‘Clarity in defending the national interest has direct relevance to joint war fighting in the future and to how joint SEAD must be configured to be meaningful in the execution of military strategy.’

Lt Col James R. Brungess, USAF

Setting the Context: Suppression of Enemy Air Defenses and Joint Warfighting, p. 47

Achieving and maintaining adequate control of the air, especially in contested environments, is a fundamental prerequisite to ensure the success of all military campaigns. The campaign to achieve control of the air has two distinct elements within it—suppression of enemy air defences (SEAD), and offensive and defensive counter air operations. SEAD operations are aimed at neutralising or destroying enemy air defences that include not only surface-to-air missiles (SAMs) and anti-aircraft artillery, but also enabling systems such as early-warning and fire-control radars, command and control nodes, and communications systems, which combine to create an effective air defence system. Suppression can be achieved through either the physical destruction of the system or through electronic warfare that neutralises the air defence systems.

Even though enemy air defence sites were targeted during World War II and then the Korean War, SEAD remained an undefined mission, since it did not form part of the overall strategy and was not considered within the doctrinal make-up of the force. Over the course of the conflict the Vietnam War was a watershed moment in the evolution of what would come to be known as SEAD. The North Vietnam Army had developed an integrated air defence system (IADS) aimed at air denial, built around SA-2 ‘Guideline’ SAMs. This forced the USAF to introduce dedicated SEAD aircraft, termed ‘Wild Weasels’ that fielded advanced technology and effective tactics. The optimised combination of hard-kill, electronic warfare and command and control countermeasures altered the kill ratio of the IADS from one aircraft destroyed for every 13 missiles fired in 1965 to one hit being recorded for every 68 missiles fired by the end of 1972. The optimisation of tactics and technology laid the foundation for future developments in SEAD missions.

There was a more strategic outcome to the success of SEAD missions in 1972, which was part of Linebacker II, an 11-day air campaign over North Vietnam. The employment of the B-52 bombers in attack missions without sufficient tactical SEAD support, led to the loss of 11 bombers in the first five days of this campaign. This prompted the decision to commence an all-out attack on the North Vietnamese air defence network. In three days the North Vietnamese leadership agreed to negotiate. The first concerted attack on the IADS left the Vietnamese defenceless and open to air attacks, which brought them to the negotiating table. Although not emphasised sufficiently, this is a signal lesson to be taken forward in similar cases, where an adversary is heavily reliant on air denial capabilities as opposed to attempting to achieve contextual control of the air.

The post-Vietnam War era was marked by the development of advanced Anti-Radiation Missiles (ARMs)
and electronic warfare assets to enhance SEAD capabilities. As a corollary, IADS also improved their capabilities and resilience to counter ARMs and electronic attacks. (For details see Pathfinder No 338, August 2019) The air campaigns of the last few decades—the Persian Gulf War in 1991, Bosnia 1995, Kosovo 1999, Iraq 2003, and Libya 2011—demonstrate the increasing effectiveness of IADS and the critical role of SEAD operations as a prerequisite for achieving the necessary control of the air. The success of SEAD operations in the past few decades has been underpinned by the flexible and holistic approach adopted by the Western air forces that combined traditional hard-kill missions by ARMs and electronic warfare tactics to neutralise sophisticated IADS.

The race to counter attacking aircraft and the need to neutralise the IADS of the adversary is cyclical with neither capability managing to be a sure winner even on a semi-permanent basis. Operation Allied Force, the 1999 air campaign in Kosovo provides a typical, if complex, case study. The Serbian air defences were numerically not very large, but they took steps to protect their IADS through dispersal and practising emission control to avoid detection and balance their lethality with survival. NATO assets launched over 750 ARMs and 12 percent of all combat sorties flown were SEAD missions. In Kosovo the success of SEAD was more a function of the Serbian forces’ lack of external support and the inferiority of their equipment than the effectiveness of Allied SEAD operations and it came as somewhat of a surprise that they managed to shoot down a stealth F-117A fighter aircraft with a surface-to-air SA-3 missile.

Both ARMs and electronic warfare capabilities have been evolving over the past few decades. Similarly air defence and air denial capabilities have also kept pace with the advances in SEAD operational capability. The evolution in SEAD can be traced from the threats that it has to defeat, from focused air denial to IADS and the increasing primacy of strategic air power. From its inception as a sub-set mission to destroy surface-to-air missiles, SEAD had evolved into a more generic application of air power to neutralise the adversary’s ability to defend from air attacks; moving from a mere secondary support role to a critical, first-day-of-the-war mission with the rapidly increasing air denial capabilities that are being inducted into even small power military forces.

With most modern military forces moving conceptually towards joint and integrated operations, it is not surprising that SEAD is also being conducted within the ‘joint’ ambit. The neutralisation of the Iraqi IADS during the Gulf War 1991 was a classic example of joint operations—the US-led coalition used air, land, Special Forces and naval forces to degrade, destroy and suppress the enemy’s air defence systems using a variety of weapons and effects. Even though the Iraqi air defences were intimidating, in the past three decades after 1991, the air defence networks have become formidable. The easy availability of sophisticated technology such as low observable and uninhabited systems, advanced communications and computing capabilities, and advances in cyber and space domains will contribute to increasing the complexity and asymmetry of future battlefields.

Realistic simulations and exercises have shown that while modern IADS will continue to be a critical challenge, the more pervasive ‘anti-access and area-denial’ strategies will almost completely preclude the effectiveness of traditional SEAD missions. SEAD itself takes on a much broader meaning as compared to its conventional understanding. The way forward to provide assured freedom of manoeuvre for friendly forces, while denying the same to the adversary, is only through joint planning and execution of SEAD missions with broader objectives. In other words, joint SEAD missions are the foundations on which all future campaigns have to be planned and executed for success.

**Key Points**

- The campaign to achieve control of the air has two distinct elements within it—suppression of enemy air defences, and offensive and defensive counter air operations.

- Where an adversary is heavily reliant on air denial capabilities, its destruction is likely to bring the adversary to the negotiating table.

- The way forward to provide assured freedom of manoeuvre for friendly forces, while denying the same to the adversary, is only through joint planning and execution of SEAD missions.