

Silencing the airwaves: Chinese SEAD capabilities

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China's territorial ambitions around its coast have long been among the driving forces of its military modernisation. *Tiago Falcao Machado* reports on how, to support the expanding missions of its air forces, the PLA is developing an increasingly effective SEAD capability

In 2015 China released a White Paper outlining its military strategy of active defence. The White Paper highlighted that the "PLA [People's Liberation Army] Air Force [PLAAF] would endeavour to shift its focus from territorial air defence to both defence and offence". Furthermore, the strategy document noted, "The PLAAF will boost its capabilities for strategic early warning, air strike, air and missile defence, information countermeasures, airborne operations, strategic projection, and comprehensive support." To fulfil its goals China is placing significant emphasis on anti-radiation hard-kill technology. This, in turn, increases survivability during airborne operations and makes the PLAAF less dependent on other forces. Therefore, by expanding the capabilities of PLAAF air platforms, Beijing hopes the force will achieve greater independence and mission scope.

Although China has invested heavily in conventional ballistic missiles to offer a powerful strike capability throughout any significant conflict, strategic and tactical bombing have not lost their importance. Lessons learnt from the Gulf wars during the 1990s have emphasised the value of suppression of enemy air defences (SEAD), as well as of denying or degrading enemy command, control, and communications. The latter fall under the banner of Chinese information operations and information warfare.



A KG-800 pictured being fitted under the wing of a JH-7A aircraft. (@Ds via Twitter)

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Supremacy over the electromagnetic spectrum is generally agreed to be vital for success against a near-peer competitor. Radars and wireless communications are regularly employed at the nexus of complex operations, meaning that the ability to destroy and suppress them can easily translate into

an advantage on the battlefield. It comes as no surprise, then, that China has demonstrated considerable interest in hard-kill capabilities that are specifically designed to seek out electromagnetic activity produced by radars and communication devices.

According to the 2015 White Paper, anti-radiation seeker technology serves the PLAAF's modernisation goals in two main ways. First, Chinese efforts to develop anti-radiation missile (ARM) and unmanned aerial vehicle (UAV) technology provide Chinese aviation units with a much-needed SEAD capability. With this the air force's strike envelope is expanded to operations over surface-to-air missile (SAM)-defended hostile territory. Second, enhancing the PLAAF's ability to destroy radars and nodes of communications enables the service to take a more prominent role in information warfare and, in particular, information countermeasures.

Although modernisation of the PLAAF will require change at a systematic level, an understanding of the electromagnetic spectrum will be beneficial to achieving this goal because it is here that hard-kill anti-radiation technology is found. By modernising PLAAF capabilities China will be able to project power further and increase its active area denial by denying or suppressing its adversaries' view of the battlespace.

Defining information warfare

Information warfare is a concept that most modern armies must factor into strategic planning, although there is a certain level of definition malleability as the scope of it is still debated. It can range from propaganda to electromagnetic jamming, but more broadly it is generally accepted as the ability of a force to enhance its information gathering, processing, and dissemination, while suppressing that of others.

An insight into the Chinese interpretation of information warfare was provided in a *PLA Daily* article in 1995. Elements highlighted included psychological warfare, operational secrecy, denying command and control, and military deception. However, when considering the concept in the context of anti-radiation hard-kill technology it is the following definition that stands out: "Electronic warfare [is] the use of electronic means of jamming, or use of anti-radiation (electromagnetic) weapons to attack enemy information and intelligence collection systems such as communications and radar."

It is within this definition that there is a convergence between information warfare and SEAD in terms of technology, but also an alignment of goals. Both depend on the ability to strike radars and communications, which, in turn, deny or suppress an adversary's understanding of the battlespace.

Defining SEAD

The US Department of Defense (DoD) defines SEAD as "that activity that neutralises, destroys, or temporarily degrades surface-based enemy air defences by destructive and disruptive means". Nuances may exist from nation to nation and between the services but, at its core, the purpose of SEAD is to prohibit an enemy's ability to counter air operations, and this can be by destructive or disruptive means. Disruptive means include primarily non-lethal measures such as electronic warfare (EW) or denying movement that weakens air defences. Destructive measures, meanwhile, focus on the countering of systems through firepower, which may include more conventional means on land, air, and sea, as well as less traditional methods such as the use of ARMs.

ARMs are essentially missiles with passive radar seekers designed to seek out and destroy enemy radar installations. The first ARM used in combat was the US AGM-45 Shrike, which entered active service during the late 1960s. However, it was susceptible to radar switch-off tactics and not

considered particularly accurate with its estimated circular error probable (CEP) of 15 m. Later ARMs became more accurate, with CEPs reduced to 1 m for some missiles, coupled with improved mitigation against switch-off, decoy, and jamming tactics. Moreover, missiles such as the Russian radar-guided Kh-31P and US high-speed AGM-88 can memorise the target location. As the battlefield is increasingly inundated with radio frequency emitters, the interest in locating, suppressing, and striking them also grows.

Chinese characteristics

Meanwhile, the PLA has not limited its radiation-homing equipment to air-to-ground missiles. Equipment of indigenous and foreign design has appeared to show a varied approach to SEAD and information warfare by Beijing. Besides purpose-designed ARMs, UAVs, ballistic missiles, and guided bombs have been developed and put into service.

Currently, the PLAAF and, to a more considerable extent, the People's Liberation Army Navy Air Force (PLANAF), cannot perform SEAD operations to the sufficient standard required to operate as an independent branch. Some headway has been made in terms of EW pods being installed and new aircraft being unveiled, but the PLAAF still lacks the specialised platforms required for the role. As a result the service relies heavily on the People's Liberation Army Rocket Force (PLARF) to fulfil this capability gap.

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