

Proceedings of Seminar on “C4ISR”

SESSION 1

OPENING AND KEYNOTE SESSION

- 1. Welcome Address by Lt Gen Vinod Bhatia, PVSM, AVSM, SM (Retd), Director CENJOWS.** Lt Gen Vinod Bhatia welcomed everyone present. He highlighted the importance of the topic in today’s scenario especially for the Indian Defence forces. He emphasized that the Indian defence Forces are the most battle hardened in the world and stressed the need for a common platform for the joint services. He thanked the COAS for sparing his valuable time for being here and requested him to deliver the special address.
- 2. Special Address by Gen Bipin Rawat, UYSM, AVSM, YSM, SM, ADC, Chief of the Army Staff.** The COAS welcomed the galaxy of strategic thinkers, academia, Industry and the representatives of the Central Armed Police Force for attending the seminar. He emphasized that the ISR and C4 verticals need to be integrated. The future battlefield will be complex and all the systems of the adversary can be neutralized only by an integrated joint services approach. Battlefield transparency is important which can only be done by C4ISR approach. He emphasized the importance of secure network with huge capacities to carry the data to the battlefield in real time. The threat of Hybrid Warfare, Sub conventional warfare and cyber warfare will continue to bother us. He stressed the need for interoperability amongst systems to ensure proper integration. He said that technology can only us to take quicker and pragmatic decisions and ultimately your own ability will lead to success.
- 3. Inaugral Address by Lt Gen Subroto Saha, PVSM, UYSM, YSM, VSM***, DCOAS (P&S).** Lt Gen Subroto Saha complimented CENJOWS for picking up a relevant topic. He gave examples of incidents in Kashmir the outcome of which would have been different in case technology was available for joining all the dots of the historical data. He stressed the need for a ISR solution tailor made for the Indian Defence. There is a requirement of right information to be provided to intelligence and operations personnel. He emphasized that we cannot overcome the biases of experience without Big Data Analytics as our thought process is outdated. The Indian Army is on a massive outreach program with the industry and the academia. Phd and undergraduate scholars are now going on ground to understand the problem statement and provide pragmatic solutions.
- 4. Keynote Adress by Lt Gen AB Shivane, PVSM, AVSM, VSM, DGMF.** Lt Gen AB Shivane informed that a study has ben constituted to understanding the ISR requirements of the Indian Army. Info superiority is the key to success in battlefield. In future wars the challenge will be of information overload and clutter created by self and the enemy. The future battle space will be characterized by situational awareness, joint force application and rapid and precision fires. There is a requirement to prioritise that the ISR capabilities be generated by the Indian Industry under the Make in India initiative of the Prime Minister.ISR is a general staff function which is command led and staff executed. There is a need to shun our rigid approach so that ISR requirements are developed

synergistically. The heart of ISR is pervasive and persistent communication and a need to shift from platform centric to network centric approach.

5. Exploring Indigeneous Solutions for Comprehensive ISR support to Indian Armed Forces by Mr MV Gowtama, CMD BEL. Mr Gowtama said that the defence preparedness of a country is measured by the ISR capability of a country. Indian industry has acquired prominence in the global world in this field and our capability is at par with advanced nations. The deployment of airborne assets has not happened in a big way and Indian industry needs to address this issue on priority. There is a lack of joint communication infrastructure as well as national data standards for sharing of data. While there is no problem of bandwidth in the future but interoperability needs to be addressed in the beginning. The GIS solutions need to be tailor-made for our needs.

6. Private Sector in Support of ISR by Lt Gen KT Parnaik (Retd), Jt MD, ROLTA India. He informed the audience that ISR, BMS, Tactical Communication are gaining top priority and are being pursued vigorously by the Indian industry. The DPP 2016 has sent a clear message to the industry. Digital India will also facilitate a Digital Army. ISR will ensure information sharing, speed of command and control and enhance mission effectiveness. The Indian industry is really gearing up to understand and deliver the ISR requirement of the Indian Armed Forces and the foreign industries will gradually fade out. ISR is the first step towards net ce

SESSION 2

ISR IN THE INDIAN CONTEXT: TECHNOLOGIES AND INTEGRATION

7. Opening Remarks by Chairman. Lt Gen JP Singh, PVSM, AVSM (Retd), Sr Advisor DRDO, brought out that for ISR to be relevant it needs to provide info in real time otherwise it may not be of much value. The ISR system must be able to merge with existing systems to provide complete and seamless coverage of the TBA. With 'Make in India' it is a great opportunity for industry to develop technology in this field, which will cater for the future surveillance requirements of the country's armed forces.

8. Communication Architecture Towards Realisation of C4ISR in the Information Age. Lt Gen R Sabharwal, Comdt MCTE, informed the house that the existing architecture for ISR was inadequate to meet current challenges. He suggested a model for futuristic intelligence requirements. He stressed that the info grid must be dynamic with the right amount of overlap between Sensor, Command and Shooter grids. He highlighted the requirement of inter operability between sensors and shooters of different comds/fmns. He also brought out that in the next few years there would be a huge scope in this field and industry must make full use of this opportunity.

9. US Army's Modernisation in Support of an Enhanced Intelligence Enterprise. Maj Gen Charles A Flynn, Dy Commanding General, USARPAC, gave a perspective into the US Army's intelligence and surveillance techniques. He said that as far as ISR is concerned, the US Army considers information as ammunition, band width as logistic chain, and hardware/processes as the weapon. He gave an insight as to how the US intends to evolve the existing intelligence set up, which is already a contemporary system, into a completely integrated system which will give real time info to commanders at all levels. He stressed on the importance of having a solid architecture, leveraging technology and Big Data Analytics to obtain reliable and timely intelligence.

10. Industry Perspective. Views of the industry were brought out by their representatives. Lt Gen M Petre (Retd), MBDA, showcased new ISR technologies and networked firing in the TBA. Mr A Pryor, Rockwell Collins, gave a system integrator's perspective on persistent surveillance inland operations. Cmde Jagadish Anand (Retd), SAAB, informed the house regarding integration of technologies of sensors, platforms and communications so as to give a real time picture of the battlefield. The industry representatives also showcased some of their products.

SESSION 3

OPERATIONAL DATA ARCHITECTURE FOR C4ISR SYSTEMS

11. Opening Remarks by Chairman. Lt Gen R Sabharwal, Comdt MCTE, said that in today's battlefield all entities should be made knowledgeable/smart and need to be able to generate and process data in real time. This will greatly enhance our battle field potential in future.

12. Land Environment ISR – Enabling Challenges and Concepts. Lt Col G Evans, SO 1, ISR, UK Army, brought out certain 'real world' considerations regarding ISR. He said that the timely and effective exploitation of data and info was non negotiable today. He highlighted that the future operational environment would be congested, cluttered, contested, constrained and connected at various degrees of isolation and all actors need to keep pace with technological changes to stay relevant. He delved into the organizational impacts of this in terms of band width management, processing power, end to end ISR, maximizing people, skills and interoperability in design. The staff should be able to locate, capture and record data accurately without information overload. Information is an essential service and the development of personnel, doctrines, infrastructure, training and integration is imperative.

13. Enhancing Aerial ISR Capabilities to Deter and Defeat Global Threats in Joint Warfare. Wg Cdr A Tyagi, IAF, brought out the differences between open source and commercial imagery and highlighted the superiority of electronics, computation, processes and integration of commercial imagery. He stressed on the need to have partnerships countries which have cutting edge technology. He informed the house that resolutions upto 0.5 metres have been achieved in the combat zone and this is the new normal now. For disaster management accurate and credible information is now available by programming satellites to fly over the area of interest at short notice. Since there will be around 30 Billion network devices by the year 2020, preliminary automated analysis will be a necessity to avoid information overload. He informed the house that the Govt has already brought out the National Geo Spatial Policy to empower people through technology. He concluded by giving an update on the advancements in small satellites and AWACS and stressed that commanders need an optimal mix of futuristic sensors including small satellites operating as a constellation.

14. Integration of ISR Assets with the Intelligence Analyst for Rapid Response Targeting. Mr E Wasson, Lockheed Martin, informed the house regarding the features of their software 'Stratus Rising' which enables precision targeting and comprehensive analysis even by low cost tactical ISR assets.

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SESSION 4

GIS AND SMART TECHNOLOGIES IN AID OF ISR NETWORK

15. **Opening Remarks by Chairman.** Lt Gen VK Khandare, DGDIA welcomed all the panelists and emphasized the need for a robust ISR architecture to ensure fast dissemination of inputs. He also recommended that persons who have the power to take decisions in this field should also be called for the seminar so that it can facilitate them to take decisions.

16. **Enhancing ISR Capabilities to Obtain Real Time Information in a Networked Battlefield , Digital Army and Lessons Learnt by Lt Col Guy Tzaidi, Israel Army.** Lt Col Guy Tzaidi gave an overview of the Israel Army Digital Army Program. He explained the operational challenges and gave out the major system components as well as the DAP roadmap. He also explained the application architecture of the DAP and the Jointness capability development program of the Israel army. He explained how jointness had led to collaboration by using tailored information, a simple network, Flexibility, data extraction and fusion and providing information to the edge of the battlefield.

17. **Next Generation Technologies for Enhanced Operational Efficiency by Mr Ashwani Mehra, Associate Director, ROLTA India.** Mr Ashwani Mehra spelt out the emerging ISR challenges as Volume, velocity, Variety and Veracity. He explained in detail the next generation ISR solution offered by ROLTA India and gave out Dynamic features, Dynamic visualization, Advance Imaging and Data Collection, Rapid Change Monitoring, Military Symbology and Operational Planning features of the ROLTA solution.

18. **Integrated Security for Coastal and Island Territories by Commodore Dalbir S Gujral of the Indian Navy.** Cmde Gujral , IN, explained in detail about the present maritime environment in the Indian Ocean. He highlighted the maritime neighbourhood, Maritime Threats, Surveillance at Sea by aerial means, surface and sub surface means. He went to state the challenges and suggested a way ahead by employment of decision support systems based on fused intelligence and Big Data analytics, common adherence to common standards and protocols for effective networked joint ISR solutions and employment of encryption techniques in conjunctions with other network security solutions.

19. **Integrated Border Solutions by Mr Muralidharan, CTO, Tata Power SED.** Mr Muralidharan gave out the details of that TATA Power SED's Core C4I program. He explained that the Battlefield Management System is a C4ISR system and gave out the linkages between the sensors, Humint, Geoint and data fusion, decision support system and the long term analytics. He also explained the JDL data fusion Model and related it to the JDL Border Management Perspective. He also gave out the Cognitive refinement in which seeks to improve the interaction between a fusion system and the analysts. He also explained the development process of the Core C4I system starting from architecture, design, implementation and testing.

SESSION 5

ISR STRATEGY FOR THE INDIAN ARMY

20. **Opening Remarks by Chairman.** Lt Gen PS Mehta, AVSM, VSM, DCIDS (DOT), HQ IDS appreciated the Israeli Model of implementation of the Digital Army Program which has been done in a practical and lucid way. He said that first and foremost we need to work towards formulation of a comprehensive joint services doctrine laying down the roadmap for integration of all agencies in ISR. He said we need to move from threat based to capability based ISR grid and a network which is mission oriented.

21. **Brig Yash Mor, Indian Army.** He highlighted the challenges and informed about the ongoing study of ISR in the Indian Army. He said that the aim is to optimize our present assets and move towards a more proactive digital army. He highlighted that our challenges are different from those of the western countries and hence we need tailor-made solutions for our army. There is a need for theatre specific simple solutions.

22. **Lt Col Gerant Evans, UK Army.** He highlighted the need for a clear insight into the gap analysis. He proposed for a system of systems approach with a multilayered network. He also highlighted the need for implementation in realistic time frames.

23. **Mr Rahul Chaudhary, CEO , Tata SED.** He highlighted the seriousness of the security threat in the present environment. He said that allowing only DPSUs for bidding in the ISR projects will be detrimental for obtaining advanced technologies. He stressed on the need for a comprehensive policy so that the industry is clear of the requirement and accordingly build it into their plans.

24. **Maj Gen Charles A Flynn, US Army.** The General stressed on the fact that technology enables people and not vice versa. He highlighted the importance of leadership and management of the surveillance system, quick processing of raw data, exploitation/ dissemination of information and training of personnel.

25. **Col A Bhaskar, Indian Army.** The officer brought out that the essential requirement of ISR is a good surveillance system. A well packaged ISR can remove boundaries between user and analyser of information. Personnel need to be trained to provide data in a usable format to avoid processing delays. Accuracy and validity analysis of data is required. Security of data needs to be in built into the system in a manner that the maintenance agency cannot access sensitive information during repairs. Leaders should ensure training of user 'on the job' and through emphasis on self learning.

26. **Lt Col Guy Tzaidi, Israel Army.** The officer gave a brief insight into the Israeli concept of ISR. He said that Israel has an established system now which incorporates armed forces and industry from the inception stage itself which negates the requirements of changes of specifications at a later stage. All systems are integrated and interconnected.

27. **Mr Andrew Pryor, Rockwell Collins.** The speaker stressed on the need to raise the level of involvement in development of ISR systems to the national level to avoid piecemeal solutions. The flow needs to be top down i.e formulation of doctrine to road map to requirements of conduct of operations to specifications. In absence of this, industry will innovate but will not be focused towards specific requirement. Product support capability and logistical support should also be catered for simultaneously.

28. Closing Remarks by Lt Gen AB Shivane, PVSM, AVSM, VSM , DGMF. Lt Gen AB Shivane, DGMF thanked all the participants for a professionally stimulating seminar which was comprehensive in nature. He complemented the organizers for selection of topic and the speakers. He highlighted that the key importance of time in warfare, space can be bought, however time cannot be bought. He said that approach of ISR has to be a balance of top down and bottom up. He stressed the need for People oriented technologies having pragmatic and progressive solutions and the need for an Empowered committee for oversight. There is a requirement of Problem centric solution and the Private Industry will play a major role in the development of an ISR solution. In the end he said that our end state is to fight to win minimum time and with minimum casualties. He once again thanked the organizers for an excellently organized seminar which met all its laid down objectives.