF, TACAN etc). (g) The pods should weigh less than 190 Kg each (Tx and Rx) so that the effect on the wing tip stations and envelope restrictions on the aircraft are avoided. **RWR System** (a) The system should be able to operate in frequency range 1-40 GHz (b) System should be able to detect and find direction of illuminating radar of ground based, ship based and airborne systems with different signatures (c) The system should be able to interface with other EW systems on the aircraft (d) System should be able to interface with aircraft avionics with available interface protocol (e) System should be able to measure frequency of the emitter with other parameters like pulse width, PRI, illumination type, operating mode etc. (f) The coarse direction finding accuracy (resolution) of the system should be max 10^{o} and fine direction finding accuracy (resolution) should be max 2^{o} (g) System should detect the signals with probability of 0.9
4.	**Tentative quantity to be procured after successful prototype development**
	(a) Immediate requirement: Approx 100 sets with associated 'O' level, 'I' level

	and ‘D’ level facilities. (b) Recurring requirement: Spares sets and individual spares as per requirement.
5.	**Tentative timeline for induction**
	Year 2021 onwards
6.	**Any other relevant information**
	(a) NIL

SHQ (Air Force)

PROJECT NO. IAF 12

1.	**Name of Potential Project**
	Long range Air-Air Beyond Visual Range (BVR) Missiles for employment from fighter aircraft of the IAF
2.	**Brief about the project**
	MoD, GoI intends to procure Air-Air BVR missiles. These missiles are proposed to be indigenously developed and manufactured under the Make category of the DPP-2016.
3.	**Broad specifications / PSQRs which can be shared with the Industry**
	BVR Missile (a) The BVR missile should use latest technology to assure long range and superior 'end game manoeuvring'/'No Escape Zone'. (b) The missile should be able to engage the target at the ranges of at least 160 Km when launched at less than 2 M speed at a target with similar parameters. (c) Missile design should allow rail as well as ejector launch. (d) The missile should interface with the aircraft through 1553B interface bus for transfer of information to and from the aircraft and follow MIL STD 1760 for information exchange. (e) The missile should have I level testing facility at bases and D level repair facility in IAF. (f) The missile should be fitted with all-weather active radar proximity fuse to detect the target and provide a firing pulse to initiate detonation of the warhead. (g) Data link transmitter to be exclusively designed and installed by the missile OEM on the launch aircraft. Data link receiver in the missile should provide a comical signal reception around the missile axis to the rear. The data link should preferably be two way data link operating in L band. (h) Vendor should be able to integrate the missile on at least one fighter aircraft platform specified by the IAF during prototype development phase. Thereafter, the missile should be integrated on other platforms supporting the missile interface requirements. (j) Missile should have own Inertial Navigation System (INS). The missile INS should be able to synchronize with the aircraft INS almost instantaneously. (k) Missile should have seeker with Lock-On After Launch (LOAL) capability. Launch aircraft will support the missile in flight until seeker acquisition through data link. The seeker should be of latest technology with RF only or with RF+IR combination to assure better detection. (l) The missile should be all weather and have capabilities of all aspect shoot up/down, multi target engagement, 'fire and forget' operation, data link, anti-jamming & jamming resistance capabilities. (m) Missile should be able to function in two modes viz normal mode where the target data is provided by the launch aircraft via the data-link till the target acquisition by the missile seeker and Fire and Forget mode if necessary in tactical situation.
4.	**Tentative quantity to be procured after successful prototype development**
	(c) Immediate requirement: Approx 500 missiles with associated 'O' level, 'I' level and 'D' level facilities.

	(d) Recurring requirement: Spares sets and individual spares as per requirement.
5.	**Tentative timeline for induction**
	Year 2021 onwards
6.	**Any other relevant information**
	A detailed RFI on the subject would be issued shortly.