

**CENTRE FOR LAND WARFARE STUDIES (CLAWS)**  
**ARMY AVIATION: THE ARM OF THE FUTURE**

**13 SEP 2011**  
**SEMINAR REPORT**

**General**

The Centre for Land Warfare Studies (CLAWS) and Army Aviation Directorate organised a joint seminar on 'Army Aviation: The Arm of the Future' on 13 Sep 2011 at the Manekshaw Centre. The seminar organised on the occasion of the Silver Jubilee celebrations of Army Aviation Corps was attended by serving officers from the three services and veteran officers.

**Inaugural Session**

**Welcome Remarks: Brig Gurmeet Kanwal (Retd), Director, CLAWS**

Future wars in the Indian Sub-Continent will most likely be limited border wars. Manoeuvre will be extremely limited due to constraints imposed by terrain in the mountains and nuclear-red lines in the plains. When manoeuvre is extremely limited, In order to achieve military objective one has to go to the other side of the manoeuvre coin, that is firepower. Therefore there will be a great demand for firepower both from fighter aircrafts and attack helicopters. The need for closer-integration between the three services and manoeuvre in the third dimension has been highlighted. A road-map for future employment of Army Aviation will be drawn at the end of the seminar.

**Opening address: Lt Gen Vijay Kumar Ahluwalia AVSM\*\*, YSM, VSM, GOC- in- C Central Command, and Colonel Commandant of the Army Aviation Corps.**

Lt Gen VK Ahluwalia felicitated the Corps on its Silver Jubilee stating that despite being the youngest corps, The Army Aviation Corps has distinguished itself in all tasks. Army Aviation has come a long way since 1947 when it had just one Air OP unit. 01 Nov 1986 was a historic and momentous day in the history of army aviation when the Army Aviation Corps was raised. It is very important to deliberate on the Operational philosophy and future force structure of Army Aviation.

The training proficiency and operational performance of Army Aviation has been remarkable. It has performed all its tasks with a great amount of operational elan'. It has performed exceedingly well in the wars of 1962, 1965 and 1971. In 1984 army helicopters played a crucial role in Op Meghdoot and continue to perform a sterling role there. Army Aviation pilots also conducted vital operations during Op Pawan in Sri Lanka. It supports all ongoing operations in the Northern and Eastern Theatres. Its crowning glory was in Op Vijay in 1999 where the Corps carried out 2500 missions and notched up 2700 hrs of operational flying. Army helicopters evacuated 900 casualties from temporary and makeshift helipads during the war. Army Aviation's contribution in Somalia in 1993 and Congo for the past six years has been positive.

The future contours of conflict are likely to involve all dimensions of land, air, sea, space and cyber space. The aim would be to bring about strategic dislocation of the enemy forces and cause psychological paralysis of its decision makers. Operations of the future would be short, swift and intense with long periods of stabilisation operations. Army Aviation plays a pivotal role in providing the theatre commander the ability to look deep and strike deeper.

Surprise, manoeuvre and information superiority are the vital factors required for a winning combination. Army Aviation possesses all these capabilities. While it is important to say that we must re-structure and re-organise ourselves it is equally important to have a look at the organisational structures of foreign armies. We must not template their model but it would be good to take back certain lessons from Iraq and Afghanistan.

The Relevance of army aviation today is far more important. In future conflicts, certain fleets must have multi-role helicopters. It would be more prudent to have a few multi-role aircrafts which are more cost effective. There is a need to carry out a capability- based threat assessment in our scenario.

### **Inaugural Address: Gen V K Singh, PVSM, AVSM, YSM, ADC, COAS**

The Army Chief congratulated Army Aviation on completing 25 glorious years of operational flying. He complimented both the Centre for Land Warfare Studies (CLAWS) and Army Aviation Corps for organising the joint seminar and he hoped that the deliberations would be very fruitful to the Army fraternity and for defence strategists as well. The seminar will go a long way in dwelling upon the capabilities and possibilities of the arm of the future.

In these 25 years that have followed, the Corps has acquitted itself well in both operations and demands of peace time. The role of the army is to safeguard the country from external threats and quelling any internal disorder. However it is the capability and strength of the army which provides the nation the platform to pursue its core interests. Army aviation plays a vital role as one of the important ingredient of the army. Today's threats are transcending from network centric warfare to challenges posed by fourth and fifth generation warfare. The traditional boundaries are getting blurred. The future battles would be fluid and non-linear with a high tempo of operations. Therefore, success would lie in following a combined arms concept and achieving success at the desired point. A closer integration between the land forces and air assets has to be achieved. For this all assets of Army Aviation have to be made integral to the theatre commander to achieve results desired by the tactical battle area commander. We are transcending to an environment where things will be decided by effect based operations. We have to carry out tenets of manoeuvre warfare in the best possible manner. Army Aviation provides the land commander the ability to manoeuvre in the third dimension, to achieve manoeuvre along with firepower and have the desired effect. The theatre commander will utilise them to shift his forces, bring down fire at areas where the enemy suddenly appears, shift his forces and provide him the capability to look deep and strike deeper. Army Aviation has a great future. The seminar has to look into the future profile of Army Aviation which could include multi-role and fixed-wing helicopters. The combined experience present in today's seminar will be utilised to come to certain conclusions for Army Aviation to become much more capable and effective.

**Special address: Admiral Arun Prakash, PVSM, AVSM, VrC, VSM (Retd), Former CNS**

In post-cold war era, air power has become complex and it is now established that wars can be won if effective air dominance is achieved. Our immediate adversary today has armed forces equally capable as ours. While own air force would be engaged in neutralising the enemy's air assets and taking on strategic targets, own land forces would face the threat of being interdicted by the enemy's air power.

Wars are not won in isolation by Navies or Air forces but in conjunction with the land forces. Therefore, achieving total synergy is imperative in a future battlefield environment. Ultimately, boots are required on the ground to gain victory and this aspect must be sub served. The role and usefulness of integral air power in the Navy was highlighted in maintaining maritime security. The three services must provide the political leadership with a realistic and genuine projection of their requirements for a balanced distribution of funds.

**Keynote Address: Shri AK Antony, Raksha Mantri**

The Raksha Mantri conveyed his felicitations to the Army Aviation Corps on the occasion of their silver jubilee.

India has always desired friendly relations with its neighbours but at the same time we are determined to safeguard every inch of our land and sea borders. Some nations are modernising infrastructure on the borders and developing their capabilities. We must also continuously improve our infrastructure at a steady pace. At the moment, we are doing that. Wars of the future will be short, limited and intense. The Spectre of terrorism continues to pose a threat to the world community. All nations must unite to defeat this evil. Security today is inextricably linked to peace, prosperity and economic growth of nations. We are committed to provide our armed forces with the latest equipment to further sharpen our cutting edge.

In modern day warfare a joint air-land and sea campaign is necessary to achieve success. Therefore all the three services must make efforts to achieve synergy. The Army Aviation Corps requires quick reaction capabilities at High Altitudes and inaccessible terrain to overcome constraints of time, terrain and distance. The Corps has been operating in difficult terrain. Today's deliberations would go a long way in making the Corps more relevant.

**Session I: Overview**

The session was chaired by Lt Gen KS Jamwal, PVSM, AVSM, VSM\*\* (Retd), former GOC-in-C Eastern Command. The speakers were Lt Gen Vijay Oberoi, PVSM, AVSM, VSM, ADC (Retd), former VCOAS, Lt Gen Anil Chait, AVSM, VSM, Commandant, Army War College and Lt Gen VG Patankar, PVSM, UYSM, VSM (Retd), former MGO.

**Chairpersons Remarks:**

Army Aviation has come a long way since its inception. Aviation in itself is very challenging and demanding and over the years the Army Aviation has grown into a highly professional force.

## **Lt Gen Vijay Oberoi, PVSM, AVSM, VSM, ADC (Retd)**

It's in the fitness of things that this national seminar of Army Aviation is being conducted in the silver jubilee year. Army Aviation was, is and will continue to be an important arm of the Indian Army. It is a force multiplier in both conventional & sub-conventional operations as it bestows exceptional tactical capabilities to field commanders with its ability to quickly engage, disengage and regroup. The Army needs a potent air arm which can meet the diverse needs of field commanders in all operations where intimate and readily available support is a must. For domination of Tactical Battle Area of this century, the Army Aviation needs to play an enhanced role and grow beyond its present fleet.

The formation of Army Aviation faced opposition from the IAF and this has also affected its subsequent growth. The reasons cited by the Air Force need to be debated and addressed as there is enough scope for both services to expand their air assets.

### *Limitations Faced by Army Aviation*

Army Aviation, as presently structured, has many limitations

- Lack of modern helicopters with all weather capability
- Miniscule tactical lift capability
- Absence of weapon platforms
- Limited night fighting capability
- Absence of electronic surveillance devices
- Primitive communication equipment incapable of passing real-time information.

Despite these limitations Army Aviation units are performing creditably but future challenges demand rapid growth.

### *Areas of Focus*

- Redefining roles of army aviation
- Making the relevant changes in organisation & structures
- Command and control
- Modernisation of equipment
- Manpower selection
- Training
- Manner of functioning

### *Integration of Indian Army UAV Squadrons with Army Aviation*

In most Armies, UAVs are grouped with Army Aviation. However, in Indian Army it is with the SATA Regiments. Major roles of UAV's are aerial intelligence, surveillance and reconnaissance (ISR); lately it is also being used for aerial armed attack and as communications relay platforms. Other roles include cover for convoys, route

reconnaissance, battle damage assessment, airfield surveillance, standoff mine detection, as well as detection of chemical, biological or radiological hazards.

There is merit in grouping UAVs with aviation, especially as UAVs and manned attack helicopters have successfully conducted hunter-killer joint operations in the US and other armies. This is a logical and a cost-effective option, which is likely to give better pay-offs.

### *Holding and Control of Aviation Assets*

Army Aviation is still stuck in a changeless groove. It is unable to provide comprehensive aviation support as its capabilities are severely limited. The proposal for raising of Army Aviation Corps was mooted in 1963, but implemented only in 1986. The 1986 decision stated that all AOP units and utility helicopter units be manned, maintained and controlled by the army. While the report also specified that attack helicopter units continue with IAF, but under command & control of army, the latter portion has not been implemented. It was also decided for the Army to create the necessary organizational infrastructure including ATC facilities at Army aviation bases for management of Army aviation units.

If we compare the asset holdings of other countries' Army Aviation assets vis a vis the Indian Army, we will see that our numbers are relatively less. All professional armies have fully equipped aviation arms, because air forces cannot perform tasks which are intimately concerned with the land battle. Air assets meant for such functions must be directly controlled by field commanders; they must be part of army formations at successive levels. Certain operational and logistics tasks are best performed by integral resources of army, because of the intimate nature of support and need for immediate application of aviation assets. The experience from world over has proven that real time battlefield flexibility and enhancement in combat power is only possible with integral aviation.

Unless Army Aviation starts growing rapidly, the Army will not be able to exercise many operational options in future conflicts. At present it is predominantly a light helicopter force with less than 250 helicopters and no armed or attack helicopters.

### *Characteristics of Army Aviation*

- Enhances a commander's ability.
- Battlefield leverage achieved through reconnaissance, mobility and firepower.
- Expands ground commander's battlefield.
- Allows commanders to achieve effects of mass without massing weapons systems.
- Gives commander ability to apply decisive combat power at critical times.
- Ability to digitally command and control assets at extended ranges and reposition commanders as the situation develops.
- Tasks in **sub-conventional operations** include detection by sensors, raids by armed helicopters, quick positioning of infantry to seal escape routes, aerial assault where feasible, and movement of reinforcements speedily by utility and medium-lift helicopters.

### *Future Battlefield Milieu*

- Proxy war, including terrorism by non-state actors are likely to increase in lethality and vigour.
- Ever present danger of fighting a conventional war, in the backdrop of a nuclear threat continues.
- Mobility, agility, simultaneity, lethality, tempo and high grade logistics are essential ingredients for winning battles and wars.
- Need is for intuitive and versatile leaders, agile battle staff and well trained soldiers.
- Operational demands will be heavy.
- High technology in every field will be the norm.

### *Complementing Land Battle*

- Army aviation, as a manoeuvre force, is the third dimension centre piece of the land force.
- Primary task of army aviation is to support all ground operations. Reconnaissance, attack, utility, and medium lift helicopters, medical evacuation platforms and air traffic control units, are all required to support the army.
- Its battlefield leverage is achieved through a combination of reconnaissance, mobility and firepower.
- It must also provide mobile command, control, communications, and intelligence capability; as well as electronic warfare capability to enable the force to gain greater manoeuvre, firepower and protection.
- Dedicated aviation assets are essential for the successful conduct of operations of the Special Forces (SF).
- Army Aviation's greatest contribution to battlefield success is the ability it gives the commander to apply decisive combat power at critical times, virtually anywhere on the battlefield.

### *Suggested Vision*

Army Aviation should play a pivotal role in providing combat, combat support and combat service support capabilities, across the full spectrum of operations, to all field commanders. Its inherent versatility, manoeuvre advantage and effectiveness in battle must influence all dimensions of the future battle space.

Highly motivated aviators, equipped with modern aviation platforms and related systems, and trained to world class proficiency, must provide commanders at all levels an exponential increase in lethality, a force multiplier of the highest level and a technologically competent leadership, to achieve decisive victory.

### **Lt Gen Anil Chait, AVSM, VSM**

Army Aviation provides a unique op capability involving mobility, agility, sustainance and ability of massing significant combat power at the right place and time in battle space in support of ground operations creating conditions for success. Aviation successfully creates situations for winning nation's wars.

He then highlighted the milestones of Army Aviation both national and international.

### *Characteristics of Aviation*

- Responsiveness and deploy ability - It reduces reaction time and affords compressed rotational timelines which facilitates multi tasking and multiple engagements by the various elements of the aviation in the battle space in a compressed timeframe. This is a unique capability associated with Aviation.
- Initiative , agility and versatility
- Lethality
- Compression in space and time is an important facet of manoeuvre warfare.
- Manoeuvre and fire power - No other component of land power combines the facets of fire and manoeuvre.

Integrating in this the ability to see, we get seek, manoeuvre and fire to generate psychological effect in the entire spectrum of battlefield. Principles of War thus get impacted, both directly and indirectly. It thus provides exponential leverage in achieving decisive victories.

### *Strategic Shift*

Mechanisation and technology is forcing a shift in our strategic thinking and application of force. Time has come to shift from linear attrition firepower orientation to manoeuvre orientation in air land battle. Future wars are going to be of short duration with intense warfare, entailing limited amount of manoeuvre. The aviation has to move away from the tactical task it was performing in the attrition war to joint air land campaign planning. For this there has to be convergence under a single power executing the air land battle campaign planning. This synergy requires employment integration and synchronisation with land forces commander's theatre concept.

### *Employment Scenarios*

**Proactive operations** – These have raised a premium on quick launch. In support of proactive operations the roles and tasks of Aviation are

- To facilitate, affect and achieve the required facilitation of severance and generation of recce pull on ground forces.
- Enhance the agility of ground forces thereby accelerating the tempo of operations.
- After reaching the area of launch there is a requirement to facilitate disruption, degradation and delaying of enemy build up and provide force protection.
- Separation of enemy combat power from its protected manoeuvre elements through killing/destruction.
- Enable exaggerated manoeuvre through temp holding of battle space in case of presence of adversary or when a desired space cannot be achieved.
- Act as a Force Multiplier through its roles as radio relay, EW, AB FAC etc.
- Enable recce of contaminated NBC area

- Support consolidation operations – recce, surveillance, support, domination of fwd buffer zone and lines of comn – from cessation of hostilities to withdrawal of troops.
- Resumption of offensive in case of breakdown of cease-fire.

He then illustrated the role of the aviation through an envisaged scenario on the Western border of India.

#### *Why Is the Aviation a Critical Component of Combined Arms Team*

Aviation is a critical component of the combined Arms Team as it undertakes or facilitates these roles

- Enhances manoeuvre through increased speed and range of operations
  - re position forces
  - air assault/heliborne assault by dismounted troops
  - critical manoeuvre of mounted units
- Shaping of the battle space
- Attack at the time and place of own choosing
- Create flexibility and agility for the manoeuvre sustainment
- Enhanced logistics
- Close battle sp, when FLOT is difficult to discern
- Precision engagement
- Info operations and ISR
- Assess effect and direct re-engagement with decisive speed and overwhelming tempo

#### *Philosophy of Employment in the Backdrop of War Zone Concept*

The Army Aviation, to thwart enemy design, can be effectively employed right from the commencement of offensive till conflict termination stage. Application of third dimension could be to achieve the following:

- Engagement of the enemy at or over the borders
- Conflict beyond immediate periphery
- Frontier defence and forward positioning
- Through the doctrine of active defence which demands integrated deep strikes in conjunction with projection of forces
- Through rapid deployment by striking at key points across the battle space.
- Destroying operational balance and immobilising the enemy
- Securing victory

He then illustrated the role of aviation in engagement with the enemy on the Eastern border.

#### *Philosophy of Employment in Sub Conventional Operations*

The present philosophy is not to use aviation assets in an offensive role but only in support of ground forces. The roles for these are



- Recce and advance info – track terrorists till their hideouts
- Surveillance of infiltration routes on LC
- Project reactionary forces
- Cut off escaping terrorists
- Provide fire support on pinpoint targets
- Provide logistics and maintenance
- Air assault against militant hideouts
- EW support and jamming of terrorist communications
- Casualty Evacuation.

### *Philosophy of Employment in Non Conventional Operations*

- Aerial survey
- Immediate response and relocation of disaster relief brick
- Dropping of supply and medical teams
- Cas Evac
- Ferry of essential stores
- Communication duties
- Confidence building and psychological support.

### *Employment in Out of Area Contingencies (OOAC)*

The aims could be Peacekeeping or power projection towards larger national aims. The role of aviation will be there in all situations whether there is a requirement of utilising light, medium or heavy forces.

### *Employment in Amphibious Operations*

He highlighted the future battlefield of amphibious operations and the role of aviation in these operations.

### *Futuristic Outlook*

- Tech driven and innovation based capability
  - ISR capability
  - Longer ranges of engagement
  - Capable of 24 x 7 all weather operations
- Extending the Cdr's battle space generating capability of effect based operations (EBO) – Increasing range and lethality of engagement.
- Creating manoeuvre space in obstacle ridden terrain - Removing friction of terrain
- Facilitating non linearity of Network Centric Warfare (NCW) forces
- Dominance of battle space for exaggerated manoeuvre; air to air combat – Both armies will aim to dominate the same critical space and this will result in air to air combat between rival aviation assets.
- Coopted working with UAV/UCAVS to offset vulnerabilities of protection.

Tech and pace of modernisation has made Army Aviation a major game changer and hence an arm of decision. To succeed therefore, Army Aviation as a cadre must

progress beyond merely flying to becoming a dominant practitioner of land power through integrated operational manoeuvre as part of air land battle.

### **Lt Gen VG Patankar, PVSM, UYSM, VSM (Retd)**

The definition of Tactical Battlefield Area is dependant on the specific context. I will be considering four battlefield scenarios, each with their own characteristics.

- Conventional War
- Sub Conventional Operations
- Limited War
- Punitive Strike

#### *Conventional War*

All tactical formations will have their own plans and would follow them to deploy. This would be true for all services. In this scenario, the first emphasis on use of the third dimension by the air force will be for control of the air and denial of aerospace to the enemy. The Tactical Battle Area will initially form low priority for the aerospace forces. The land forces however need control over the air over the Tactical Battle Area.

Time and Space Dimension - If EBOs form the centre stage of any future environment, then we are unlikely to see the classic phases of operations. The nature of time dimension will also change; short, swift, high intensity, high attrition war. When time is at premium and manoeuvre and firepower are pre dominant, the gains have to be immediate.

Considering these facts, Army Aviation is the best placed to take control over the airspace just above the Tactical Battle Area. This would entail controlling all weapons of the TBA that require the use of the third dimension including Artillery, UAVs, SSMs etc. The Army Aviation should form the airspace management centre to effectively control use of this airspace. The details of this can be worked out. There also needs to be interface with the strategic forces on use of airspace.

Battlefield Air Support should become the bread and butter for the Army Aviation. This would also include providing stores and reconnaissance. The machines should be versatile enough to switch between these roles.

#### *In Peace*

Being the holder of largest number of rotary wing inventory in the country, Army Aviation should be the repository of all matters related to rotary wing flying in the country and facilitate interactions among all rotary wing agencies. It can also be the nominated interface with the aviation industry.

### **Discussion**

Army Aviation needs to acquire attack helicopters to act as manoeuvre force in the third dimension.

Army Aviator should be made part of planning and execution of all exercises.

It should progress from combat support to being a combat arm.

Making the UAV sqns part of Army Aviation may be considered.

Night fighting capability needs to be further increased.

## **Session II: Force Structuring and Modernisation**

Lt Gen VK Kapoor, PVSM (Retd), former Commandant, Army War College chaired the session. The speakers were Lt Gen Sumer Singh, AVSM, DG PP, IHQ of MoD (Army), Mr P Soundarajan, Managing Director, Helicopter Division, Hindustan Aeronautics Limited and Lt Gen BS Pawar, PVSM, AVSM (Retd), former Commandant, School of Artillery & ADG Army Aviation.

### **Chairpersons Remarks:**

India faces a two-front threat scenario coupled by insurgencies in J&K and the North-East. If the LWE situation in the hinterland gets out of control, it might open another front for the Army. Therefore, the role of the Army Aviation in the future would be to assist the Indian Army in fulfilling all its tasks effectively.

### **Lt Gen Sumer Singh, AVSM**

Capability development of Army Aviation is one part of the overall capability development of the Indian Army. The desired force structure should possess capabilities to meet a wide range of challenges across a large spectrum such as out of area contingencies, sub-conventional operations, UNPKO and aid to civil power.

India faces a traditional land-based threat on its western and northern borders. It has to deal with the non-reconcilable claims over territory of our northern neighbour. The instability, turbulence and non-conventional threats from the west may have a spill-over effect on us. Operating in a nuclear environment adds another dimension to the conventional threats. Then there are threats emerging from the maritime and regional neighbourhood domains. Added to these are the internal challenges posed by insurgencies, terrorism, LWE, internal fault lines and natural disasters.

### *Terrain Imperatives*

Capabilities for swift mobilisation and rapid inter and intra theatre movement is required in the high altitude and rugged terrain of our Northern borders. Versatile and adaptive capabilities are required to adapt to the varied terrain and challenges posed by a high terrain friction and emergence of new population centres and built-up areas in the western theatre. These terrain imperatives can be overcome by manoeuvre and mobility (3<sup>rd</sup> dimension vectors).

### *Adversaries Strategies, Doctrines and Concepts*

The following are the salient features of our adversaries' strategies, doctrines and concepts:

North

- Infrastructure development in TAR.
- Creation of Rapid Reaction Forces (RRF).
- Light Armoured Special Operations Forces (SOF) provide mobility.
- Logistics build up capability.

West

- Improvement in operational structures and war fighting concepts
- Acquisition of weapons / equipment, especially firepower, tactical mobility, aviation and C<sup>4</sup>ISR systems
- India Centric Force Modernisation Programme

### *Future Battlefield Milieu*

The future battlefield environment may have the following characteristics:-

- Multi Spectral - conventional, sub conventional & non conventional.
- Conventional wars will be swift, short and intense.
- Real-time surveillance, high technology, high lethality and precision firepower.
- Increased usage of cyber, space and informational warfare.
- Nuclear weapons & CBRN Threats (Rogue Elements).

### *Imperatives of Tactical Battle Area*

A field force commander faces a non-linear challenge in the Tactical Battle Area where he has to first fix the enemy with flexibility and manoeuvre and then achieve its decisive destruction. Army Aviation ideally fulfils all these imperatives and acts as a force multiplier.

The thrust areas for capability development should include Command, Control and Communications, Information Dominance and Battlefield Transparency, All Weather Day / Night Capability, increased range, accuracy and lethality of weapons systems-precision weapons and enhance manoeuvre and mobility.

The one common feature of Army Aviation units across the world is that helicopter assets are integral to the Army and are flown and manned by Army Aviation pilots. They are employed at the tactical level and partly at the operational level. Adequate backup staff and infrastructure are available.

Attack Helicopter (AH) Regiments with PLA Army have a 2:1 ratio of Utility Helicopters (UHs) to AHs. Pakistan has 350 helicopters including 50 AHs with plans to induct 100 more helicopters.

The desired profile philosophy of Army Aviation should include:-

- R&O helicopters at tactical level.
- Dedicated Attack Helicopter squadrons for offensive formations.
- ALH (WSI) squadrons for defensive formations in the plains / semi desert / desert sector.

- Light Combat Helicopter for all mountain formations.
- Enhance Rapid Reaction Forces capability with tactical and medium lift helicopters.
- Dedicated Aviation effort for Special Forces operation.
- Integration of UAVs/ UCAVs.
- Fixed wing aircrafts at theatre level – This can be achieved at a later time-frame.

The major challenges faced by Army Aviation are:-

- Integrate as a manoeuvre arm in the Tactical Battle Area.
- Creating requisite Human Resource capital.
- Improve infrastructure.
- Enhance indigenous aircraft production capability.
- Develop Multi Role Helicopter.
- Joint Development.
- Air space management.

The integration of all fixed wing, rotor, UAV and UCAV assets is paying rich dividends in Afghanistan. Task Force ODIN (Observe, Detect, Identify and Neutralise) has eliminated more than 3000 terrorists since its creation in October 2006.

### **Mr P Soundarajan**

It takes about 25-30 years of technological research to successfully develop a product.

The Helicopter Division of HAL was established in 1969 primarily to cater to military requirements. The in-house production of Cheetah/ Chetak has provided the technical know-how for manufacturing helicopter structures & systems.

Since 1970, HAL has manufactured 352 Chetak, 275 Cheetah and 107 ALH Dhruv helicopters for the Indian Armed Forces. The total production envisaged by 2021-22 is 1180 units.

Mr Soundarajan illustrated the various technical stages involved in design, manufacture, production and flight testing of helicopters by HAL. He concluded by stating that the indigenous helicopter production in India is likely to witness a steady rise with the support of the Army.

### **Lt Gen BS Pawar, PVSM, AVSM (Retd)**

The role of the air force in close air support operations will diminish with the arrival of precision long range artillery munitions, UAVs and UCAVs. But their role cannot be completely taken away. The question of command and control of the airspace and assets ownership should be resolved between the respective service HQs. It would be prudent that airspace up to a certain elevation from the ground be controlled by the theatre commander. In Counter-Insurgency operations there is a need to have a relook in employing armed helicopters in uninhabited areas and to cut-off escaping

terrorists. This would prevent own casualty on the grounds and pay rich dividends in neutralising terrorists.

Op Neptune Spear is the finest example of integration of all types of rotor assets and UAVs in an operation. Success was achieved by integrating attack and assault helicopters for the Special Forces operation that eliminated Osama Bin Laden. Integration of attack and assault helicopters was first undertaken by the American forces in Vietnam. The downing of helicopters went down considerably after the integration was achieved. In India, Cheetah (Lancer), Mi-8 and Mi-17 helicopters have been modified with firing pods and MMGs.

There is a need to emphasise more on a combined arms team concept for the future battlefield milieu. A Stealth helicopter program can be developed in the long run.

## **Discussion**

Nano technology should be used in helicopter manufacturing for the future.

There is a need to improve the cadre management of Army Aviation officers. They should be brought into the General Cadre owing their dynamic employment profile. Pilots are frequently attending war games and sand model discussions for better appreciation of the land battle-field environment. A permanent cadre for Army Aviation Corps JCOs and ORs has been approved.

