

## List of Potential 'Make Projects' as on 10<sup>th</sup> Oct 2017

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1. Under the 'Make in India' initiative of the Government, a list of potential 'Make' Projects has been identified by the Service Head Quarters (SHQs) in consultation with the other stakeholders in the Ministry. These projects are being contemplated to be undertaken as per category Make-I or Make-II of new revised Chapter-III on Make Procedure of Defence Procurement Procedure-2016 which is available on MoD website at link <http://mod.gov.in/writereaddata/DPPnew16.pdf>
2. Brief summary of the identified items containing tentative quantities, broad specification/ QRs, expected timelines for induction of these items by the Services, are enclosed at **Annexure** to this notice.
3. Interested Indian companies are requested to carry out preliminary assessment regarding their technical capability to undertake these projects and economic viability of the project.
4. Following Nodal officers have been nominated for any queries related to these proposals:

Organization	Name & Designation	Office Address	Contact Details
Army	Col Anurag Awasthi Dir PP(AoN & Cat)	GS Branch Dte Gen Perspective Planning ( AoN & Cat) Room No-121, A Wing, Sena Bhawan, New Delhi	(P) - 011-23335517, 23019762 (F) - 011-23332864
Navy	Cmd K Anil	Dte of Indigenization SHQ (Navy) 5 <sup>th</sup> floor, Chanakya Bhawan, Chanakayapuri New Delhi	(P) – 011-24103973 (F) – 011-24122689 Email: doi-navy@nic.in
Air force	Air Commodore Ravuri Sheetal, VM PD(Plans)	Room No.426, Air Head Quarters (Vayu Bhawan) Rafi Marg New Delhi- 110106	(P) - 011-23010231 Ext. 5431 (F) - 011-23015164 Email: makeind.af@gov.in
DDP	Shri Ravin Kulshrestha Dir( P&C)	Dte of Planning & Coordination Room 16, H-Block New Delhi-110011	(P) - 011-23011420 (F) – 011-23793032 Email: dirpnc-ddp-mod@nic.in
DDP	Shri Chandandeep Singh Planning Officer	Dte of Planning & Coordination Room no-41, H Block	(P) & (F) -011-23016619 Email: poms-ddp-mod@nic.in

5. The project-wise contact details of Project managers are given below:

**SHQ (ARMY)**

Sr no	Proposal	Name & Designation	Office Address	Phone/Fax	E-mail
1.	125mm smooth bore gun barrel for T-72 & T-90 tanks with missile firing and improved ammunition	Col KK Singh, Dir Inservice Eqpt (AC), DGMF Dte	Room No 501, 5 <sup>th</sup> Floor, A-Wing Sena Bhawan, Inservice Eqpt (AC), Section IHQ of MoD (Army)	011-233-35093	-
2.	125mm APFSDS (Armour-piercing fin-stabilised discarding-sabot) Amn with Depth of Penetration (Dop) of 600mm (min) – 800mm for T-72 Tank	Col KK Singh, Dir Inservice Eqpt (AC), DGMF Dte	Room No 501, 5 <sup>th</sup> Floor, A-Wing Sena Bhawan, Inservice Eqpt (AC), Section IHQ of MoD (Army)	011-233-35093	-
3.	1000HP Engine with associated peripherals for T-72 Tank	Col KK Singh, Dir Inservice Eqpt (AC), DGMF Dte	Room No 501, 5 <sup>th</sup> Floor, A-Wing Sena Bhawan, Inservice Eqpt (AC), Section IHQ of MoD (Army)	011-233-35093	-
4.	Individual Under Water Breathing Apparatus (IUWBA) @ 04 per tank. – for T-90 Tank	Col VS Kahlon, Dir MoD	Room No 501, 5 <sup>th</sup> Floor, A-Wing Sena Bhawan, Inservice Eqpt (AC), Section IHQ of MoD (Army)	011-233-35094	-
5.	Environmental Control Unit– for T-90 Tank	Col VS Kahlon, Dir MoD	Room No 501, 5 <sup>th</sup> Floor, A-Wing Sena Bhawan, Inservice Eqpt (AC), Section IHQ of MoD (Army)	011-233-35094	-
6.	Auxiliary Power Unit (APU) for T-90 Tank	Col VS Kahlon, Dir MoD	Room No 501, 5 <sup>th</sup> Floor, A-Wing Sena Bhawan, Inservice Eqpt (AC), Section IHQ of MoD (Army)	011-233-35094	-
7.	Tracked Light Dozer (TLD)	Col Vikram Gulati, Dir CE (CE-5B)	Room No 91, Combat Engr Dte E –in -C Branch Kashmir House Rajaji Marg New Delhi	011-23019604 011-23019675	ce5-einc-army@nic.in
8.	Assault Track Way- CI 24 for movement of	Col Vikram Gulati, Dir CE	Room No 91, Combat Engr Dte E –in -C Branch	011-23019604	ce5-einc-army@

	HMVs in Desert & Semi Desert	(CE-5B)	Kashmir House Rajaji Marg New Delhi	011-23019675	nic.in
9.	APTA( Advance Pilotless Target Aircraft )	Col Harsion Verma, Dir(Mod) Armd AD	IHQ of MoD (Army), AAD Dte, Room No 606,D-1 Wing, Sena Bhawan,Delhi	Fax 23333632	-proc.aad-army@nic.in
10.	MEAT (Manoeuvrable Expendable Aerial Target )	Col Harsion Verma, Dir(Mod) Armd AD	IHQ of MoD (Army), AAD Dte, Room No 606,D-1 Wing, Sena Bhawan,Delhi	Fax 23333632	-proc.aad-army@nic.in
11.	AFV Protection and Counter measure system(APS)	Col VS Kahlon, Dir MoD	Room No 501, 5 <sup>th</sup> Floor, A-Wing Sena Bhawan, Inservice Eqpt (AC), Section IHQ of MoD (Army))	011-233-35094	-
12.	Multi Target Tracking System (MttS) for Tanks	Col Amit Mathur, Dir (MoD)	DGMF, A-Wing, Sena Bhawan	011-233-35094	
13.	3 <sup>rd</sup> Generation Missile for 125mm Gun Barrels of T-90 and T-72 Tanks	Col RD Sharma, Dir (MoD)	DGMF, A-Wing, Sena Bhawan	011-233-35094	
14.	Armoured Fighting Vehicle Protection And Counter Measure System for T-90 Tank	Col RD Sharma, Dir (MoD)	DGMF, A-Wing, Sena Bhawan	011-233-35094	
15.	Advanced 30mm Cannon Ammunition for Bmp - 2/2k	Col Vishal Dev	DGMF, A-Wing, Sena Bhawan	011-233-35094	
16.	Fuzes for all Variants of Pinaka Rockets	Col Ramit Arora, Dir Arty13 (Rkt Arty)	DG Arty, 5 <sup>th</sup> Floor, A-Wing, Sena Bhawan, IHQ of MoD (Army)	011-233-35092	
17.	Light Weight Body Armour	Col H Kataria, SM, Dir Inf-3	Room No. 415, D-Wing, Sena Bhawan	011-233-33819	

18.	Robotics Surveillance Platform for Rashtriya Rifles	Col Aditya Mishra, Dir RR-2	DG RR, Delhi Cantt	011-25692895	
19.	Individual Protection System: Multi Applicable Smart Sensor Based Impact and Blast Resistant Protective Shield	Col Aditya Mishra, Dir RR-2	DG RR, Delhi Cant	011-25692895	
20.	Programmable, Pre-Fragmented, Proximity Ammunition (3 P) Ammunition for 40 mm L-70 Gun	Col Rajesh Tanwar, (Planning)	Army Air Def Directorate, Dir Room No. 606, D-1 Wing	011-23339001/23333632	
21.	Antenna Alignment System (AAS) for OSA-AK Missile System	Col Rajesh Tanwar, (Planning)	Army Air Def Directorate, Dir Room No. 606, D-1 Wing	011-23339001/23333632	
22.	1200-1500 HP Modular Engine for Tank T-90 S/Sk	Col RD Sharma, Dir (MoD)	DGMF, A-Wing, Sena Bhawan	011-233-35094	

**SHQ (NAVY)**

Sr no	Proposal	Name & Designation	Office Address	Phone/Fax	E-mail
1.	Diesel engine for Boats	Capt AK Chakrabarti, DME	IHQ MoD(N), Directorate of Marine Engineering 305 C Wing, Sena Bhawan, IHQ MoD(N), New Delhi 110010	011-23010302 011-23011352	dme-navy&nic.in
2.	Upper Air sounding system	Cdr A Vidyasagar, JDNOM	IHQ MoD(N), Directorate of Naval Oceanography and Meteorology, 130 A Wing, Sena Bhawan IHQ MoD(N), New Delhi 110011	011-23010139 011-23011663	dnom-navy@nic.in
3.	High Speed Low flying Targets	Capt VS Harke, DSR (ASW)	IHQ MoD(N), Directorate of Staff Requirements 56 A Block Hutments, Sena Bhawan IHQ MoD(N), New Delhi 110011	011-23010948 011-23010241	dsr-navy@nic.in
4.	Expendable Underwater Target	Capt VS Harke, DSR (ASW)	IHQ MoD(N), Directorate of Staff Requirements 56 A Block Hutments, Sena Bhawan IHQ MoD(N), New Delhi 110011	011-23010948 011-23010241	dsr-navy@nic.in
5.	Deck Winches( for shipping applications)	Capt H Gurumani, DOH	IHQ MoD(N), Directorate of Hydrography 5M, West Block IV, Wing 5 Sector 1, RK Puram New Delhi,	011-26181834 011-26181834	doh-navy@nic.in
6.	Diesel Engines for Propulsion	Capt AK Chakrabarti, DME	IHQ MoD(N), Directorate of Marine Engineering 305 C Wing, Sena Bhawan IHQ MoD(N), New Delhi 110010	011-23010302 011-23011352	dme-navy&nic.in
7.	Shafting & Propeller for <i>IN</i>	Capt Anish MJ	IHQ MoD(N),	011-	dme-

	Ships	Nair DME	Directorate of Marine Engineering 302 C Wing, Sena Bhawan IHQ MoD(N), New Delhi 110010	23010302 011- 23011352	navy&nic.i n
8.	RAS/FAS Equipment	Lt Cdr S C Joshi Dte of Naval Architecture (DNA)	Dte of Naval Architecture (DNA) Room no. 423 C/DII Sena Bhawan	011- 23010184	
9.	Indigenous Software Defined Radio (INDE- SDR)	Capt Iftekhar Alam Capt Rajesh Jangid	WESEE, West Block-V,RK Puram, New Delhi	011- 26194508	<a href="mailto:iftekhar.alam@navy.gov.in">iftekhar.alam@navy.gov.in</a> <a href="mailto:rajesh.jangid@navy.gov.in">rajesh.jangid@navy.gov.in</a>
10.	Electolysis Based Hydrogen Generator	Capt Mangal Kakkar	DNOM, Room no. 004, Ground Floor, Talkatora Stadium Annex Building	011- 23093274	<a href="mailto:dnom@navy.gov.in">dnom@navy.gov.in</a>

**SHQ (Air Force)**

Sr no	Proposal	Name & Designation	Office Address	Phone/Fax	E-mail
1.	Air to Ground Rockets	Wg Cdr S Swami JD ASR (F)	Room No. 459, Air HQ (VB), New Delhi	23010231 Extn: 7467	makeind.a f@gov.in
2.	Chaff & flares	Gp Capt SK Das, JD ASR (EW & VE)	Room No. 453, Air HQ (VB), New Delhi	23010231 Extn: 7453	makeind.a f@gov.in
3.	Long Range Glider Bomb	Wg Cdr Sajja Sunil, JD ASR(Wpns)	Room No. 452, Air HQ(VB), New Delhi	23010231 Extn: 5847  23060225	makeind.a f@gov.in
4.	Imaging Search and Track System (IRST)	Gp Capt AP Saraph VSM D ProjSu-30	Room No. 402, Air HQ(VB), New Delhi	23010231 Extn: 5492  23060217	makeind.a f@gov.in
5.	Air Combat Maneuvering Instrumentation(ACMI)	Wg Cdr P Ganguli JD C <sup>4</sup> ISR	Room No. 417, Air HQ(VB), New Delhi	23010231 Extn: 7422	makeind.a f@gov.in
6.	7.62mm Ammunition for Galil sniper rifle (NATO)	Wg Cdr A Susheel Kumar JD ASR (T-M)	Room No. 451 Air HQ (VB) New Delhi	011- 23010231 Extn: 7451	makeind.a f@gov.in
7.	5.56mm Ammunition for Negev LMG (NATO belted)				makeind.a f@gov.in
8.	5.56mm Ammunition for TAVOR Assault Rifle (NATO)				makeind.a f@gov.in
9.	Design & Development of 125 kg bomb (akin to MK-81 bomb)	Wg Cdr D Sarfrozuddin	Room No. 451 Air HQ (VB) New Delhi	011- 23010231 Extn: 5851	<a href="mailto:makeind.a_f@gov.in">makeind.a_f@gov.in</a>
10.	Aerial Fuse for Bomb				
11.	Advanced Self Protection Jammmer (ASPJ) Pods and Radar Warning Receiver (RWR) for Fighter Aircraft	Wg Cdr NK Yadav JD Proj (Su-30)	Room No. 401 Air HQ (VB) New Delhi	Phone:011- 23010231 Extn: 7492,  011- 23060217	<a href="mailto:makeind.a_f@gov.in">makeind.a_f@gov.in</a>
12.	Li – ion /	-	-	-	-

	polymer rechargeable smart battery				
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**Brief summary of the identified Potential 'Make' Projects**

**SHQ(Army)**

**Project No.1 & 2**

**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.**

<b><u>S No</u></b>	<b><u>Parameter</u></b>	<b><u>Capability</u></b>
(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).**

<b><u>S No</u></b>	<b><u>Parameter</u></b>	<b><u>Capability</u></b>
(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.3**

**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.**

<b>Ser No</b>	<b>Parameter</b>	<b>Capability</b>
(i)	Power	1000HP $\pm$ 20HP
(ii)	Power to Wt Ratio	Not less than 20 HP/Ton
(iii)	Fuel consumption	Dunal Trn - 750 km X-Country - 650 km $\pm$ 10 On Rd- 500 km $\pm$ 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.4**

**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<sup>0</sup>C to + 45<sup>0</sup> 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<sup>0</sup>C to 55<sup>0</sup>C.

(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.5**

**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<sup>0</sup>C, 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 : 28<sup>0</sup> ±5 °C  
desired (hatches closed) **in an ambient temperature range from -5<sup>0</sup>C ± 5<sup>0</sup> C to 45<sup>0</sup> C ± 5<sup>0</sup> C. For temperatures beyond 45<sup>0</sup> C**

ambient a minimum of 15° C drop in temperature within the tank must be effected.

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

(v) Compatibility : **As per JSS -5555 (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° C + 50° C to 45° C + 50° 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.6**

**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 EM/EM compatibility.

(iv) **Auxiliary Power 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.7**

**TRACKED LIGHT DOZER**

1. **Name of the Project.** Tracked Light Dozer.
2. **Brief of the Project.** Tracked Light Dozer is envisaged as an earth moving plant to be employed by the Indian Army Units in mountainous terrain for a variety of earth moving tasks such as track construction, levelling, land slide clearance & snow clearance etc.
3. **Broad Specifications.**
  - (a) Capable of being lifted by in-service helicopters up to an altitude of 4000m.
  - (b) Detachable Modular Parts of maximum 1.5 to 2 Ton.
  - (c) Capable of being disassembled/ assembled in field with ease, without the need of any specialised equipment.
  - (d) Minimum operating temperature up to (-) 20<sup>0</sup>C.
4. **Tentative Quantity.** The quantity to be procured is approximately 180 with anticipated requirement of 15-20 per year of 10 years with complete spares and overhaul support.
5. **Tentative Timelines for Development/ Production.** Two-three years.

**SHQ(Army)**

**Project No.8**

**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<sup>0</sup>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.9**

**ADVANCED PILOTLESS TARGET AIRCRAFT (APTA)**

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

2. **Broad QRs.**

<b><u>SN</u></b>	<b><u>Parameter</u></b>	<b><u>Capability</u></b>
(a)	Max Speed	Not less than 0.6 Mach (550 m/s) speed at 6000m altitude in clean configuration (ie without tow body)
(b)	Max Endurance	Not less than 45 mins at 4000 m alt at 0.40M with one tgt towed
(c)	Min Altitude	Not less than 300m for clean configuration
(d)	Max Altitude	Not less than 8km for clean configuration
(e)	Manoeuvrability	Not less than 3.5 'g'
(f)	Launch Mode	By ground/sea
(g)	Radar Band for Detection	X, Ku and Ka Bands
(h)	Range	Radio control up to 60 Kms or more and Autonomous mode up to 100 Kms
(j)	Recovery	Ground based

3. **Tentative Quantity.** Approx 05 per year.

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

**SHQ(Army)**

**Project No.10**

**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.**

<b><u>Ser No</u></b>	<b><u>Parameter</u></b>	<b><u>Capability</u></b>
(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.11

## AFV Protection and Counter measure system(APS)for armoured fighting vehicles

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 of the Mechanised Forces to significantly enhance their survivability.

2. **Broad QR/Specifications.** The broad QR/ Specification for the intended active protection system are as under:-

(a) **Physical Characteristics.**

(i) Should be light in weight and not adversely affect existing agility/mobility of the vehicle. The complete **weight added** due to fitting the system should be **less than 1000 kg**.

(ii) Should be mountable on tanks without interfering with other systems or their functioning and ergonomics of the crew.

(iii) Should not necessitate the removal of essential fitment items.

(iv) Components fitted outside must be military grade and protected against splinters and small arms firing.

(b) **Operational Characteristics.**

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

(aa) RPG/ RL (From a min dist of 75 m)-80%.

(ab) ATGM - 80%.

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

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

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

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

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

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

(vii) The fitting of the system should **not affect sealing of combat vehicle for deep fording and NBC protection**. The sub system fitted externally should be waterproof for fording.

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

(ix) Should withstand the climate and durability tests as per **JSS : 5555**.

(x) 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.

(xi) System should be capable of withstanding variation/ fluctuation of **electric voltages as per MIL 1275 B**.

(xii) 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.

**SHQ(Army)**

**PROJECT NO. 12**

**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. 13**

**3<sup>rd</sup> 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 3<sup>rd</sup> generation gun launched missiles should achieve a DoP of 800-850mm and be capable of Beyond Line of Sight (BLOS) engagement 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. 14**

**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 Launcher (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<sup>0</sup> to plus 20<sup>0</sup>.
  - (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 than 1000 kg.

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

**SHQ(Army)**

**PROJECT NO. 15**

**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 BMP - 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 degree at 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. 16**

**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:-

<b><u>Ser No</u></b>	<b><u>Type of Fuze</u></b>	<b><u>Requirements</u></b>	<b><u>Used in Rockets</u></b>	<b><u>Approx Quantity</u></b>
(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.		
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4. **Timeline and Process.** As per Chapter III of DPP 2016.

**SHQ(Army)**

**PROJECT NO. 17**

**LIGHT WEIGHT BODY ARMOUR**

1. **Brief Description.** The present & future concept of conflicts and challenges faced by a soldier 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 soldier. 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.**

<b><u>S. No</u></b>	<b><u>Components</u></b>	<b><u>Min SAP Size</u></b>	<b><u>Min HAP Size</u></b>
(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. 18**

**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) **2<sup>nd</sup> Unit and Remote Operability.** Many a times two or more teams have to operate in conjunction inside a single target area. Thus a 2<sup>nd</sup> 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. 19**

**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.
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. 20**

**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 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. 21**

**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 -  $\pm 120$  Deg.
- (ii) Elevation - (+) 5 to (-) 20 Deg.
- (iii) Levelling -  $\pm 12$  Deg.

(c) **Antenna System.**

- Unit
- (i) Height of the mast without oscillator 20 Mtr and with Oscillator 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  $\pm 5\%$  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°C.

(ii) Relative humidity (20±2°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(Navy)**

**PROJECT NO. 22**

**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<sup>0</sup>
    - (ii) Max Tilt angle - 25<sup>0</sup>
  - (d) Compression ratio - >15:1
  - (e) Engine Weight - <1500 Kgs
  - (f) Power to weight ratio - ≥25 HP/Ton
  
4. **Tentative Timeline.** As per Chapter III of DPP 2016.



**SHQ(Navy)**

**Project No.1**

1.	<b>Name of Potential Project</b>
	Diesel engines for boats
2.	<b>BRIEF SPECS</b>
	<ul style="list-style-type: none"><li>▪ For propulsion of various boats used in <b>IN</b></li><li>▪ The engine is to be supplied with its associated ancillary equipment, pipes, fittings, instrumentation which broadly include the following:-<ul style="list-style-type: none"><li>• 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).</li><li>• 24 V electric starting equipment along with suitable battery catering to minimum 40 starts of the engine with provision for alternative mechanical / hand start</li><li>• Exhaust system comprising silencer, manifold (water cooled type)</li><li>• Engine driven fresh water, fuel oil and lube oil pumps</li><li>• 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.</li><li>• The engine should be fresh water cooled which in turn should be cooled by sea water.</li></ul></li></ul>
3.	<b>Tentative quantity to be procured after successful prototype development</b>
	<ul style="list-style-type: none"><li>▪ Approx 40 for 2016-17</li></ul>
4.	<b>Tentative timeline for induction</b>
	03 to 05 years

**SHQ(Navy)**

**Project No.2**

1.	<b>Name of Potential Project</b>
	Upper Air Sounding System (UASS)
2.	<b>Brief Specs:</b>
	To Record:- <ul style="list-style-type: none"><li>▪ Upper Air Profile for Weather Prediction</li><li>▪ Generation of Aviation Met Reports</li><li>▪ Assessment of Anomalous Propagation Conditions</li><li>▪ Ballistic Correction for Ammunition Firing</li></ul> <p><i>Complete system is Integral Part of all Capital Ships, Aircraft Carriers And Air Stations</i></p>
3.	<b>Tentative Quantity to be Procured After Successful Prototype Development</b>
	Ground Station (Fixed) : 25 Units For <b>IN</b>  Radiosonde (Consumable) : Approx 14000 Per Annum
4.	<b>Tentative Timeline for Induction</b>
	24 Months

**SHQ(Navy)**

**Project No.3**

1.	<b>Name of Potential Project</b>
	High Speed Low Flying Targets
2.	<b>Brief Specs:</b>
	Broad Requirement:- <ul style="list-style-type: none"><li>▪ High speed low flying aerial target</li><li>▪ Expendable in nature and launched from ship upto Sea State 3</li><li>▪ Speed greater than or equal to 350 Knots</li><li>▪ Endurance greater than or equal to 25 min at max speed and 40 min at Economical speed</li><li>▪ Flight Altitude 10m to 6000m</li><li>▪ Pre-programmed autonomous flight using way point navigation</li><li>▪ Target should be capable of being controlled upto 75 Km based on clear Line of sight</li></ul>
3.	<b>Tentative Quantity to be Procured After Successful Prototype Development</b>
	<ul style="list-style-type: none"><li>▪ 40 per year</li></ul>
4.	<b>Tentative Timeline for Induction</b>
	<ul style="list-style-type: none"><li>▪ 03 years</li></ul>

**SHQ(Navy)**

**Project No.4**

1.	<b>Name of Potential Project</b>
	Expendable Under Water Target (EUT)
2.	<b>Brief Specs:</b>
	<ul style="list-style-type: none"><li>▪ Self-propelled expendable target body</li><li>▪ Control console capable of programming trajectory and signature EUT, and undertake testing of EUT prior launch</li><li>▪ Hydrodynamic design and battery operated</li><li>▪ Lightweight less than 30 kg, capable of being launched manually by lowering from ship's side</li><li>▪ Capable of operating between 1 to 8 knots of speed</li><li>▪ Operate within depth from 10 m to 150 m</li><li>▪ Endurance of more than 4 hrs</li><li>▪ EUT should be capable of operated upto Sea State 4</li></ul>
3.	<b>Tentative Quantity to be Procured After Successful Prototype Development</b>
	<ul style="list-style-type: none"><li>▪ 60 per year</li></ul>
4.	<b>Tentative Timeline for Induction</b>
	<ul style="list-style-type: none"><li>▪ 02 years</li></ul>

**SHQ(Navy)**

**Project No.5**

1.	<b>Name of Potential Project</b>
	Winches - Deep Sea Side Scan Sonar Towing Winch
2.	<b>BRIEF SPECS</b>
	<ul style="list-style-type: none"><li>▪ A self-contained, electro-hydraulic or electro-mechanical, variable speed cable handling system.</li><li>▪ Stainless steel hardware protected for marine environment.</li><li>▪ Capable of withstanding load on the winch in sea state 3-4 at ship speed of 10 knots.</li><li>▪ Size – not more than 5 ft w x 4 ft h x 4ft l</li><li>▪ Total weight – less than 1500 kg</li><li>▪ Automatically align cable during retraction to avoid fouling of cable.</li><li>▪ Remote control operation in addition to local control and manual.</li><li>▪ Suitable electrical motor capable of operating on ship's power supply 415 v/ 3 phase/ 50 hz.</li><li>▪ The drum should leave atleast 2" in clearance on flange</li></ul>
3.	<b>Tentative quantity to be procured after successful prototype development</b>
	<ul style="list-style-type: none"><li>▪ Qty – 04 Nos</li></ul>
4.	<b>Tentative timeline for induction</b>
	02 years

**SHQ(Navy)**

**Project No.6**

1.	<b>Name of Potential Project</b>
	Diesel Engines For Propulsion
2.	<b>BRIEF SPECS</b>
	<ul style="list-style-type: none"><li>▪ The Diesel Engines are required for propulsion onboard Ships. The Engines with Power Rating of 5-10 MW are required to be indigenously developed.</li> <li>▪ 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.</li> <li>▪ The Engine is to be supplied with its associated Ancillary Equipment, Pipes, Fittings, Instrumentation etc.</li> <li>▪ The materials used in the engine should comply to Defstan 02-313. The broad specifications will be provided on request.</li> <li>▪ The Engines should be class approved and certified by IRs/ABs or any other suitable agency. The first of the Engine will be type tested.</li> <li>▪ 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.</li></ul>
3.	<b>Tentative quantity to be procured after successful prototype development</b>
	<ul style="list-style-type: none"><li>▪ The Quantities would be finalised post discussions and based on Induction Plan of Ships for 5-10 MW Power Rating Engines.</li> <li>▪ Tentative Quantities are 15 Per Year 2020 onwards</li></ul>
4.	<b>Tentative timeline for induction</b>
	03 To 05 Years

**SHQ(Navy)**

**Project no. 7**

<b>1</b>	<b>Name of Potential Projects</b>
	Shafting & Propeller for <i>IN</i> Ships
<b>2</b>	<b>Brief Specs</b>
	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 <i>IN</i> ships.
<b>3</b>	<b>Tentative quantity to be procured after successful prototype development</b>
	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 <b>37 Nos</b> shafting system would be required.
<b>4</b>	<b>Tentative timeline for induction</b>
	04 to 05 years

**SHQ(Navy)**

**Project no. 8**

<b>1</b>	<b>Name of Potential Projects</b>
	RAS/FAS Gear for <i>IN</i> Ships
<b>2</b>	<b>Brief Specs</b>
	<p>(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)'.</p> <p>(b) The RAS/FAS equipment onboard ships can be broadly classified under two groups, as follows:-</p> <ul style="list-style-type: none"><li>(i) Equipment for delivery ships.</li><li>(ii) Equipment for receiving ships.</li></ul> <p>(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.</p> <p>(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.</p>
<b>3</b>	<b>Tentative quantity to be procured after successful prototype development</b>
	4 Ship sets for 4 Naval Ships
<b>4</b>	<b>Tentative timeline for induction</b>
	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:

<u>Hose Size</u>	<u>Maximum Volume Flow Rate</u>
177mm(7")	626 M <sup>3</sup> /Hr
153mm(6")	460 M <sup>3</sup> /Hr
64mm(2.5")	80 M <sup>3</sup> /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°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**

**INDIGENOUS SOFTWARE DEFINED RADIO (INDE-SDR)**

1. **Name of the Equipment.** Indigenous Software Defined Radio (INDE-SDR).
2. **Brief Specification.**
  - (i) The requirement of voice and data communication between **IN** platforms is currently been met by conventional voice grade radios that provide limited bandwidth for data communication. Multiplicity of type, lack of features upgrades and dependence on foreign OEMs for product supportability renders the current fit of radios unsuitable to meet future net centric requirements of IN. A Software Defined Radio (SDR) being multi –mode ( supports both voice and data), multi-band operating equipment with higher bandwidths, utilizing common hardware across from factors and offering features upgrade through software upgrade is an ideal replacement for the current generation of radios.
  - (ii) The indigenous SDR (INDE-SDR) is envisaged to be a replacement for the existing radios offering interoperable and reconfigurable waveforms spanning HF, V/UHF and L bands reconfigurable waveforms developed meets extant specification for end use and its band of operation. The architecture facilities high data rates (upto 6 Mbps) to enable near real time exchange of information between platforms fitted with the system.
  - (iii) Private industry partnership in the program for production of modules and assemblies such as power amplifiers and Antenna Tuning Unit for HF will scale up capacity and would improve overall product performance.
3. **Tentative Quantity to be Procured after successful prototype development per year, for next ten year alongwith indicative cost.** 270 nos.
4. **Tentative timeline for induction.** Phased procurement with likely induction of 1<sup>st</sup> unit by 2020.

**SHQ(Navy)**

**PROJECT NO. 10**

**ELECTOLYSIS BASED HYDROGEN GENERATOR**  
**DIRECTORATE OF NAVAL OCEANOLOGY AND METEOROLOGY**

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 (Air Force)

### Project No.1

1.	<b>Name of Potential Project</b>
	Air to Ground Rockets — 70 mm Calibre
2.	<b>Brief about the project</b>
	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.	<b>Broad specifications / PSQRs</b>
	(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.	<b>Tentative quantity to be procured after successful prototype development</b>
	(a) Immediate requirement: Around 30,000. (b) Recurring requirement: Around 20,000 per year.
5.	<b>Tentative timeline for induction</b>
	2018-21
6.	<b>Any other relevant information</b>
	(a) A detailed RFI on the subject would be issued shortly. (b) On successful development of such capability, other similar weapons are also intended to be indigenised.

**SHQ (Air Force)**

**Project No.2**

1.	<b>Name of Potential Project</b>
	Chaff & Flares
2.	<b>Brief about the project</b>
	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.	<b>Broad specifications / PSQRs</b>
	(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.	<b>Tentative quantity to be procured after successful prototype development</b>
	Around One lakh Chaffs and Two Lakh Flares per year
5.	<b>Tentative timeline for induction</b>
	Recurring requirement from year 2019 onwards



**SHQ (Air Force)**

**Project No.3**

1.	<b>Name of Potential Project</b>
	Long Range Glide Bombs
2.	<b>Brief about the project</b>
	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.	<b>Broad specifications / PSQRs</b>
	(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.	<b>Tentative quantity to be procured after successful prototype development</b>
	Appr a thousand per year.
5.	<b>Tentative timeline for induction</b>
	As soon as trials are successfully completed.

**SHQ (Air Force)**

**Project No.4**

<b>1. Name of Potential Project</b>	Long Range Dual Band Infrared Imaging Search and Track System (IRST)
<b>2. Brief about the project</b>	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.
<b>3. Broad specifications / PSQRs</b>	<p>(a) IRST should be able to perform long range IR detection in a large field of view (FoV)</p> <p>(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.</p> <p>(c) IRST should support 3D localization by an eye-safe Laser Range Finder.</p> <p>(d) Should be compatible with existing similar system fitted in Su-30MKI aircraft in terms of mechanical and electrical requirements.</p> <p>(e) IRST should be able to operate as per Su-30 MKI aircraft operating envelope.</p> <p>(f) Transportation and storage in Indian conditions.</p>
<b>4. Tentative quantity to be procured after successful prototype development</b>	<p>(a) Immediate requirement: Approx 100.</p> <p>(b) Recurring requirement: Spares sets and individual spares as per requirement.</p>
<b>5. Tentative timeline for induction</b>	2018-21

**SHQ (Air Force)**

**Project No.5**

**Air Combat Manoeuvring Instrumentation (ACMI) pods**

1.	<b>Name of Potential Project</b>
	<u>Air Combat Manoeuvring Instrumentation (ACMI) pods.</u> It is proposed to acquire additional Air Combat Manoeuvring Instrumentation (ACMI) pods and its associated equipment through the 'Make' route as per DPP-16.
2.	<b>Brief about the project</b>
	Air combat forms a vital part of air operations. Situations during air combat are extremely dynamic with rapid changes in speed, height and position of each fighter aircraft relative to other aircraft. Air Combat Manoeuvring Instrumentation (ACMI) equipment provides an electronic replay of the entire combat sortie thereby ensuring thorough and effective post-flight debriefings. IAF has in the past procured these systems/pods for limited fleet through the 'Buy (Global)' route. However a need has been felt for long term indigenous substitute of ACMI for all fighter squadrons in the IAF.
3.	<b>Broad specifications / PSQRs</b>
	The ACMI pods fitted on the aircraft constantly transmits aircraft flight path information to the ground station. On ground, when replayed along with the inputs from other pods, it reproduces an accurate and a complete picture of the air combat exercised. Real time monitoring of a combat air situation is possible through ACMI system by the ground based supervisors and if required, corrective instructions can be passed to the pilots on radio. This avoids repetition of missions for better assimilation of an air situation. ACMI systems provide the precise bomb scores based on aircraft parameters and trigger press without the actual bomb release.
4.	<b>Tentative quantity to be procured after successful prototype development</b>
	The IAF presently requires 165 ACMI Pods, associated systems, ground debriefing stations, testers, documentation, spares and GHE/GSE as MRLS for its fighter squadrons. The new system being procured should be backward compatible with existing ACMI pods and its associated systems available in the IAF inventory.
5.	<b>Tentative timeline for induction</b>
	2019-21
6.	<b>Any other relevant information</b>
	The Indian industry, at present does not have any vendor who can provide the ACMI equipment, which is compatible with the ACMI equipment already inducted in IAF. IAF has planned to induct new ACMI systems, manufactured by Indian Industry through the 'Make-II(Industry Funded)' Route of DPP-16. The aim of the exercise is to find capable vendors in the Indian Industry willing to undertake the project. Presentations and consultations in order to resolve the concerns would be welcome. It is envisaged that the Indian Industry shall showcase its abilities to manufacture a prototype for the testing and certification purposes. This shall aid in

	the process of import substitution. The questionnaire annexed along with this shall help in resolving the concerns of the Indian Industry.
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**SHQ (Air Force)**

**Project No.6, 7& 8**

1.	<b>Name Of Potential Project</b>
	7.62mm & 5.56 mm NATO ammunition
2.	<b>Brief About The Project</b>
	Procurement of 7.62mm & 5.56 mm NATO ammunition for Garud Force
3.	<b>Broad Specifications/ PSQRs</b>
	(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.	<b>Tentative Quantity to be procured after successful prototype development</b>
	(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.	<b>Tentative timeline for induction</b>
	2018-2019
6.	<b>Any other relevant information</b>
	(a) Indian Vendor has to obtain ToT and certification from the OEM (in case of foreign) for indigenous manufacture under licence.

**SHQ (Air Force)**

**Project No. 9**

1.	<b>Name of Potential Project</b>
	125 kg bomb (akin to MK-81 Bomb)
2.	<b>Brief about the project</b>
	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.	<b>Broad specifications / PSQRs</b>
	(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.	<b>Tentative quantity to be procured after successful prototype development</b>
	500 per year
5.	<b>Tentative timeline for induction</b>
	Immediate
6.	<b>Any other relevant information</b>
	Nil

**SHQ (Air Force)**

**Project No.10**

1.	<b>Name of Potential Project</b>
	(a) Electronic Fuzes with either impact, delay or impact cum delay settings for Aerial Bombs.  (b) Proximity Fuze for Aerial Bombs.
2.	<b>Brief about the project</b>
	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.	<b>Broad specifications / PSQRs</b>
	(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 $25 \pm 2^{\circ}$ 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.	<b>Tentative quantity to be procured after successful prototype development</b>
	(a) Electronic fuze 3000/Year.  (b) Proximity fuze 100/Year.
5.	<b>Tentative timeline for induction</b>
	(a) Electronic fuze:- Within 2 years  (b) Proximity fuze:- Within 3 years
6.	<b>Any other relevant information</b>
	Nil

**SHQ (Air Force)**

**PROJECT NO. 11**

1.	<b>Name of Potential Project</b>
	Advanced Self Protection Jammer (ASPJ) Pods and Radar Warning Receiver (RWR)
2.	<b>Brief about the project</b>
	MoD, Gol 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.	<b>Broad specifications / PSQRs</b>
	<p><b><u>ASPJ Pods</u></b></p> <p>(a) The ASPJ should be able to perform the intended role in the frequency band between 2 and 18 GHz</p> <p>(b) The pods will be mounted externally on the aircraft on two wing and will have capability of jamming front and rear sectors with <math>\pm 60^\circ</math> on each side.</p> <p>(c) The pods should not impose any limitation on aircraft envelope and should allow carefree flying.</p> <p>(d) The pods will interface with the aircraft through 1553B interface bus for transfer of information to and from the aircraft.</p> <p>(e) The pods should have I level testing facility in IAF operating units and D level facilities at designated BRD</p> <p>(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).</p> <p>(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.</p> <p><b><u>RWR System</u></b></p> <p>(a) The system should be able to operate in frequency range 1-40 GHz</p> <p>(b) System should be able to detect and find direction of illuminating radar of ground based, ship based and airborne systems with different signatures</p> <p>(c) The system should be able to interface with other EW systems on the aircraft</p> <p>(d) System should be able to interface with aircraft avionics with available interface protocol</p> <p>(e) System should be able to measure frequency of the emitter with other parameters like pulse width, PRI, illumination type, operating mode etc.</p> <p>(f) The coarse direction finding accuracy (resolution) of the system should be max <math>10^\circ</math> and fine direction finding accuracy (resolution) should be max <math>2^\circ</math></p> <p>(g) System should detect the signals with probability of 0.9</p>
4.	<b>Tentative quantity to be procured after successful prototype development</b>
	(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.
<b>5.</b>	<b>Tentative timeline for induction</b>
	Year 2021 onwards
<b>6.</b>	<b>Any other relevant information</b>
	(a) A detailed RFI on the subject would be issued shortly.  (b) On successful development of such capability, similar systems can be developed for other platforms in future.