

# CENTRE FOR JOINT WARFARE STUDIES



## CENJOWS

### PROCEEDINGS OF SEMINAR ON “FORCE PROTECTION INDIA 2019”

BY

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### INAUGURAL SESSION

1. **Welcome Address: Lt Gen Vinod Bhatia, PVSM, AVSM, SM (Retd), Director, CENJOWS.** In his welcome address Lt Gen Vinod Bhatia, PVSM, AVSM, SM (Retd), Director, CENJOWS welcomed all the delegates in the seminar on behalf of CENJOWS and IMR. He emphasized that we cannot afford to continuously lose rank and file and damage to our installations in the ongoing low intensity conflict and proxy war due to lack of protection. As the challenge's increases, we need to optimally upgrade our protection so that men suffer less casualties. He informed that this seminar gives a platform, so that all stakeholders which include officials, para military forces, industry and academia are on one front. He emphasized that everyone in the services needs protection, be it the soldier deployed in field area, CI ops area, High altitude area or the sailors at sea and air warriors in the sky. Drone threats are emerging threats nowadays for which protection is required. IEDs have always been a threat. He said that force protection requirements can be based on low to medium technology and it has large volumes including requirements from armed forces, CAPFs and state police forces. At the end of the two-day seminar we are looking for some

worthwhile recommendations which can be processed to the decision makers.

2. **Inaugural Address: Lt Gen PJS Pannu, AVSM, VSM, Deputy Chief IDS (Doctrine and Training), HQ Integrated Defense Staff.** In his inaugural address Lt Gen PJS Pannu, AVSM, VSM, Deputy Chief IDS (Doctrine and Training), HQ Integrated Defense Staff emphasized that aim of force protection is to ensure maximum casualties to the enemy and minimize own. However, the present kill ratio of 1:3 (Armed Forces: Terrorists) in Counter insurgency environment is too high and is not acceptable. The General officer gave few examples of operations in 15 Corps Sector where QRT rushing to the operations was ambushed, resulting in collateral damage. Such incident also gets added to the adverse kill ratio. If the forces were enticed to go to a wrong place, it means our surveillance was not good. Similarly, in Pathankot terrorist strike, there were various forces e.g. DSC, NSG, AF guards and Para troopers in direct contact with the insurgents. Everyone was giving a different version of contact, which resulted in high kill ratio. Soldier needs to protect themselves to protect the nation. Casualties of soldier's effect morale of everyone, even of the citizen and nation. In high altitude area if a soldier can't sustain themselves due to weather and adverse health condition, it affects his capability to discharge his duties. The Deputy Chief praised CENJOWS for well conceptualized, pertinent and structured Seminar and he was sanguine that it will bring fruitful discussions.

3. **Keynote Address: Air Mshl RKS Bhadauria, PVSM, AVSM, VM, ADC, Vice Chief of Air staff.** Air Marshal RKS Bhadauria in his Keynote address informed that seminar on this subject was important as force protection is key to all the armed forces. He gave examples of recent incidents where terrorists attacked civilians and forces. Though the forces gave a befitting reply but there have been casualties, as the initiative and surprise were with the terrorists/adversaries. He emphasized, the need for integrated approach by all the stake holders and steps to be taken to minimize attrition and to avoid collateral damage. He said that strategic need of protection should be intelligence driven and should harness technology. He informed that for Indian Air Force, Pathankot was a watershed moment. Though contained, it was eye opener due to kill ratios. Measures to avoid such incidents have been put in place and Air warriors are better trained, equipped and in better position to handle such incident in future. He informed that Air Force is undertaking trials for integrated security systems and perimeter surveillance capability. This system will provide early warning and will reduce dependence on security personnel. The said system will be installed at all the Air Force bases as per priority. Force protection initiatives in, increasing fire power, night fighting capability, bullet

proof vests and infusing technology has been taken. Specialized security training has been given by opening schools where approx. 1200 air warriors have been trained to protect themselves. He further added that Force protection is critical, multidimensional and its demand is increasing. Industry should provide solutions as the non-state actors pick up the technology faster. We need to stay ahead of them. He said that private sector should be on board and we should let it grow as public sector should become integrator.

4. **Special Address: Lt Gen SK Upadhyay, AVSM, SM, VSM, Master General Ordnance.** In his special address the General officer brought out that Security related equipment have become very important in the changing time. Previously even a barbed wire as a security fence was sufficient. The change has taken place after the monopoly of the state over violence has changed. The forces need to keep pace with the technology and maximize value for the money spent. He emphasized that more deliberations are needed while purchasing equipment. He suggested that procedures for purchases should be simplified, there should be stability in purchases as the technology changes overnight. We should look for purchases on ten-year horizon. Industry needs to align themselves with this. If they bring equipment regularly, it will be of no help as the industry needs to allow the technology to be stable. Though the forces can't deny our self the latest, we will prioritize, and the forces deployed in active operations will get the latest. Force protection is manifesting on ground as we are having a long-term perspective. There needs to be more synergy between military and industry. This seminar is an ideal forum for this discussion. We both need to be alive to each other's requirements and constraints.

5. **Industry Perspective by Col KV Kuber, Director Defense & Aerospace, Ernst & Young.** The speaker released EY – IMR Report on Force protection and soldier technology. He said that force protection is about integration of Artificial Intelligence, surveillance, early warning etc. As a continuously evolving segment, force protection is required to adapt to changing scenarios, and thereby needs regular upgradations and routine examinations so that it does not fail in the event of a contingency. The key subject areas for force protection range from border protection to coastal area surveillance and from personal protection to strategic assets. The released report highlighted the key areas which are critical from force protection point of view and therefore require constant monitoring.

## **SESSION 1** **EMERGING TECHNOLOGIES**

6. **Introductory Remarks of Maj Gen Rakesh Kapur, ADG OS (CN&A), Director General Ordnance Services.** The General Officer informed that technology is changing human beings. Every technology has certain positives and in certain areas it is not as good. In logistics, it is seen that sustenance of emerging technologies is susceptible as it is not maintainable. The fine print comes later. Due to high cost, the organizations can't maintain the emerging technologies. Maintenance and sustenance of emerging technologies are suspect as it is taken from foreign countries and still at a progress stage.

7. **K Nagarajan, A1 Fence Products. "Proactive Deterrence and Mitigation of Intrusions Risks."** The speaker gave an overview of his company. He informed that his company is an Indian company with a global presence and has six manufacturing units in India and abroad and provides physical barriers and smart technology solutions. They have fenced more than 800 kms of borders in India and abroad. Their product acts as a physical barrier causing delay and deterrence. They have different types of fence for human/ vehicles and can be provided in single/multilayer. Smart capability includes sensors, radars for human & UAV, cameras, Command and Control, IR & fence lights. They also have various options for offensive actions. The speaker suggested following considerations.

(a) **Effective tendering.** Have effective tendering as retendering costs money and time to users and vendors. Consultative/collaborative approach can avoid pre bid clashes, litigations and re-tendering.

(b) **No Cost No Commitment (NCNC).** The companies are ready to invest in R & D but expect some commitment after the agreed QRs are met. Fund development is norm in many countries which resulted in development of new technology.

8 **Maj Gen Ravi Arora (Retd) Chief Editor, IMR, "Global Trends in Force Protection"**. Maj Gen Ravi Arora spoke on international perspective and Global trends in Force Protection. The speaker discussed following systems:

(a) **Protected Vehicle.** He informed that trend has moved from mine carrying vehicles to high level of mobility and protection to soldiers. The vehicles are being produced with exotic materials to take on bigger blast. He gave examples of Manti's family of tactical armored vehicles and Land Rover based Supacat LRV which are of light weight but well protected.

(b) **Counter Drone System.** He informed that lot of counter drone solutions are coming in market i.e. RF jamming system which disrupt the jamming, Lasers for kinetic kill, infra-red detectors with acoustic algorithms and anti UV detection system.

(c) **CBRN Protection.** Avon protection escape hood. It protects against chemical warfare. He also spoke about breathable suits as under garments.

(d) **Countering IEDs.** He briefed about Rantheous ground eye mounted on top of vehicle and Humanistic Robotics mine roller.

(e) **Unmanned Ground Vehicle.** He said that very few of unmanned ground vehicle are under operation as they are still under development e.g. Themis UGV which is designed for anti-tank role.

(f) **Unmanned Surface Vessels.** Rafael's Protector SSM.

(g) **Perimeter Protection.** The trends in Perimeter protection systems is of detection and defeating before intruder reaches the fence and use of additional cameras to neutralize blind spots. e.g. Radio barrier CGS perimeter security systems.

9 **Shri A K Sharma, Additional Director General (logistics) BSF, "Recent Improvement in Border Fencing"**. The speaker shared ground experiences of border fencing in various phases of fencing. He said that fencing on borders started in 1984. There have been various challenges in various phases and task of erecting fencing on border is still not completed. In last few years BSF has been using technology solutions i.e. surveillance solutions where physical fence cannot be erected as fence only impedes and it is required to be covered by troops. Any crossing through border is recorded, which helps the troops in detection of intruders. The speaker also explained various peculiarities of Indian borders e.g. in Gujrat, the area is near sea, so there are fast winds, due to which deterioration of fence is very fast. The solution for this is use of plastic-coated fence. Similarly, in Rajasthan there is problem of shifting of sand dunes. Efforts have been made to construct high fence but that too couldn't sustain. In Bengal and

Assam there is problem of cutting and climbing of fence by intruders so the fence has been designed where there is no space given for climbing. In Riverine areas, there is problem of erosion of fencing. There have been improvements to tackle these challenges but still more is required to be done. The speaker suggested that academia needs to be got involved as there is need for more research to tackle these challenges. The rate of improvement needs more acceleration. He briefed about Comprehensive Integrated Border Management System (CIBMS) in which all command elements have been integrated in the system. In routine, the patrol party takes action as he deems necessary as the image is made available to all commanders so that they can indulge where necessary. This has improved effectiveness as they can now guide and control. The system includes rows of sensors on ground, detection sensors which detects and relays to confirm sensors. Behind the sensors is data acquisition action which is based on layers of computer networks in data Centre which generates alerts.

## **SESSION-2** **PERIMETER AND ASSET PROTECTION**

10. **Air Vice Mshl Sanjay Bhatnagar, VM, VSM, ACAS Operations (Offensive), Air HQ.** The General Officer chaired the second session and introduced the topic which was essentially focused on the perimeter and asset protection. He emphasized that our projected need for the equipment for perimeter and asset protection must be based on the holistic approach.

11. **Col Ashwini Pundir, Colonel Ordnance Services (Ops & Training), Army HQ. "Protection of Ordnance installations.** The speaker spoke about the role of Ordnance, it's inventory range, pan India presence with its spread of Depots. The range of inventory consist of Armaments, ammunition, Aviation, combat vehicles, Electronic and power equipment, communication equipment, Field Engineering stores, CBRN equipment and MT spares. The officer also covered the details of supply chain from source to field units. The speaker covered the vulnerabilities and threat assessment of various ordnance installations which includes aerial threat, sabotage/subversion, terrorist/suicide attacks, fire hazards and theft. He also gave the various security measures which includes surveillance of area, Perimeter security, access control and specific point protection. The officer covered pre modernization security set up and then covered the first phase of modernization and its road ahead. The officer explained Perimeter intrusion detection system in detail. It is the first line of defense based on detection by thermal cameras integrated with color pan tilt zoom camera for live feed. It has the capability to accurately detect size, velocity and location of intruder.

It gives clear thermal videos 24 hours a day in all season. He also covered Access control systems, communication system to be integrated with Perimeter intrusion detection system and Fire detection and control system.

12. **Air Cmde PK Ghosh, Provost Marshal (Air), Air HQ. “Protection of Air Force Assets”.** The speaker informed that all Air Force stations have fencing/ Perimeter wall and all the guard posts are manned. He said that base security systems have been developed in three phases.

(a) Phase I (1932- 1990) in which security arrangement was against sabotage/theft and was catered by IAF Police, DSC, AF Dogs, Airmen guard and Watchmen etc.

(b) Phase II (1990 – 2000) saw increase in terrorist activity in J & K and other parts of the country. There were random attacks on AF/ Military assets.

(c) Phase III (2000 – 2015 Pre Pathankot attack) Due to increase in terror attacks on air bases, IAF increased 15 Garud Flights and smart electric power fence for few bases in J & K was introduced.

Analysis of Pathankot attack shows that only four terrorists entered the base who were motivated and familiar with the area and caused lot of collateral damage. They were constantly guided and controlled by handlers. Prompt action was taken by the leadership and due to airlifting of NSG we could protect the technical area. As a fallout of this incident, Risk categorization of bases was done. Integrated perimeter security system (IPSS) has been planned for 23 bases. The features and functions of IPSS was explained. There are plans to create base defense force as a first responders to any sub conventional attack. Composite security training courses has been started for the air warriors.

13. **Cdr Himadri Das, JD Naval Ops (Coastal Security & Anti-Piracy) Naval HQ. “Protecting Naval Assets Against Attacks”.** The officer briefed on security zone and threat on naval assets worldwide & in India. He explained about various surveillance mechanism by using coastal radars and National AIS chain. He gave an overview of security of naval assets and NC3I network which has enhanced surveillance. The key measures taken which includes audit and augmentation in security related works. The officer briefed about the water front security which includes Sonar radar etc. In water front security, Navy raised Sagar Prahari Bal consisting of 1000 personnel, additional boat patrols with Coast Guard and conduct of joint training and mock drills. He gave the progress of future projects like smart card and bullet proof vests.

14. **Shri George Eapen, Fenzgard India Pvt Ltd. “Redeployment Fences – A force Multiplier”**. The speaker spoke about the innovative fences and showcased the products of his company. The main features of his fence are that it is light in weight and portable with in house R & D. It is an anti-climb electric fence having no downtime. Flexitenz is redeploy able, powered by solar power and having a life of 20 years. It can be used for Air bases till the permanent solutions is catered. The other product of this company is the offset electric fence which is a coastal fence. He gave various advantages of Fenzgard fences.

15. **Mr Narinder Paul, IG CRPF, “Recent Initiative of Force Protection in CRPF”**.

The speaker informed about the following initiatives taken by the CRPF:

- (a) Body armor head Gear has been recently developed and is light weight from existing 14 kg to 7 kg.
- (b) Protected Mobility. It consists of Armored vehicles and mine protected equipment. It provides protection against threat from bullets and mines. There is requirement of more powerful engine.
- (c) Camp Security. Physical and electric security to guard against intruders.
- (d) Protection against Law and order duties. Safety of troops against stone palters.
- (e) Protection against IED in LW area. Striving for cutting edge technology so that market is not left unexplored.

16. **Shri Anjeesh Kumar, “Laser based Intrusion Detection”**. The speaker briefed about Laser Fencing System (LFS). He explained its main features such as, it is invisible/ virtual fence between laser transmitter and receiver, having range up to 500 meters. It gives two tier security having audio/ visual alarm and video display. It gives event triggered video recording. Approx. 55 LFS have been installed in field. He briefed about multi sensor data fusion He gave the example of future development in Laser fencing which will be based upon their speed. He also briefed about the other system which is Optical target locator. He explained about its concept which is laser-based surveillance system used for protection of VIPs.



### **SESSION-3** **PERSONNEL PROTECTION**

17. **Maj Gen (Dr) GD Bakshi, SM, VSM (Retd), former GOC Romeo CI Force.** The General officer chaired the third session and shared his operational experience in J&K. He informed of an instance when he as Commanding officer got the data of casualties digitized by which he got to know where we were being hit and where we need to protect. He informed that in spite of using BPP/BPJs casualties were occurring. On analyzing the data, it emerged that 40% of bullet hits were in the portion between BPP & BPJ, 9% on legs and 7% on back. By using BPJ in innovative way, casualties were minimized. He emphasized that designing of force protection equipment's has to be innovative. He gave examples of combat vehicles used in Iraq war by US. He said that in next war with Pakistan, no logistics vehicle will be able to move till they are tracked.

18. **Col Amitoz Singh, Infantry Directorate Army HQ, "Protecting the Soldier – Requirements and Challenges"**. The speaker emphasized that soldier have challenges of weather, climate, terrain and mobility for his survivability and protection. He needs to protect himself from observation, anti-mine protection and should have night fighting capability. He explained advancements in technology under Lethality, Ballistic Protection and Night vision technology. He highlighted the requirements and way ahead for equipment which can protect the soldier in operations. The items which have been recently procured and under planning are Ballistic helmet, Ballistic Google, BPJ, Elbow knee Pad, Boot anti mine infantry, modern integrated combat kit. He also gave latest trend in protection material and futuristic projects such as Exo skeleton which increases endurance, easy to carry heavy loads, saves energy for final missions, enhances survivability thereby increasing overall efficiency.

19. **Brig Manu Mehrotra, Deputy Director General CBRN of the Prospective Planning Directorate of the Army HQ.** He spoke on subject of "Preparedness against CBRN threats". He brought out the concept of CBRN protection, Force protection and CBRN defense preparedness. He briefed about the threat environment under nuclear and missile capability, Proliferation and Non state actors. He gave figures of estimated nuclear weapons of all countries and figures of regional threats in nuclear, biological and chemical weapons. He explained that CBRN disasters are unpredictable and covered threats and challenges of CBRN. He speaker briefed about individual protection and collective protection in CBRN environment. He stressed that absolute protection from CBRN attack is

unviable but, pre-emptive measures, equipment and training can limit the extent of the threat. He informed that medical management in CBRN environment is tedious due to heavy rate of causality.

20. **Dr ASB Bhaskar, Scientist F, DRDE, Gwalior. “Preparedness for Chemical & Biological Threats and Responses”**. The speaker informed that chemical/ biological threat can be intentional or unintentional. He gave the range of chemical weapons which are increasing everyday as Novachak agent was used in UK which is not categorized under chemical weapons. He explained threat perception of chemical terrorism and gave example of terrorist group with chemical warfare capability. He informed that biological weapons are potentially far more destructive, hard to trace and more complex due to increasing agents. He briefed about infected doses of biological agents. He gave the core competency of DRDE in detection, protection and decontamination medical countermeasures.

#### **SESSION 4** **RESEARCH AND DEVELOPMENT**

21. **Shri PS Negi, Scientist F, SASE DRDO. “Avalanche protection and recovery”**. The speaker briefed about the avalanche mitigation methods both active and passive. He explained in detail the types of avalanche, its ingredients, size trigger and causes of avalanches. He covered avalanche size e.g. sluff, small, medium and large. He briefed on avalanche formations zone and background such as formation zone, middle zone and run out zone. He explained weather and atmospheric factors contributing to avalanche formation. He gave avalanche accident summary in year 2018-19 in which there were 36 casualties. He gave overview of avalanche mitigation methods, avalanche avoidance and avalanche mitigation engineering solutions.

22. **Dr P Murali Krishna, Scientist F, CAIR, DRDO. “Robots and Unmanned Systems for Force Protection”**. The speaker explained the autonomy of mobile Robots. In semi-autonomous robots he covered Robot sentry its features and test conducted at DRDE like slope test. He explained about the legged Robot which can be used for mine detection. He explained the functioning of four-legged robot, Serpentine robot, wall climbing robot which can give information of the adversary. In Autonomous Navigational CAIR he covered different modules of robots and Intelligent unmanned aerial system.

## **SESSION 5** **COUNTERING IEDs AND DRONE THREATS**

23. **Introductory Remarks by Brig ADS Aujla, SM, VSM, Brigadier Infantry, Directorate General of infantry, Army HQ.** He brought out that countering IED is requires thorough understanding of the activities associated with an IED attack such as terrorist leadership, planning, financing, material procurement, fabrication, target selection, recruiting and execution of attack. Therefore, intelligence and our basic tactics have to be part of an integrated solution. He brought out that our structures, information sharing mechanisms, training, equipping and IED handling protocols have to be designed accordingly.

24. **Lt Col Prashant Bisht, Senior Instructor, EDD, CME, Pune.** **“Concept and application of Counter IED Strategy”.** The officer spoke on concept and application of counter IED strategy. He brought out the threat dynamics and stakeholders at the national level, existing CIED set up and shortcomings, Indian Army counter IED strategy, application of counter IED strategy at tactical level operations. He proposed a concept of national counter IED strategy. He briefed on shortcomings of the present set up such as limited synergy and integration of efforts, incomplete database on IEDs, standalone networks and absence of real time.

25. **Col RJ Singh, Colonel Emerging Technologies, Army Air Defence Directorate.** **“Countering Drone Threats”.** He spoke on new policy by DGCA on Drones, maturing technology, threats and counter measure techniques on drone threats. He brought out the vulnerabilities of drones such as slow speeds, vulnerable sensors/ links and limited situational awareness. The counter measures against drones includes detection by visual radars, passive sensors, defeat options both soft kill and hard kill.

### **VALEDICTORY SESSION**

26. **Valedictory Address: Lt Gen Sanjay Verma, VSM\*\*.** In his Valedictory address the General officer congratulated the speakers and emphasized that we have the capability and if we don't protect the force, then the capability can't be used. The seminar covered the vast areas/spheres of topics on force protection. He said that relevance of this topic from year to year basis was necessary as technology on these issues was changing very fast. It's a smart technology. All the solutions to counter IEDs and drones become irrelevant very fast. All the solutions given by the industry should be modular or be upgraded for procurement. The solutions

should be theatre specific and not central as by the time the item comes on ground it becomes irrelevant. Such seminar makes all the stake holders aware of what's latest in the industry.

27. **Closing Remarks: Lt Gen Vinod Bhatia, PVSM, AVSM, SM (Retd), Director, CENJOWS.** In his closing remarks he thanked the industry, reps from services, CAPFs, other professionals and the sponsors for their contribution for the successful deliberations of the two-day seminar on force protection. He also impressed upon the industry and the users to work together to improve the security of the nation. The security solutions evolved should be as per need and context of the nation. The overall aim should be to cut down own casualties and maximize cost to the adversary.

### **TAKEAWAYS OF THE SEMINAR**

28. The seminar threw up several takeaways, which needs to be pursued by all concerned to address the urgent requirement of force protection by all the security agencies. These are discussed in the succeeding paragraphs.

29. **Threat Analysis.** The threat to the national security both internal and external was well appreciated and understood by all concerned in the seminar. The IS situation in J & K is undergoing a serious turmoil post Pulwama attacks, necessitating involvement of various state and central security forces in different roles. Force protection to our soldiers whether for cross- border firing, Counter Insurgency operations, stone pelting and crowd control is the urgent requirement. LWE conflict in Maoist infected areas is taking a dangerous shape where the CAPFs are suffering casualties due to IED attacks, which need attention by all stake holders.

30. **Need for Force Protection.** The aim of the seminar was very clearly laid out by the Deputy Chief IDS (Doctrine and Training) in his opening remarks i.e. to minimize own casualties and to cause maximum damage to the adversary. Having understood the threat analysis both current and emerging, a clear need emerged to equip the security forces on priority. The provision of right force protection also has direct impact on morale of the security forces ensuring success in various operations.

31. **Force Protection Requirements.** Representatives of armed forces, CAPF and other security forces laid down their requirements of force protection ranging from personnel, equipment, vehicle, camp/garrison, Air Assets, Air Bases and Naval Ships. The requirement of force protection is absolute critical however the high technological solutions being very expensive is not affordable. Industry was urged to develop indigenous and

affordable solutions under 'Make in India' initiative of the Govt. This was well received by the industry who presented various solutions and innovative options.

32. **Current Status.** The security forces are far short of their force protection equipment/measures. The industry (especially private players) is skeptical of the procedural delays and firm commitments from the users whereas output of Defense PSUs is far behind the requirements/expectations. Further the GSQR of equipments not matching the fast changing/evolving technology outpacing the procurement timelines.

33. **Recommendations.**

(a) **GSQR.** The Security Forces need to look ahead and define the GSQRs of various force protection items in collaboration with the industry. The industry needs to take care of full life - cycle of the items to include R & D, design, trials, testing and certification from laboratories, production, maintenance, upgrades and redevelopment.

(b) **Force Protection, Capability and Constraints.** There is a dilemma between force protection, capability and constraints in terms of higher cost, efficiency and mobility of soldier. The military leadership and industry need to analyze how we can bridge the gap between force protection capability, constraint and cost. The Force Protection equipment needs to be made cost effective to make it affordable. It will increase the domestic and global demand as Indian Forces are in continuous state of operations and are engaged with foreign armies in joint exercises. Indian soldiers using latest equipments will open new markets for the industry.

(c) **Force Protection in all Operations of War.** The force protection is more focused on low intensity conflict as compared to conventional/hybrid warfare. We need to equip with force protection equipments for across the spectrum of operations.

(d) **Requirement based on Holistic Approach.** Our projected need for the equipment for personal protection must be based on the holistic approach. It must be appropriate to the task, firepower needed, the operating terrain and the prevailing weather. Mismatch could affect mobility and fighting potential of the soldier.

(e) **Protection to Infantry Soldier.** Currently, an infantry soldier carries more than 10kg of weight. Efforts are needed to reduce it with a new light weight harder compounds /light body armor. R&D in the new

technologies such as Nano technology and artificial intelligence should be exploited to provide answer to the challenges faced by the soldiers. The industry should look into how to protect the soldiers without compromising the agility.

(f) **Force Protection in High Altitude Area.** There is a need for incorporation of emerging technologies in items like fire retardant material, improved shelters, lightweight thermal clothing and safer heating devices. Industry should indigenously manufacture state of the art clothing, equipment and shelters to cater for Protection of personals deployed in high altitude area.

(g) **Force Protection in Counter Insurgency Areas.** For forces operating in Counter Insurgency areas, protection measures like long-range acoustic devices, long range immobilizers, full body armor and mini drones for reconnaissance be procured. AI-based facial recognition should be deployed in such areas.

(h) **Camp Protection in CI Areas.** Intelligent perimeter security system having cameras, radar, IR sensors and physical means of detecting intruders should be used for perimeter surveillance and camp protection in such areas.

(j) **Mine Protection Vehicles for IED Threats.** Mine Protection Vehicles should facilitate vehicle-based road opening operations, transportation of small teams, casualty evacuation and should be capable of being used as escort vehicle to clear IED.

(k) **Counter IED Strategy.** Need to introduce and equip units operating in counter insurgency operations with Laser cum Seismic System for analyzing the type of IEDs and adopt a concept of national counter IED strategy.

(l) **Perimeter/Border Fence.** Border/Perimeter fence should be mounted with short range radar, should have tunnelling detection, strong and uncheckable wireless network, tactical ground surveillance kit, advance warning video cameras, use of thermal imaging which is stable under all conditions and does not raise false alarms etc. It should have end to end integrated Perimeter intrusion detection solution.

(m) **CBRN Protection.** Security Forces need to equip with new trends on NBC suits for CBRN protection. Chemical and biological threats are highly toxic and protection is difficult as very small quantity

is sufficient to cause the damage. For such threat's education is most important to avoid its worst affects.

(n) **Unmanned Ariel Systems (UAS).** UAS should be procured and deployed in counter insurgency areas /Areas affected with LWE for early warning and tracking of terrorists. It can also be used for disaster management.

(o) **User Industry Interface.** For development and provision of a good security solution/ Force protection equipment's, continuous cooperation and interaction should take place between user and industry right from inception, formalization of GSQR, production and introduction of equipment.

(p) **Innovation and Exploitation of Technology.** Industry needs to be innovative to incorporate dynamic challenges and ever-changing requirements of force protection and exploit technology to provide cost-effective state of art force protection measures and solutions for protection of the personals, equipment and logistics.

(q) **Govt Initiatives.** The "Make in India" program wherein the government has taken a number of positive initiatives including sanctioning of strategic partnerships of domestic industrial houses with foreign manufacturers for having joint ventures (JVs) with transfer of technology (ToTs). Introduction of new, transparent and efficient defense procurement procedure is likely to improve long procedural delays. The monopoly of OFB and defense PSUs is under scanner and provision of level playing field to all domestic and foreign vendors is encouraging step by the government. The industry to take note and use the opportunity not only for provision of better and competitive equipment to security forces but also make nation self-reliant in a long term.

(r) **Integrated Approach by all stake holders.** There is need for integrated approach by all the stake holders and steps to be taken to minimize attrition and to avoid collateral damage. The strategic need of protection should be intelligence driven and should harness technology.

(s) **Procurement Procedures.** The procedures for purchases should be simplified, there should be stability in purchases as the technology changes overnight. We should look for purchases on ten-year horizon. Industry needs to align themselves with this. If they bring

equipment regularly, it will be of no help as the industry needs to allow the technology to be stable.

(t) **Effective tendering**. Have effective tendering as retendering costs money and time to users and vendors. Consultative/ collaborative approach can avoid pre bid clashes, litigations and re-tendering.

34. **Way Forward**. The seminar provided the opportunity to the users from security services, the industry and all other stake holders to understand the threat scenario, current status, requirement and provision of right solution at an optimum cost. The demand of force protection equipment is huge in volumes and with positive initiatives of the government it is the right opportunity for the domestic industry to develop, grow and deliver competitively. The seminar provided the stake holders a platform to interact more in future for development of various force protection solutions. The seminar coordinated and conducted by CENJOWS with support of IMR shall go a long way in exploiting the technology in provisioning of critical solutions for the security forces and also help the Nation to be self-reliant.