

PROCEEDINGS OF SEMINAR ON
“INTEGRATED AIR & MISSILE DEFENCE”

30 MAY 2018

1. A seminar on 'Integrated Air and Missile Defence' (IAMD) was held at the DRDO Auditorium, New Delhi on 30 May 2018. It was organised by Centre for Joint Warfare Studies (CENJOWS) and South Asia Defence & Strategic Review (Defstrat) and brought together leading representatives of the military, R&D, think tanks and the industry onto a single platform to share, information, knowledge and perceptions. The seminar focused on Capability Development for the Indian Defence Services to develop a formidable Integrated Air and Missile Defence capability against current and futuristic air threats, as also Capability Sustainment to include upgrading/sustaining legacy systems.

OPENING & KEYNOTE SESSION

2. **Chairman's Address.** Lt Gen Vinod Bhatia, PVSM, AVSM, SM (Retd), Director CENJOWS stated that AD is a critical component of both war prevention and war fighting, especially in the current environment where real time credible threats exist. On one hand we have Pakistan waging a proxy war and on the other we have China, which is a potential flash point as periodic transgressions and disagreements take place on the Indo-China border and LAC. As air power will play an important role in future wars, it is imperative that the voids in our present inventory of AD missiles and radars are urgently addressed. The seminar will focus on future technology and capacity enhancement and the aim is to provide a platform to all stake holders to discuss the strengths, opportunities and concerns in the AD domain and suggest implementable solutions for critical AD issues.

3. **Opening Address.** The VCAS, Air Marshal SB Deo, PVSM, AVSM, VM, VSM, ADC, spoke on the subject 'Evolving a Strategy for Capability Development and Self Reliance in Air Defence.' He stated that there are three key issues pertaining to capability development and indigenisation. First, there should be no more procrastination; this besides other reasons also happens because we want to reinvent the wheel, which is certainly not the right way forward. Second, poor engineering is delaying programmes, to obviate issues on this account we must ensure proper quality controls and third, there are avoidable problems on account of poor domain knowledge; to obviate this there is a need for the services to continually interact with DRDO and the Industry. This would ensure that all stake holders are on the same page. He further added that the Industry should be very excited about IDDM Make-II. It is a very simple procedure, and the industry should take advantage of this and offer equipment which the Services would then be obliged to try out and buy, if the equipment meets the specified requirements. He also said that we have the requisite expertise available in India. The industry must take advantage of this as the costs in India are low. We have seekers and warheads available, all that needs to be done is engineering and integration.

4. **Special Address.** Mr U Raja Babu, Outstanding Scientist and Programme Director, Ballistic Missiles, DRDO, spoke about 'India's Ballistic Missile Defence (BMD) Programme: Implementing New Technologies to compliment current Air Defence capabilities.' He said that trends are changing from BMD, due to high costs towards IAMD. The present operational environment poses different type of threats from ballistic missiles, cruise missiles, manned and unmanned aircraft and rockets and artillery. Air and Ballistic missiles are two separate missions as they have different characteristics of dealing with threats from different ranges and heights. IAMD enables to coordinate and efficiently utilise available resources to maximise air defence, even though systems engineering poses some challenges.

5. **Keynote Address.** Lt Gen AP Singh, DG AAD at the Army Headquarters spoke on the subject 'Army Air Defence: At the Threshold of Modernisation.' Stating that the modernisation of Army AD has been long overdue, he informed that we stand now at the threshold of the fructification of acquisition programmes initiated in the last ten years. The canvas of air threats has considerably widened in the large ten years to include fifth-generation aircraft as well as UAVs. In tactical battle areas, 60% of the threats in future would be from UAVs. Therefore, there will be an enhanced role for ground-based AD systems to defend assets in TBA. As Procurement initiatives of the last ten years fructify in the near future, we will have adequate AD in the TBA. Radars which can look 360 degrees are being put in place. Upgradations and improvements are being planned in guns and sighting systems and this will make the related equipment last for another five to six years. As far as sustainment is concerned refurbishment of missiles has been a problem as in addition power-packs and gun ammunition also needs to be taken care of and we solicit the support of the industry in this regard. As far as the wish list is concerned we have to focus on hard kill options. There is tremendous scope for artificial intelligence in Air Defence and our future systems must incorporate the same wherever feasible.

6. **Address by Industry Representative.** Mr Jagdish Chand, GM Missile Systems, BEL, spoke on 'Augmenting the Effectiveness of the India's AD Capability.' He brought out that BEL has been providing support to the Indian Army in radars, weapon systems, C4I systems, missile electronics and RF seekers.

SESSION 1

EMERGING AERIAL THREATS AND COUNTERMEASURES: FUTURE TECHNOLOGIES

7. **Emerging Gun Technologies.** Mr SM Shivkumar, VP Defence, Bharat Forge, informed the house regarding the history and basics of air defence. He emphasised on the need for a multi-layered air defence for asymmetric targets. The future trends are focussed on development of FCS and ammunition. He said that some futuristic AD guns which are under development are Directed Energy Weapons, High Power Microwave, Laser, etc.

8. **Active Phased Array Radars.** Mr Anders Wadsten, SAAB, gave the historical perspective and development of radars. He gave the concepts, technical possibilities, Op needs, effect on target and benefits of phased array radars. The solutions provided by SAAB and some of their AD radars were also showcased.

9. **Air and Missile Defence Including ISR.** Mr Saurabh Kumar, Product Manager, Hexagon, briefed regarding their LUCIAD technology which provides real time software solutions for air defence. LUCIAD provides precise and direct connection to any data source enhances performance and provides one coherent platform for all geo-temporal data. This technology for missile defence is superior to any static GIS system.

10. **AD Missile Technologies : Evolution of MANPADS Systems.** Dr Bo Almquist, SAAB, briefed about the evolution of Man Portable Air Defence System (MANPADS). He gave examples of how MANPADS has been used worldwide, including prevention of terror attacks during the London Olympics.

11. **Evolution of Radars and BEL's Role in Indigenisation.** Smt P Balachandran, AGM D&E, BEL, informed about the sustenance being provided for existing radars like INDRA II, Flycatcher, Reporter, etc. She also told about the new radars like Rohini, Revathi, 3DTCR, Aslesha, etc which are under development at BEL.

SESSION 2

CAPABILITY SUSTAINMENT AND SELF RELIANCE IN AIR DEFENCE

12. **Adding New Capabilities to Existing Legacy Systems.** AVM J Chalapati, VSM, PD, Dte of Armament and Safety Equipment, IAF, emphasised the importance of proper management of our system. He said that upgrades are a low cost option as the basic system remains the same and new sub systems added which greatly enhance capability. He then brought out the advantages of an air based platform in AD role. He informed as to how upgrades had improved performance of MIG 21-Bison, Mirage 2000, MIG 21 and Darin III aircraft. These upgrades enhanced life of these aircraft, helped in better obsolescence management, increased weapon accuracy and ranges, increased surveillance ranges, enhanced volume of air space controlled in air defence and enhanced EW protection.

13. **Capability Sustainment : Obsolescence Management of AAD Systems.** Brig V Sharma, DDG (Equipment), AAD, defined obsolescence and emphasised on concepts which affect our equipment management. He enunciated how risk can be mitigated by managing obsolescence. He informed regarding the challenges facing the army and informed the industry regarding the equipment which needs to be refurbished with the help of industry.

14. Questions & Answers

Q1. If radars are destroyed in war, what is the alternate surveillance arrangement?

Ans. Redeployment and employment of reserve radars is resorted to in such a scenario.

Q2. How much of core technology information regarding MANPADS has been given by SAAB to Bharat Forge?

Ans. About 30%

Q3. How will radar technology tackle hypersonic weapons?

Ans. Radars need to be adapted to track high speed projectiles. More radars need to be deployed to get an accurate fix on a high speed target.

Q4. Why are radars required when ISRO is giving satellite surveillance?

Ans. ISRO satellites only provide surveillance and cannot track continuously as done by radars.

Q5. Is IFF system incorporated in radars?

Ans. SAAB has IFF integrated in all its systems.

15. **Panel Discussion.** The panel discussion on “Capability Development and Self Reliance in Critical Technologies for Air Defence and Sustaining Legacy Systems” was chaired by Maj Gen Subodh Kumar, ADG, AAD. The following points emerged from the discussion :-

(a) Dte of Indigenisation is mandated to indigenise foreign made parts. Now it is also taking up assemblies and sub-assemblies. The perspective plan for indigenisation of BMP, Arty Met System, etc has been made. Spare parts of Tangushka, Strella 10M and Kvadrat AD systems have been identified for indigenisation.

(b) IN has invested heavily in indigenisation and integration with industry e.g. in ship building ventures. The requirement of indigenisation often arises when the OEM closes down. However industry must provide solutions to armed forces requirements within an acceptable time frame, otherwise the requirement itself becomes obsolete.

(c) To inform the industry about indigenisation requirements each service has its own web portal with specifications of parts requiring indigenisation. The industry must look at these portals to identify requirements.

(d) Requirement to manufacture ammunition in India was projected during the Ammo India 2018 Seminar. At present 11 contracts, for a period of 10 years, for ammunition manufacture has been contracted. Industry must come forward to invest in manufacture of ammunition.