Additional Potential Projects identified by SHQs

S.no.	Name of the Project	Concerned SHQ
1.	Multi target tracking System for 'A' Vehicles	SHQ (Army)
2.	AFV protection and counter measure	
3.	Advanced 30 mm cannon ammunition for BMP	
4.	Electronic fuses for rockets	
5.	Light weight body Armour	
6.	Robotic surveillance Platform	
7.	Individual protection system with inbuilt sensors	
8.	Pre-fragmented programmable proximity fuzed ammunition	
9.	Antenna Alignment System (AAS) for OSA-AK missile system	

PROJECT NO. 1

MULTI TARGET TRACKING SYSTEM (MTTS) FOR TANKS

1. **Proposal**. 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 inazimuth.

€ 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. **Indigenous Capability**. Will be ascertained.

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

PROJECT NO. 2

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

1. **Proposal**. 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 and Cost**. Quantity 1657, Cost – 2485.50 Cr.

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 minimumdist 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. **Indigenous Capability**. Being ascertained.

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

PROJECT NO. 3

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

1. **Proposal**. 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 and Cost**. Nine Lakh rounds/Year @ Rs 10000 - 15000/ rounds.

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. **Indigenous Capability**. Apart from OF, Khamaria, no private industry is currently involved in manufacturing of ammunition for BMP Gun System 2A42.

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

PROJECT NO. 4

INDIGENOUS MANUFACTURE OF FUZES FOR ALL VARIANTS OF PINAKA ROCKETS

1. **Proposal**. 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	ApproxQuantity
(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	Area Denial Munitions (ADM) Type 1,2 & 3 Rockets (Under development)	1620 per year for each type

		(iv) Accuracy - 0.05 (v) Electronic output.		

4. **Indigenous Capability**. It is desired to develop indigenous capability for manufacturing fuses for Pinaka Rockets.

5. **Timeline and Process**.

(a) To achieve redundancy in ammunition sources and self reliance through manufacture by private industry.

(b) Indigenous manufacturing to avoid screw driver/CKD-SKD model.

(c) Selection from amongst Indian private companies only.

PROJECT NO. 5

LIGHT WEIGHT BODY ARMOUR

1. **Proposal**. 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 and Cost**. Quantity and cost will be ascertained shortly.

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.

PROJECT NO. 6

ROBOTICS SURVEILLANCE PLATFORM FOR RASHTRIYA RIFLES

1. **Proposal**. 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 and Cost**. Quantity 544.

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. **Indigenous Capability**. Being ascertained.

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

PROJECT NO. 7

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

1. **Proposal**. 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 and Cost**. Quantity - 59,825.

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. **Indigenous Capability**. Will be ascertained.

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

PROJECT NO. 8

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

1. **Proposal**. 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 and Cost**. Approximately 3,30,000rds over a period of twelve years. Cost will be ascertained during vendor interaction stage.

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 aerialtargets**.**

(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 ofdesired 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**. Theproximity featureshouldbe integrated into themunitionsto enhance hit probability. The miss distance should be minimum and the fuseshould 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 ofthe 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 calibrei.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 Warfareen-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 QF40 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. **Indigenous Capability**. Will be ascertained.

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

PROJECT NO. 9

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

1. **Proposal**. 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 and Cost**. Quantity -05, Cost is not yet ascertained.

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 systemsuitable 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. **Indigenous Capability**. Will be ascertained.

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