



CHALLENGES TO THE SUPPRESSION OF ENEMY AIR DEFENCES

'In the more distance [distant] future, AAA systems will become more lethal at much higher altitudes (60,000-plus feet) as numerous new technologies such as rail guns, extended-range artillery and 'smart' artillery shells come online...should AAA include these, virtually no altitude will be safe.'

David Sobota
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The suppression/destruction of enemy air defences (S/DEAD) has played a critical role in the effectiveness of air power projection for more than five decades. However, the emergence of extremely sophisticated air defence systems and their easy proliferation has created substantial challenges to the efficient prosecution of S/DEAD missions. Modern air defence systems are built around extra long-range 'double-digit' surface-to-air missiles (SAM) and associated anti-access/area denial (A2/AD) technologies that combine early warning and ground control intercept radars and radar directed air defence artillery systems. These developments have diminished the effectiveness of S/DEAD missions, which in turn makes it difficult for air power to obtain and sustain the necessary level of control of the air.

This gradual shift in the capability balance between air defence and strike options has manifested itself in the extended period of time that air forces cater for in their plans to neutralise the enemy air defence network, which is a prerequisite to achieve control of the air. Western air forces have not had to fight to obtain control of the air since the Korean War and therefore, the changing circumstances might come as a surprise to most. It is also a fact that Western nations have not been required to combat a near-peer adversary since the end of the Korean War.

Anti-aircraft capabilities have improved in leaps and bounds in the past few decades—the threat to attacking aircraft and their crews have become uncomfortably high, especially when the conflict is with a near-peer adversary. The improvements have also increased the survivability of air defence systems and effectively neutralising them could take several days. This leads to a situation where



Scorpion HK Surface to Air Missiles

other roles such as strike and even control of the air may have to be undertaken while the adversary's air defences are still active and a threat to air power systems. The situation would necessitate an air force having to carry out all of its roles simultaneously with S/DEAD missions. The possibility of increased attrition levels to one's own forces cannot be ruled out in such a scenario.

With the improvements in air defence capabilities becoming prevalent and also the availability of cheap air defence systems increasing in proliferation, it could well be that the earlier sequential conduct of an air campaign—where S/DEAD was carried out in the 'first-day' of war to be followed by strike support to other elements of the joint campaign—may not be a feasible prospect anymore. Adversary air defence networks will be more robust and also mobile, which would make their neutralisation difficult and definitely not containable in the first few days of war, if minimal effort was applied.

All air forces would now have to prepare for a prolonged S/DEAD campaign while also being able to undertake other joint campaign missions simultaneously. This is not to suggest that the S/DEAD missions are not part of the joint campaign, they most clearly are; although aimed directly at neutralising the threat to air assets and therefore prone to being considered purely 'air' missions is a somewhat warped understanding of the overall campaign. The onus of responsibility to provide strike support to the joint campaign continues to be that of air power, which makes it imperative that adequate strike and close air support (CAS) is provided from 'Day One' of the campaign. Taking into account the different missions that an air force would be required to provide from the outset of a campaign and the resource-constrained numerical status of medium and small air forces, it is not difficult to envisage the pressures that will be placed on air power. The strain of asset allocation and the conflicting demands to enforce S/DEAD missions will challenge the planning premises of the air campaign within the joint campaign.

In a modern conflict against a peer-adversary, the battlespace will be lethal for air assets conducting all missions and virtually no altitude or speed will be safe. Developments in Anti-Aircraft Artillery (AAA) pose a crippling threat to aircraft, especially the ones engaged in providing CAS that are relatively slower and forced to fly low. Unlike earlier AAA guns that were individually stand-alone and had a slow rate of fire, modern AAA are normally linked to the integrated air defence systems. They also have electro-optical and infra-red sensors and radar guidance, which greatly improve their effectiveness. In the modern concept of operations, most missile sites, other high-value targets and vital areas are defended by AAA batteries. The only way to neutralise these sophisticated AAA batteries is to have a sufficient long-range air-to-surface missile capability within the S/DEAD force. The cost-benefit analysis of this exchange may not always favour the S/DEAD force element.

Uninhabited Aerial Vehicles (UAVs) have been considered as part of the answer to the increasing threat from air defence systems. Since they are relatively cheap they are cost-effective, although the loss rate in an attack against an integrated air defence system may not be sustainable. The AAA batteries are being optimised to counter the newly emerging swarming UAV concept. The battle between the need to defend and to defeat an

emerging air defence system and the concept of a system is now being revisited.

Adding to the challenge of S/DEAD are the advances taking place in the SAM systems that have both passive and active sensors and can also cover extended areas. The integrated air defence network of Russia, for example, cover much of the Baltic and Black Sea regions. Similarly China has extended its air defence network far into the South China Sea in pursuit of its own version of the A2/AD concept. SAM systems remain the major challenge to all air operations in a future conflict scenario. Long-range, stand-off air-to-air weapons provide a modicum of anti-SAM system capabilities, although the cycle of defence and suppression could at the moment be considered to be tilted in favour of the air defence network.

The battlespace of the future is unlikely to be one of isolated AAA and geographically static SAM systems. The air defence networks are going to be dense, integrated, and mobile, with both passive and active sensors and ranging across the electro-magnetic spectrum. They are also going to impose a high attrition rate on aircraft and UAVs engaged in S/DEAD as well as other strike and CAS missions. The current fleets of combat aircraft in medium and small air forces are such that it is difficult to believe that attrition has realistically been included in the force-structure planning. The modern integrated air defence networks will not permit unfettered operations in a contested environment without creating unacceptable losses on the attacking force. For medium and small air forces, the challenge to achieve success in obtaining and maintaining control of the air just went up.

Key Points

- *S/DEAD missions have played a critical role in the effectiveness of air power projection for more than five decades.*
- *With the improvements in air defence capabilities and also their proliferation, the conduct of a sequential air campaign may not be a feasible prospect anymore.*
- *The modern integrated air defence networks will not permit unfettered operations in a contested environment without creating unacceptable losses on the attacking force.*



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