COAS Gold Medal Essay Competition 2013-14

Doctrinal Integration of Attack Helicopter Operations*

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Introduction

An attack helicopter (AH) is a military helicopter specifically designed and built to carry weapons for attacking targets on the ground, such as enemy infantry, armoured vehicles and structures. Weapons used on AHs can include automatic cannons, machine-guns, rockets, and guided missiles. Many AHs are also capable of carrying air-to-air missiles, though mostly for purposes of self-defence. AHs are best employed to provide direct elevated fire support for ground troops, and, in the anti-tank role, to destroy enemy armour concentrations. With its unique ability to hover, take-off and land rapidly, the AH has extended the efficacy of air power by bringing it 'down-to-earth'. With the proposed induction of new generation AHs and raising of a Mountain Corps,1 there is a need to critically evaluate the concept of employment, to effectively exploit the full potential of this potent force multiplier platform.

This essay examines the current Indian Army AH tactics and procedures to arrive at a Doctrine and Concept for employment of AHs in a multi dimensional environment as obtaining in the Indian context. In addition, key aspects relating to integration of AHs into existing land operations have also been analysed.

Future Battlefield Dynamics

Operational Challenges

The future battlefield will be characterised by a combination of small, highly mobile platforms which will apply advanced sensor and information technology, use long range precision attack weapons and conduct relentless operations under all meteorological conditions.2 Operations will be characterised by non-linearity of the battlefield and multiple asymmetrical threats in the contemporary operating environment, and these will create challenges for our Army.

Future multi-dimensional scenarios will include a canvas of low-intensity conflicts, encompassing CI/ CT, and even localised wars like Kargil might evolve in the future in J&K, North East India and even in our immediate neighbourhood. These could be fanned by adversaries (and competitors) like Pakistan and China. A table depicting the above operational continuum is indicated at Table 1 below.3 A state of peace or conflict could exist simultaneously in a military commander's theatre of operations, and could even overlap; like conduct of non-combat operations during war.

Army's Role in Shaping the Spectrum

The Army faces the unprecedented challenge of preparing for multiple contingencies, some of which may be impossible to predict. In response to this new strategic environment characterised by global uncertainty and regional instability, the Army will require to maintain its strategic focus on proactive operations with conflict parameters ranging from dissuasion to deterrence. This would require the Army to be prepared to deploy rapidly and conduct operations with very limited period available for acclimatisation, rehearsals or logistics build-up. In addition, the Army will require to be operationally prepared for an expanded focus on 'Operations Other Than War' (OOTW) such as disaster relief, humanitarian assistance, CI/CT operations and to UN peacekeeping missions.

Where Does the AH Fit In?

In the scenarios depicted above, where highly mobile infantry and the Special Forces (SF) operate, the use of AHs will enable timely identification of hostile forces and neutralise them in an earlier time frame.4 In the Indian context, the AH is well-suited to meet these operating conditions and the challenges they pose and thus exploiting the third dimension to overcome both, terrain and force friction. However, the scarce AH resources will need to be exploited ingeniously which is possible, if there is seamless integration with the field formations.

Organisational Evolution and Force Re-Structuring

Existing Organisation. The Indian Army uses the Russian origin Mi-25 and Mi-35 helicopters as its mainstay fleet of AHs. However, the concepts employed for operations, by the pilots currently drawn from the Indian Air Force (IAF) only partially meet the operational requirements of our Strike formations. The AHs held currently are organised as two squadrons, with a total of ten helicopters each, and are deployed in support of each of the Strike Corps. The primary role in which these AHs are being employed today is as individual aerial platforms, against high-value targets, and in a secondary role in support of armour operations.

Adequacy of Resources. In the current roles, the capability of AHs to undertake other operations like armed reconnaissance, interdiction, counter-attack or pursuit is not being exploited to its full. This aspect gains importance in view of the planned induction of a family of helicopters (discussed subsequently) as part of Composite Aviation Brigades (CAB) in the Army.5

Re-structuring Required. There is a requirement for the AHs to evolve from its initial inception as an aerial platform designed in support of mobile Strike Corps elements into a potent aerial combat weapon system capable of extending the Army's reach to the third dimension. The capability of executing independent manoeuvre operations, similar to (traditional) armour operations is possible due to inherent mobility and flexibility of AHs. The challenge lies in incorporating these inherent capabilities in the doctrine for employment of AHs.

AHs as Force Multipliers. By virtue of short duration and high intensity characteristics of future wars, with increased depth and frontage of contact, the AH is an ideal weapon system for operations in the tactical battle area (TBA)6. Precise and incisive fire power, speed and manoeuvrability in the third dimension and close integration with the ground forces makes the AH a force multiplier in the TBA and a critical resource to the field force commander.

Assets Complimenting the AH. In order to effectively utilise the capabilities of AHs, integration of other aerial resources is essential to make a truly "Composite" Aviation Brigade (CAB; discussed subsequently). These will include the light utility helicopters (LUH), tactical battle support helicopter (TBSH), (christened as 'Dhruv') and Light Combat Helicopters (LCH). 7 The armed version of the Advanced Light Helicopter (ALH) 'Rudra', though not a typical AH, has an array of comparable weapon systems to include gun, rockets, air-to-air, and air-to-ground missiles (ATGM). These could be orbatted to a Pivot Corps enhancing the defensive and offensive capabilities. The tandem-seating LCH, a stealth featured derivative of the ALH, may be employed in an anti-infantry and anti-armour role with a capability to operate at high altitudes.

Command and Control Systems

Breaking Free of Legacies

'Command' in the current context implies authority for movement and deployment of AH resources whereas 'Control' applies to the control over flying operations including air space management. Command also entails responsibility for administration of AH resources. The eventual availability of multiple types of helicopters at a Corps level mandates the need for tailor made structures to exercise control over the organic and any additional aviation assets placed under command of the formation. This has led to the need for creation of composite aviation brigades (CAB) in each Corps. The CABs will have to be inherently modular in structure, capable of accepting/ detaching sub-units in sync with the overall 'Integrated Theatre Battle (ITB)'.

Operational synchronisation between ground and air manoeuvres, and conduct of aviation operations will be coordinated by the CAB. The effective command and control of the AH assets in the TBA will include aspects related to operational employment, staffing, training, maintenance and allotment of resources. A detailed analysis of various systems available in other armies was carried out and the following emerged: -

(a) There is a need for delineation between operational employment of AH resources and a "Class Authority" that deals with allotment, philosophy/policy formulation and maintenance of AH resources – on lines of what the Indian Navy follows for its Naval Aviation Arm.

(b) An institution for Tactics and Strategy Development (on lines of the Air Force's 'TACDE') is recommended to be built.8 The foundation for it could be the existing Combined Air Training School (CATS) functioning in Deolali.

(c) Specialised stream of officers and men for ASM on the lines of the Fighter Controllers (FC) stream of the IAF.

Accordingly, it is recommended that a variant to the current system of delineation of responsibilities, as followed in the Indian Navy – between the Flag Officer Naval Aviation (FONA) and Assistant Chief of Naval Staff (Air) – be adapted for the Indian Army, as under: -

(a) **Military Operations (MO) Directorate.** Operational policies, control and allotment of AH resources including concept of employment.

(b) **Aviation Directorate.** Development of AH tactics, strategy, staffing norms and armament aspects.

The specific tasks and proposed controlling authorities for all the above issues is proposed as listed in the Table 2 below: -

Table 2 : Delineation of Responsibilities

Ser No	Type of Activity	Controlling Authority
(a)	Operational Policy	MO Directorate (MO-7)
(b)	Acquisition	Aviation Directorate
(c)	Operational Concept/ Employment	Formation General Staff
(d)	Staffing Norms	Aviation Directorate
(e)	Armaments	Aviation Directorate
(f)	AH Tactics and Strategy	Combat Air Training School C/o Aviation Directorate

(g)	Tactics Evaluation Group	
(h)	AH Maintenance	EME Directorate
(j)	Control/ Allotment (AH Resources)	MO Directorate (MO-7)

Communications

Aviation operations rely heavily on secure communications for their success. Combat information reporting, dissemination and its exploitation are fundamental to combat operations. This includes:-

(a) Passage of operational mission status, including Recognised Air Situation Picture (RASP).

(b) Airspace and Air Defence clearances.

(c) Air Traffic Controller (ATC) services – in the 100 metre from ground-up within the TBA.

(d) Fuel, ammunition, spares and logistics states.

(e) Weather picture etc on a real-time basis.

With AH operations spread over large areas in the TBA, communications must be reliable and redundant. Key aspects meriting attention are as under: -

(a) Use of Combat Net Radio (CNR), including stand-by High Frequency (HF) for beyond line of sight ranges and during nape-of-earth (NoE) flying.

(b) Satellite communications (using state-of-art Ku-band transponders on the recently launched GSAT-7 satellite).9

(c) Operational Data Link (ODL) connectivity to formation HQ (akin to the 'Link-16' used in the F-16 fighter planes). Information shared will include the following: -

(i) Real-time sharing of the Situational Awareness (SA) picture.

(ii) Voice/ data connectivity with Joint Air Defence Centre (JADC) on Command radio nets.

Training and Administrative Aspects

Training

The optimum utilisation of AHs as force multipliers can only be made by enhancing the skill sets of pilots for performing close combat attacks and air-ground integration. Aspects requiring attention are discussed in the subsequent paras.

Institutional Issues

(a) The Aviation Directorate will require to develop a close combat attack school, on the lines of the IAF, where pilots would be ready for all different types of engagements prior to arriving at their unit. Training on planning and executing missions will require to be incorporated.

(b) Structured training of the currently available Air Force AH pilots in strike corps operations.

Jointness in Training. Operations of the AHs will entail close coordination between the IAF, Army Air Defence, offensive formations and the AH. The need for Jointness in training can accordingly be appreciated and some of the aspects that will require to be addressed are mentioned below :-

(a) Specialised training infrastructure and syllabi for the new specialisations, to include Fighter Controllers and Forward Air Controllers.

(b) Complexities of flying technically advanced AHs at night will require special emphasis.

(c) Radio Telephony (RT) procedures be standardised and protocols between the ground forces and AH pilots will require to be laid down afresh. This aspect assumes significance when calling Battlefield Air Strikes (BAS) or Close Air Support (CAS), both discussed subsequently.

Administrative Aspects

Cadre management of a new stream of AH pilots, keeping in mind the peculiarities and uniqueness of the "trade" involved. In addition, a planned strategy to "operationally orientate" the newly trained Army AH pilots after Air Force pilots are returned back to their parent Service.

Amendments to the existing **"Army - Air Force Joint Training Directive of 1996",** to incorporate AH doctrines and employment philosophies.

Doctrinal Framework and Operational Concepts

The Russian and the US Philosophies

It was only in the late seventies that a thorough integration of air and land battle concepts was duly recognised. It was

somewhere around the same time that, emergence of dedicated AHs took place, leading to the development of air-land doctrines. The Russians incorporated the AHs effectively in their BAS missions as demonstrated by them in Afghanistan. Their 'Hind' class of AHs also substituted for tanks and artillery in the mountainous terrain for obvious reasons.10 The Americans on the other hand conceived the idea of employment of AHs primarily in the anti-armour role.11 It was only in the eighties that the NATO realised the concept of employment of AHs in BAS role. This was subsequently demonstrated in the Gulf Wars and in Afghanistan.

Doctrinal Aspects in Indian Context

AH employment must be akin to that of an independent armoured brigade acting like the sword of the strike formation. The aviation assets must be seamlessly integrated with other ground components to achieve the desired concentration of effects. Bold employment of composite forces, centred on "combined arms team" concept, involving rapid grouping and re-grouping, would epitomise its employment philosophy. The AH is envisaged to be used as part of an Airborne Task Force (ABTF), comprising attack, recce/ EW helicopters12 to be grouped with requisite infantry, armour and integral air defence, with a specific objective based on capability and mandated to compliment the primary operational (ground) plan.

A typical mission plan, based on the above operational imperatives, will include: -

(a) Selection of mounting bases, landing zones, firm bases and locations of Forward Area Arming and Refuelling Points (FAARPs).

(b) Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis including characteristics of objective, resources analysis (AH, firepower and troops) and execution timelines.

(c) Aspects related to logistics and maintenance over an area of operations will need to be factored-in.

In view of the limited ground holding capability of the ABTF, its operations must be synchronised with the main offensive for desired impact. In addition, the ABTF can also be assigned independent tasks like flank protection and recce-in-force.

Use of AHs in Mountain Strike Corps

Mountainous areas provide unique opportunities for AH. The AH is perhaps tailor-made for mountain operations as enemy mechanised forces will be slowed down and channelised as they move up steep gradients and down narrows valleys or are restricted to roads and trails, providing excellent targets. Fighter aircraft would be restricted in their operations due to limited manoeuvring air space and difficulties in target acquisition. Mountains provide excellent terrain-masking and permit easy avoidance of radar and visual acquisition. In addition, decisive manoeuvre in the mountains requires a significant infantry force capable of traversing most inaccessible terrain. However, such AH based air power alone cannot be relied upon as sole provider of concentrated fire power to support ground missions. Suppressive fire, created by a heavy volume of continuous fire over a wide area, is a necessary complement to ground manoeuvre, and is best provided by the artillery.

Mountainous environment, particularly the severe and rapidly changing weather, affect aircraft performance, accelerate crew fatigue and influence basic flight techniques. Limited visibility and peculiarities of flying in the mountainous terrain pose additional hazards and require extensive aircrew training. While high altitude limits load-carrying capabilities of the aircraft, compartmentalised mountain terrain enhances the possibilities for rapid movement to the flanks and in the rear of an isolated enemy force.

AH vis-à-vis Fighter Aircraft. There is indeed a need to re-look fresh at the concept of close air support in the TBA and the role of AH/armed helicopters in the same. The present concept of close air support is a relic of World War II, driven by range limitations of surveillance, target acquisition, and engagement capability of land-based platforms. The availability of UAVs, missiles and long range artillery platforms (40-120 km) has changed all that. Today, surface-based platforms can cover the entire TBA. This also brings into focus the role of AHs in providing close air support (CAS) in the TBA. In Afghanistan, the troops on the ground have been more comfortable with the intimate support provided by attack/armed helicopters in their operations, due to the visible, proximity and response time factors. However, helicopters have their limitations due to their inherent characteristics and subject to weather conditions. Hence, fighter aircraft will continue to be relevant but will have a diminished and limited role in the TBA.

Concept of Operations

The AHs have precise reconnaissance, attack or protection missions. In attack tactics, the surprise effect of a low altitude approach at least partially offsets increased vulnerability due to proximity to the ground. Accordingly, the employment of AH in support of ground operations will call for own armour – with mobility, shock effect and fire power – to spearhead the offensive, with the AHs coordinating its attacks with the advancing armour, to form a combined team. Thus, integrated into teams, AHs can interdict enemy columns on the move in depth, hold up their advance, protect flanks, disrupt the movement of reserves and destroy mechanised forces. Some of the roles that can be assigned to AHs in our context include: -

(a) **Battlefield Air Strikes.** Given their flexibility and the weapon mix available, Battlefield Air Strike (BAS) is a role that is ideally suited for AHs. Factors favouring the use of AHs are: -

(i) Can operate without an airfield/ runway.

(ii) Familiarity with terrain helps reduce response time.

(iii) Can exploit the terrain features for surprise attacks.

(iv) Attack helicopters fill a vital gap in BAS when strike fighters are either not available due to limitation of resources, weather or terrain.

(v) Low speeds and low altitude capabilities reduce chances of detection by ground based air defence systems.

(b) **Suppression of Enemy Air Defence (SEAD).** SEAD may be required when penetrating or exiting enemy territory. SEAD activities can also be used to distract enemy defences from the actual planned routes or time of operations. The accuracy and lethality of AHs make them useful for conducting SEAD missions.

(c) **Helicopter Counter Air Operations.** The growing threat in the TBA from enemy AHs has necessitated development of 'Helicopter Counter Air' missions. AHs operate from FARRPs and are heavily dependent on large quantities of fuel and ammunition.13 AH based Counter Air Operations can be used to target enemy fuel and ammunition dumps.

(d) **Joint Air Attack Teams (JAAT).** The concept of JAAT was conceived by the Americans and also employed by the Russians. In the Indian context, JAAT operation could have synchronised simultaneous attack by AHs, fighter aircraft and field artillery. The composition of a JAAT would also include forward air controllers and directed by an overall commander in an AH.

(e) **AH in CI/ CT Operations.** The AH is ideally suited for employment in counter insurgency (CI) and special operations. Employment of this resource by the US in Afghanistan, Russians in Chechnya and Pakistan in the federally administered tribal areas (FATA), in CI operations clearly illustrates this. While in India, we have used helicopters in CI operations, the use of AH has been avoided as a policy due to the concerns of collateral damage. In special operations, Operation Neptune Spear/ Geronimo launched by the US to get Osama, exemplifies the close and precise integration of all elements of army aviation with SF as well as other elements like the RPAs to achieve success.

In addition to the above, peculiarities of operations in a two-front scenario will necessitate use of AHs in the following secondary roles: -

(a) Anti UAV Operations (to include slow moving targets).

(b) Escort to Heliborne (HB) Forces, and SHBO.

(c) Combat Search and Rescue (SAR).

(d) Convoy Protection for Move of Strategic Assets (e.g. Brahmos)

(e) AEW/ ASW (relevant in the context of own Amphibious Brigade).

Limitations of AHs. Although the military benefits of AHs are unchallenged, their limitations must also be considered in order to understand the current situation. Flying lower and slower than a fighter aircraft, the helicopter will always remain vulnerable to some degree to the enemy threat, which has increased since the appearance of ground-to-air missiles that can be carried and used by a single man.

Process to Achieve Doctrinal Integration

The primary employment of AH is to fight the land battle and support ground operations. Some aspects meriting attention for achieving doctrinal integration are discussed in the succeeding paras.

Integral Lift Capability to Complement AH Operations. The organisational changes mentioned above and the process of modernisation would lead to a capability-based force, with integral lift capability of a company at the Corps level, a battalion at command level and a brigade at army level. Accordingly, the resources for this capability in terms of tactical and heavy lift helicopters will require to be inducted.

Integration with GLONASS System. The need for moving away from US-based GPS systems needs no elaboration. A case for ab-initio integration of our AH navigation systems to the GLONASS exists.14

Encryption of RT. The current CNR connectivity between ground and AHs is in clear. There exists a case for encryption of this link. A combined project to develop communication protocols for the ODL (on the lines of the 'Link-16' discussed earlier) and encryption of RT link, may be considered for taking up as a project by the Army Technology Board (ATB).

Situational Awareness Using Tri-Services Resources. A slew of projects have been undertaken within own and the sister Services to enhance situational awareness (SA) on the battlefield. The integration of data feeds from the air, sea (to cater for contingency of own Brigade in amphibious operations) and ground-based sensor grids will make the AH platform an ideal force multiplier in the TBA. Some of the projects identified are as under:-

(a) Integrated Air Command and Control System (IACCS) of the IAF.

(b) Maritime Operations Centre (MOC) of the Indian Navy.

(c) Real-time video and data feed from Indian Navy's 'Trigun' system.

(d) Army's Battlefield Support System (BSS).

(e) The Army Air Defence's 'Akashteer' project. The integration being referred-to herein is a more close form

as compared to the existing mechanism of data availability at the Joint Air Defence Centre (JADC).

GSAT and RPVs Integration

Integration of RPVs and AHs will enable greater target differentiation in the combat zone and tactical mobility. Such integration can work in following ways: -

(a) The RPV as an autonomous platform for detecting and identifying threats using on-board sensors (electro-optical, thermal and radar). Integrated with a high-capacity data link, it can relay the data in near real-time to different platforms including the helicopters. The latter can then engage the select targets at stand-off ranges, depending on beyond-line-of-sight firing capability.

(b) In addition, RPVs can operate as an extension of the AH. In such a scenario, the AH will function as an autonomous intelligence gathering and data relaying platform – continuing to retain the advantages of its integral acquisition systems and ability to bypass terrain barriers.

The integration of weapon systems into increasingly sophisticated communication and digitised networks should constitute a major focus of future projects in the Army's Aviation Directorate. A need is also felt for constituting an Experts' Panel to progress a time-bound project under the aegis of the Army Technology Board, on issues pertaining to data and video integration.

Air Space Management

The management of airspace in the TBA is a complex issue with a plethora of weapon systems operating in a confined space and with proliferation of users of air space in the TBA. The enhancement in the types of military equipment along with lethality, speed and accuracy of aircraft and helicopters and air defence, have added a new dimension to air space management in the TBA. Operating of ground-based high trajectory weapon systems, and aircraft (fixed and rotary) mentioned above, will lead to major air space 'conflicts' and confusion, endangering own assets and serious issues of IFF, thus requiring special attention.

The air space envelope below 100 metres above ground level (AGL) is mandated to be under the control of the Army. This is controlled through the Corps Air Space Control Centre (CACC), established under the aegis of CAB. A major aspect of coordination pertains to identification of ground features to de-lineate the TBA at the Command level.

Concept. Air space management in the TBA will enhance efficiency in combined operations of land and air components with minimum interference and restraint. This will involve control of: -

(a) Own airborne assets.

(b) Ground-based air defence systems.

Backbone. The backbone of ASM in the TBA will be the recognised air surveillance picture (RASP) with colour-coded tracks available to the CACC. This would also ensure positive control of air space, based on timely detection and identification of all tracks. It involves integration of radar picture through IACCS, Akashteer and Trigun.

Prevention of Fratricide. Clearing friendly elements of indirect fires is vital in fratricide prevention. This task will be coordinated by the JADC – with representatives of Artillery, Infantry (Mortars), UAVs, Aviation, the Air Defence and the IAF – by engaging enemy aircraft and control of air assets to avoid fratricide. Further, the following measures are recommended to achieve coordination between the fixed and rotary wing aircraft :-

(a) A fixed high-performance aircraft engaged in tactical air operations would normally be under radar or radio control while operating or transiting through the TBA.15

(b) All rotary winged aircraft would be operating below 100 meters, under the control of the CACC.

(c) To reduce conflict between rotary and fixed winged aircraft, a coordinating altitude has been designated. Normally, rotary wing aircraft operate below 100 meters AGL and fixed wing above this altitude, with a buffer zone of 100 – 500 meters, where transitory flights will travel.

Coordination with RPVs/ Slow Flying Objects. All movement of remotely piloted vehicles (RPVs) below 100 meters AGL will continue to be controlled by CACC. To ensure the same, command of RPVs in a TBA will be under the respective aviation brigades.

AH Coordination for Missiles/ Artillery Fire Support. The JADC, in consultation with the FDC, will coordinate fire areas for artillery. However, a detailed mechanism for missile systems will require to be worked out with the Strategic Forces Command. In the interim, AHs in the TBA will require to be re-routed to prevent fratricide due to own missile systems.

Conclusion

Attack helicopters are likely to play a vastly enhanced role in future conflicts. In addition to the roles described in conventional operations earlier, their crucial role in CI / CT operations cannot be overemphasised. The modernisation process that the Army has commenced is a step in the right direction, but the momentum needs to be maintained.

This essay has attempted to bring out doctrinal recommendations in the overall context of future employment of AHs in the Army's operations, and is consistent with the principles defined in the Indian Army Doctrine. The dove-tailing of the force multiplier capabilities of the AH in future ground operations of the Army will entail addressing the

doctrinal, training and integration aspects in a coordinated and sustained manner.

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* This is a slightly edited version of the essay which won the First Prize in the COAS Gold Medal Essay Competition 2013-14 (Group I).

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