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ANOTHER SETBACK FOR THE US HYPERSONIC EFFORTS: GOODBYE TO HALO

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The US has again faced a significant setback in developing an offensive hypersonic system. On April 4, 2025, it was reported that the US Navy had shelved its much-solicited Hypersonic Air-Launched Offensive Anti-Surface Warfare (HALO) Engineering and Manufacturing Development (EMD) programme.[1] The psserogramme was cancelled in the fall of 2024, but came to light recently. While giving the reasons for the cancellation, the US Navy Spokesperson primarily referred to the "budgetary constraints"[2] preventing the timely completion of the programme. The cancellation, however, is not the first of its kind. In early 2024, the US had cancelled its much-touted hypersonic AGM-183A Air-launched Rapid Response Weapon (ARRW). The efforts and eventual acquisition of hypersonic capabilities have been an area of interest for the US, with each of the defence arms, the army, the air force, and the navy working to develop and deploy such capabilities. However, due to many factors, the ambition and the eventual employment of hypersonic capabilities still seem a distant dream for the US. This study is also essential for India, as it seeks to enhance the hypersonic capacities. Given the national security concerns, India should take a look at this hypersonic setback and its reasons while charting a clear pathway for hypersonic ambitions in terms of development and strategy.

Understanding HALO

The HALO, also known as Offensive Anti-Surface Warfare (OASuW) Increment 2, is essentially an advanced version of OASuW 1, a subsonic but stealthy Lockheed Martin AGM-158C Long-Range Anti-Ship Missile (LRASM).

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The LRASM is also an offshoot of the AGM-158 Joint Air-to-Surface Standoff Missile (JASSM). The OASuW Increment 1 was developed under the incremental approach.[3] The incremental approach, as used by the US Department of Defense, goes back to the early 1950s when the US first developed its X-15 hypersonic jet. According to the 2003 National Defense Authorisation Act (NDAA), the incremental approach essentially means the "term "increment acquisition program" means an acquisition program that is to be conducted in discrete phases or blocks, with each phase or block consisting of the planned production and acquisition of one or more units of a major system."[4] The OASuW Increment 1 demand was first raised in response to a 2008 US Pacific Fleet Urgent Operational Need.[5]

The LRASM programme began in 2009, and while fielding the LRASM, the US Navy FY2018 stated that the OASuW Increment 2, aka HALO, will be required to "deliver the long-term, air-launched anti-surface warfare (ASuW) capabilities to counter 2028 threats (and beyond)."[6] On March 27, 2023, the US Navy awarded two contracts to Raytheon Missiles and Defence and Lockheed Martin for the initial development of the HALO. The contract was valued at a total of USD116 million.[7] The US Navy received approximately USD151.9 million for this programme in the FY2023 budget. According to the budget documents, the service aimed for an initial flight test in FY2026. The budget document mentioned that "in order to counter the evolving near-peer threat capability, OASuW Inc2/HALO is required to be fielded in FY 2029."[8] The decision to induct the weapon in FY2029 was based on an extension from FY2028.

HALO's development has been under a cloud since its conceptual beginning. Since HALO was supposed to be a hypersonic weapon, it required a scramjet-powered missile design. In March 2021, the Office of Naval Research issued a notice about the development of an experimental scramjet-powered hypersonic anti-ship cruise missile design, essentially meant to be compatible with the F/A-18E/F Super Hornet fighter jet, aka Screaming Arrow. The programme, however, was cancelled within days without specifying any reasons. The programme was revived again in August 2021, but the current progress of the programme is not in the public domain.[9]

HALO's Development

As mentioned, HALO was not a new weapons system developed from scratch. The AGM-158 JASSM was the first system of its kind, and HALO traces its roots back to it. The AGM-158 was initially developed in the late 1990s. The USAF drove its development to achieve a weapon with low-observable, standoff capabilities and the ability to carry out precision

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strike missions. Lockheed Martin was tasked with designing and developing the missile, which commenced in 1998. The missile was declared operational by the USAF in 2003.[10] The AGM-158 JASSM was the baseline variant and is no longer in use. It was later developed into what is now known as the AGM-158B JASSM-ER, with the ER indicating extended range variant, and providing a range of 1,000 km. It is to be noted here that the AGM family of cruise missiles are subsonic. The LRASM, from which HALO directly originates, was first brought into existence in 2009. The LRASM was developed to supplement the US Navy's primary anti-ship missile, the Harpoon. It was already 40 years old in 2009 and started losing relevance because of China's sub-surface capabilities. The Harpoon faced issues such as subsonic flight, limited range, and limited targeting and navigation skills, making it less lethal when facing China's A2/AD capabilities.[11] In its initial development period, the LRASM had two variants, LRASM-A and LRASM-B. The 'A' version was supposed to be a subsonic, low-flying, stealthy missile. The 'B' version was imagined to be a high-altitude supersonic, ramjet-powered anti-ship missile. However, the 'B' version did not see much progress and was cancelled in 2012.[12] One of the reasons for the cancellation was related to "tightening [of] the defence budgets."[13] The 'A' version finally received all the attention and developed into what is now AGM-158C-1. The US Navy is developing at least two variants of AGM-158C. The first is the 'C' version, which has already been deployed on the USAF's F-15E and EX Eagle II. For the Navy, the F/A-18E/F Super Hornets are available platforms for the 'C' version.[14] The development of the AGM-158C has been done while keeping in mind the A2/AD capabilities of the adversary's navy. The 'C' version employs detection through an imaging infrared (IIR) system, which can assist in precise strikes of surface vessels. Another essential feature of the 'C' version is its passive radio frequency sensors, which provide a wide area of target acquisition and help avoid detection because of non-distributive radio frequency.[15] This anti-ship missile also has a weapon data link system, which is meant to give it in-flight updates.

The AGM-158C or LRASM is already a well-equipped missile system with a substantial cost designation. The unit cost of the 'C' version missile is around US$3 million. This raises the question of why HALO was needed and what led to its cancellation, which dented US hypersonic efforts.

Why was the Demand for the HALO Raised?

The US Navy budget document of FY2023 mentioned that the development of this hypersonic system is related to anti-access/area denial (A2/AD) countermeasures.[16] To effectively counter the A2/AD capabilities of its adversaries, the US started thinking about it right after the end of the Cold War. General Ronald Fogleman, then Air Force Chief of Staff, stated in 1996 the following concern:

> "Saturation ballistic missile attacks against littoral forces, ports, airfields, storage facilities, and staging areas could make it extremely costly to project US forces into a disputed theater, much less carry out operations to defeat a well-armed aggressor. Simply the threat of such enemy missile attacks might deter US and coalition partners from responding to aggression in the first instance."[17]

The Secretary of Defense Donald Rumsfeld on January 31, 2002 also highlighted the same concerns and argued that "we [the US] must, therefore, reduce our dependence on predictable and vulnerable base structure, by exploiting several technologies that include longer-range aircraft, unmanned aerial vehicles, and stealthy platforms, as well as reducing the amount of logistical support needed by our ground forces."[18] The A2/AD problem for the US became a much more holistic denial strategy which can be implemented by its adversaries. Admiral Jay Johnson, who was the Chief of Naval Operations in the late 1990s, argued that:

> "I anticipate that the next century will see those foes striving to target concentrations of troops and materiel ashore and attack our forces at sea and in the air. This is more than a sea-denial threat or a Navy problem. It is an area-denial threat whose defeat or negation will become the single most crucial element in projecting and sustaining US military power where it is needed."[19]

After the end of the Cold War, extended-reach operations became very important for US strategic interests, and so were adversaries' capabilities in this domain. For the US Navy, to successfully deter its adversaries, the post-Cold War era demanded an assured access strategy. By the end of the 20th century, the US Navy had four strategic concepts: forward presence, deterrence, sea and area control, and power projection.[20] The 2001 Quadrennial Defense Review Report (QDR) [now known as National Defense Strategy] first brought up the issue of 'assurance of access' to the US extended facilities and the region. This document was also the first to refer to the development of capabilities for "sustained operations at great distances with minimal theatre-based support."[21] Not only official documents but also higher officials of the US Navy started arguing about the need for precision strike capabilities in the early 2000s. Admiral Vern Clark, former US Chief of Naval Operations (CNO) in October 2002, wrote "Sea Power 21: Projecting Decisive Joint Capabilities." In this article, Clark argued that future operations at sea would require the US Navy to enable "ForceNet, an overarching effort to integrate warriors, sensors, networks, command and control, platforms, and weapons into a fully netted, combat force." He further stated that the ISR capabilities would help the US Navy to create a knowledge well, which will help in a "full array of Sea Strike operations-next-generation missiles capable of in-flight targeting, aircraft with stand-off precision

weapons."[22] While for the first decade of the 21st century, the US primarily focused on the Global War on Terrorism. However, future threats posed by states remained an area of concern for the US. The 2010 QDR, while heavily referring to threats posed by non-state actors, still managed to bring the issues related to future anti-access capabilities of some states. The 2010 QDR stated that the US must "Deter and defeat aggression in anti-access environments", and to do so, the QDR mentioned expansion of "future long-range strike capabilities."[23]

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The 2015 QDR was more vocal on the issue of overcoming A2/AD capabilities and enhancing long-range standoff capabilities. This particular QDR stated clearly that the US requires advanced air-to-surface missiles to perform precision strikes. This QDR also invoked the Chinese A2/AD abilities for the first time, which can prevent the US's future military operations. This QDR was also important for developing HALO because it mentioned developing offensive strike capabilities, such as the Offensive Anti-Surface Warfare weapons. Besides the observations by the QDR, the following three points also became important for the US in developing hypersonic systems such as the HALO.[24]

China's Greater Shipbuilding Capacity:

Since the end of the Cold War, the US Navy has enjoyed a greater edge in the number of its surface and subsurface vessels. However, China has made sure to overcome the US Navy's numbers. In a recent US Navy briefing, the Office of Naval Intelligence presented compiled data that showed "a growing gap in fleet sizes is being helped by China's shipbuilders being more than 200 times more capable of producing surface warships and submarines."[25]

China's Modernisation of Surface Fleets:

China's naval battle fleet now possesses a range of modern and lethal offensive systems. The Type 055, which entered service in 2020, has hot—and cold-launched missile systems. This allows China to load various missile systems, such as the YJ-18, CJ-10, YJ-83, the HQ-16 and HQ-9, and the Yu-8 and DK-10 missiles. Most importantly, China has also made sure to equip its missiles with countermeasures to help avoid anti-ship missiles in the Pacific region.[26]

Integration of the Hypersonic Systems for the A2/AD Superiority:

The new, more challenging security environment requires the United States to be more cautious when starting new weapons programmes that become unsuccessful in the long run.

Besides building a substantial Navy, China has equipped its surface fleets with hypersonic systems. China's YJ-21 hypersonic anti-ship missile has an average speed of Mach 6 and a terminal velocity of Mach 10. Recently, China has also shown an air-launched version of the YJ-21. Along with the DF-21D and DF-26, the YJ-21 is being developed to boost the Chinese Navy's A2/AD superiority.[27]

Conclusion

Given the developments, the US Navy has developed standoff capabilities in the Pacific region. The HALO was another answer to China's future A2/AD problems. A hypersonic missile provides speed, manoeuvrability, and low-level flying capability to avoid detection by air defences effectively. The LRASM already have two of these capabilities: low-level flying and manoeuvrability. While HALO was referred to as 'a critical asset', it could not overcome issues related to cost and industrial planning. HALO's cancellation is based on the cost-return issue. When estimating the ARRW programme, which has already been shelved, the CBO estimated a cost of US$15-18 million per ARRW hypersonic missile.[28] There is also an issue of industrial planning, which HALO faced right from the beginning of the programme. In 2024, the GAO critically reviewed the six ongoing hypersonic programmes and stated that four of these six programmes, including HALO, did not "solicit and incorporate direct and timely user feedback or have plans to do so in the future." The report also mentioned that these four programmes have failed to take "full advantage of modern engineering techniques" to develop the hypersonic systems.[29]

Hypersonic development has become an imperative area of interest for the US. However, despite being the first country to start a programme on hypersonic technology, the goal of having a proper hypersonic system still seems a dream. While the reason for cancelling the HALO was based on financial constraints, a closer look also revealed other issues. While pushing forward numerous weapons projects, the US military-industrial complex fails to cross-check the existing industrial capacity and the subsequent cost assessment. Therefore, the new, more challenging security environment requires the United States to be more cautious when starting new weapons programmes that become unsuccessful in the long run. Given that India's hypersonic ambitions are also based on long-term R&D, particularly through the Defence Research and Development Organisation (DRDO), the US setbacks accentuate the extreme complexity of hypersonic development. In this scenario, in India, some lessons can be particularly drawn. India

could follow an incremental and research-intensive approach without subjecting itself to the race the US is trying to chase.

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