Swarming : Is it the Panache of Future Wars?

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"Time and again, where a radical change in equipment, doctrine or force structure is concerned, one finds a gestation period of between 30 to 50 years or more between the technique becoming feasible, or the need for change apparent, and full-scale adoption of the innovation."

-Richard Simpkin

Introduction

26/11 was an attack by two to three "pods" of a "cluster" of ten men lightly armed, moving rapidly, near simultaneously "pulsing" five targets over a wide area of West Mumbai. These men were not only well oriented to their area of operation but were intricately networked. This is probably an apt example of 'swarming' albeit by a terrorist organisation. On the flip side, in response to the attack, the police forces used 'melee' and 'mass' to counter-attack. The results are well known.

For long, swarming has been one of the four forms of warfighting in which the enemy is engaged simultaneously from all directions with fire and/or force. The other three forms of engaging the enemy are the 'melee', 'mass' and 'manoeuvre'. One distinct difference between each of these forms of fighting has been the differing range of information required for their successful execution. The information requirement is least for melee, manoeuvre needs more than massing and swarming depends completely on robust and rapid communications.1

Today, information technology has not only been a major cause of RMA but has become instrumental in changing the very way 'war making' is being viewed. New generations of insurgents, terrorists and criminals are exploiting innovations of the information revolution. Information revolution has enabled them to be loosely organised, in small groups and sometime even singly, into networks that permits close coordination and cooperation. When the time is right they strike from all directions, simultaneously at multiple targets. This swarming technique causes paralysis of the security system that gets overwhelmed and fails to respond effectively.

History is replete with examples of swarming being used to good effect and even some states have tailored their forces and doctrines based on the concept of swarming. The concept of swarming, probably, needs closer scrutiny and there may well be a case to adopt this concept selectively or wholly. One fact that stands out is that adopting swarming as a concept would call for radical changes in our organisational structures, command and control systems. The question is, do we need to change, or is swarming old wine in a new bottle?

History of Swarming

Even before man was possibly using the technique of swarming to wage wars on his enemies, animals were using it most effectively. Examples of swarming amongst the animals are seen in ants, bees and wolf packs. In amongst men the most ancient recorded history of swarming is seen amongst the tribes of the central Eurasian steppe like the Scythians, Parthians, Huns, Avars, Bulgars, Magyars, Turks, Cossacks, and Mongols. For close to two thousand years these tribes invaded settlements in China, the Middle East, and Eastern Europe2 with armies of lightly armed archers on horseback that used swarming tactics. Later, swarming was used by the British who pioneered a kind of swarming in their naval doctrine when fighting against the Spanish Armada in 1588. The British Navy used swarms of fire to relentlessly harass the enemy ultimately leading to his defeat. In the 18th century, the British got a taste of their own medicine when swarming fire of American rebels resulted in the British Army suffering heavy losses. In the Zulu war of 1879, yet again swarming was used this time by the Zulu Army. During World War II, the British used their Air Force in defensive swarms to win the Battle of Britain and the Germans used it in operations of the U-boat wolf-packs in the Battle of the Atlantic.

More recently, the ethno-nationalists of Somalia and Kosovo organised in small, dispersed units, wreaked havoc and stunned the US and allied forces. Similarly, the Russian military faced the battle-minded clans of Chechnya who used swarming techniques most effectively during the battle of Grozny. In the conventional format the US Marine Corps is known to have structured forces called 'multi squad-sized fire teams' that are designed to operate on the concept of swarm.3 The Iranian forces have also supposedly adopted swarm technique for its special forces and structured and equipped them accordingly. At home and in the neighbourhood, in Sri Lanka and Afghanistan, we have seen the insurgents/terrorists, LTTE, and the Taliban using swarming to shocking effects. The serial bomb blasts in Mumbai, Bangalore and Delhi are classic examples of stand off swarm attacks with fire.

Concept of Swarming and its Imperatives

Arquilla and Rondfeldt in their seminal work 'Swarming and the Future of Conflict' have described swarming as follows:-

"Swarming is seemingly amorphous, but it is a deliberately structured, coordinated, strategic way to strike from all directions, by means of a sustainable pulsing of force and/or fire, close-in as well as from stand-off positions. It will work best-perhaps it will only work–if it is designed mainly around the deployment of myriad, small, dispersed, networked maneuver units (what we call 'pods' organised in 'clusters')".4

Today, information technologies have made it possible to connect and coordinate entities even when widely distributed. Therefore, the key forms of organisations that are emerging are all-channel networks. The connectivity also enables creation of a large number of highly mobile small units, networked in such a fashion that, although they might be widely disbursed, they can regroup at will to attack the enemy from unexpected directions. Though such a networked force would enjoy substantial advantages, they would be effective only if old principles and practices give way to a new way of war fighting and new doctrines.

As has been defined, the swarm concept is based on networked, small units operating adaptively and autonomously in an environment of directive style of command. An elaborate C4ISR and a compatible architecture for information, fire support and logistics are mandatory for a swarm to be effective. At the tactical level, swarms have to depend on accurate organic fire, information operations and indirect fire to cause attrition on the enemy. The main intent of the swarm would be to force the enemy to be confronted with multiple new threats from constantly changing directions. The swarm would aim at psychological dislocation of the enemy more than his physical destruction.

Successful swarming is based on some important principles. Principles that are vital are elusiveness, superior situational awareness; stand off capability, simultaneity and encirclement.5 These basic principles make the swarm unique in the way combat power is applied and distinctly different from other forms of application of force using non-linear, distributed technique of warfighting. The five principles are further elucidated below:-

(a) **Elusiveness.** Elusiveness of the swarm is basically derived from the distributed state of its small size pods, its high mobility and its superior situational awareness.

(b) **Superior Situational Awareness.** This principle is extremely important and is dependent on the robustness of the network connectivity. Squads and even individuals are required to be completely aware of the tactical situation, preferably as well as the senior most commander of the operations.

(c) **Stand Off Capability.** This principle basically denotes the fact that the swarms can inflict more damage on the enemy than it has to endure. This requirement reiterates that networking, combat support of air force and long range weapons are of utmost importance.

(d) **Simultaneity.** This is an important combat behavior of the swarm to use its pods simultaneously to cause the enemy to have to turn to threats from multiple directions and at unexpected time.

(e) **Encirclement.** Swarms have the ability to get behind the enemy lines. This it can do with relative ease owing to its small size, situational awareness and effective logistical architecture. This gives the swarm substantial tactical and psychological advantages.6

Relevance of Swarming in Future Conflicts

Future battlefield milieu will be characterised by well dispersed forces due to increasing lethality of weapons, particularly the precision guided munitions (PGMs), which would make it imprudent to mass forces. Vast improvements in C4ISR have enabled effective use of long-range fires. In effect, warfare is fast becoming akin to the game of hide-and-seek where entities remain indefinable in order to survive. In such an environment, the need is to remain dispersed yet integrated and use non-linear tactics. Such tactics are best suited to forces that are applied in small teams, are networked and can operate independently with adequate support and effective stand off capability.

Appropriateness of swarming in future conflicts could be assessed by studying its application in defensive, offensive and counterinsurgency/counterterrorist operations. Operations could be against an enemy who is technologically advanced or otherwise. The enemy may also be using similar non linear tactics or could be more conventional in the form of tactics he uses.

Defensive Operations

Many examples are available of swarming in defensive operations. Consequently, there is plenty of scope to analyse these to derive sound planning considerations for such swarming operations. Swarming is also well suited to defensive operations since imperatives for swarming would be more easily satisfied while operating in own territory. The problem of insertion and extraction are also absent in a defensive operation. Another important aspect is that a well laid out logistic architecture can be put in place to support the swarms. Finally, support from other arms, be it the air or long range weapon platforms, can be better coordinated and applied.

In a defensive operation swarms can be applied to deter, delay, cause attrition and halt a much larger enemy force and prevent it from seizing vital objectives. Swarms can rapidly deploy, manoeuvre and bring to bear long range artillery, air, and naval fires, using an operational concept based more on elusive tactics and reliance on stand off fires. Areas requiring heavy deployment of forces can be defended by swarms particularly in some terrains that contribute to their lethality. Swarms can best operate in a closed country like jungles, built up areas and hilly terrain that enable them to use stealth, and restricts the enemy to limited avenues for attack.

The deployment of swarms could also be done in conjunction with defensive forces holding ground. In such a scenario the defensive forces should be deployed in depth to lure the invasion forces to penetrate the defensive area. Carefully planned obstacle system and layout of defenses can channelise the enemy to selected areas where swarms could pulse the enemy from multiple directions of attack, achieve encirclement and sever enemy's lines of communication. Such encirclement and pressures would adversely affect the enemy's psychological strength. Swarms must never be used to hold ground or tasked for any other missions that do not exploit their mobility.

Offensive Operations

Unlike the defensive operations there are very few examples of swarming in conventional offensive operations available to aid analytical study. One example that closely resembles swarming is of the US forces in Vietnam War where small teams were launched for short duration operations like the offensive insertion of SOG12 teams into Laos and Cambodia to ambush NVA truck convoys along the Ho Chi Minh Trail. These teams also worked as ISR teams planting sensors and providing vital information aboutthe enemy. These teams often used swarming by fire calling for air strikes on enemy base camps, truck parks, and weapon caches.

Common military understanding of tactical feasibility indicates that that swarming could be adapted to offensive operations. One deployment option could to secure an initial area in the peripheries of the area of operations and using this as the launch pad for the swarms. The pods and clusters could use different insertion modes and infiltrate into adjacent areas to gradually disperse outwards in all directions, building additional base camps and supply depots, and so on. Once distributed with adequate supplies and support materials, the swarms could extend outwards spreading across the entire area of operation. Such an operation should have to be undertaken when manoeuvre and mass are not the most optimal methods to use in that particular circumstance.One major consideration in using the swarm in offensive mode would be its survivability. Arms and supply caches would have to be prepositioned and a reliable chain of resupply set up before the operation even begins. Alternatively, a system of rotating the teams would have to be devised.

Counter-Insurgency/Counter-Terrorism Operations

Considering the nature of these operations, swarming could be said to be the most appropriate form of structure and the most effective mode of contesting an elusive enemy who more often than not is networked and distributed using pulsing technique to strike at soft targets. The application of swarming is not being discussed extensively as there are any number of examples of CI/CT operations being conducted by small teams and adequate expertise exists in this mode of fighting. However, to make the method being applied to fit to the definition of swarming, appropriate restructuring and equipping of the force to be effectively networked would be desirable. Also, the intent of the operations would need to be clear and not be restricted to a mere bean count of number of insurgents/terrorists eliminated. The situational awareness needs to be of a high order that is possible only with an intelligence network and process of dissemination that is capable of providing real time intelligence. Most importantly, there needs to be in place a fully integrated surveillance and communications system. Possibly, if our present system can be hybridized and incorporated with these attributes we would be able to classify it as swarming.

Conclusion

The ultimate aim of swarming may not be as much the physical destruction of the enemy, although swarms can cause heavy attrition, but more the disruption of the enemy's cohesion that renders him incapable of manoeuvre or fire effectively. To achieve this, swarm has two basic requirements. First, to be able to attack an enemy from multiple directions, the need is to have large numbers of small units of manoeuvre that can communicate and coordinate with each other effectively. Secondly, swarm force must have offensive capability as also the ability to act as a sensory organisation, with reconnaissance and surveillance capability. This would enable the swarm force to maintain situational awareness. Thus, to have 'small and many' as Libicki7 calls it and a command element that 'knows' a great deal but intercedes only when necessary, there may be a need to transform our security apparatus with new structures and adaptable C4I systems. One thing is for sure, the wine is old and ready to be savoured, definitely not preserved in a new bottle.8

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