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The U.S. Army's Long-Range Hypersonic Weapon (LRHW): Dark Eagle

What Is the Army's Long-Range Hypersonic Weapon?

The Army's Long-Range Hypersonic Weapon (LRHW), also known as Dark Eagle (**Figure 1**), with a reported range of 1,725 miles, consists of a ground-launched missile equipped with a hypersonic glide body and associated transport, support, and fire control equipment. According to the Army,

This land-based, truck-launched system is armed with hypersonic missiles that can travel well over 3,800 miles per hour. They can reach the top of the Earth's atmosphere and remain just beyond the range of air and missile defense systems until they are ready to strike, and by then it's too late to react.

Figure 1. Artist Rendition of a Notional LRHW Unit



Source: <https://www.popularmechanics.com/military/weapons/a36421213/army-hypersonic-weapon-1700-mile-range/>, accessed November 18, 2021.

The Army further notes

The LRHW system provides the Army a strategic attack weapon system to defeat Anti-Access/Area Denial (A2/AD) capabilities, suppress adversary long-range fires, and engage other high payoff/time critical targets. The Army is working closely with the Navy in the development of the LRHW. LRHW is comprised of the Common Hypersonic Glide Body (C-HGB), and the Navy 34.5-inch booster.

LRHW Components

Missile

The missile component of the LRHW is reportedly being developed by Lockheed Martin and Northrop Grumman. When the hypersonic glide body is attached, it is referred to as the Navy-Army All Up Round plus Canister (AUR+C). The missile component serves as the common two-stage

booster for the Army's LRHW and the Navy's Conventional Prompt Strike (CPS) system, which can be fired from both surface vessels and submarines.

Common Hypersonic Glide Body (C-HGB)

The C-HGB is reportedly based on the Alternate Re-Entry System developed by the Army and Sandia National Laboratories. Dynetics, a subsidiary of Leidos, is currently under contract to produce C-HGB prototypes for the Army and Navy. The C-HGB uses a booster rocket motor to accelerate to well above hypersonic speeds and then jettisons the expended rocket booster. The C-HGB, which can travel at Mach 5 or higher on its own, is planned to be maneuverable, potentially making it more difficult to detect and intercept.

LRHW Organization and Units

The LRHW is organized into batteries. According to the Army "a LRHW battery consists of four Transporter Erector Launchers on modified M870A4 trailers, each equipped with two AUR+Cs (eight in total), one Battery Operations Center (BOC) for command and control, and a BOC support vehicle."

The 5th Battalion, 3rd Field Artillery Regiment at Joint Base Lewis-McChord, Washington, was designated to operate the first battery of eight LRHW missiles. The battalion, also referred to as a Strategic Long-Range Fires battalion, is part of the Army's 1st Multi Domain Task Force (MDTF), a unit in the Indo Pacific-oriented I Corps stationed at Joint Base Lewis-McChord. Other LRHW batteries are planned for Strategic Long-Range Fires battalions in the remaining MDTFs scheduled for activation.

LRHW Testing and Program Activities

According to a 2023 Congressional Budget Office (CBO) Study, "U.S. Hypersonic Weapons and Alternatives," "Extensive flight testing is necessary to shield hypersonic missiles' sensitive electronics, to understand how various materials perform, and predict aerodynamics at sustained temperatures as high as 3,000° Fahrenheit." The Army originally planned for three flight tests of the LRHW before the first battery fielding in FY2023. On October 21, 2021, the booster rocket carrying the C-HGB vehicle reportedly failed a test flight, resulting in what defense officials characterized as a "no test" as the C-HGB had no chance to deploy. Reportedly, a June 2022 test of the entire LRHW missile also resulted in failure.

Flight Test Delays

In October 2022, it was reported the Department of Defense (DOD) delayed a scheduled LRHW test in order to "assess the root cause of the June [2022] failure." Reportedly, the

delayed test would be rescheduled to the first quarter of FY2023.

March 2023 LRHW Test Scrubbed

On March 10, 2023, it was reported

On March 5, DOD was preparing to execute Joint Flight Campaign-2 featuring the Army version of the prototype weapon launched at Cape Canaveral Space Force Station, FL, when the countdown was halted.... As a result of pre-flight checks during that event, the test did not occur.

Cancelled September 2023 LRHW Test and Program Delay

On September 6, 2023, it was reported

The DOD planned to conduct a flight test at the Cape Canaveral Space Force Station, Florida, to inform hypersonic technology development. As a result of pre-flight checks, the test did not occur.

On September 14, 2023, in an Army statement to Bloomberg News, the Army reportedly acknowledged it would not be able to meet its goal of deploying the LRHW by the end of FY2023.

Change in LRHW Testing Pathway

In late November 2023, Navy and Army acquisition executives reportedly decided to “revamp efforts to prepare for [LRHW] flight test following three flight test attempts this year that were scrubbed because of problems with the Lockheed Martin-produced launcher.” The Army’s new testing approach will feature subcomponent testing. The Army Assistant Secretary for Acquisitions, Logistics, and Technology reportedly stated

On the launcher side, we’re going to go back and do a little more step-by-step risk reduction to make sure we’ve got this. The missile itself—we might also concurrently do some missile tests that don’t involve the launcher just to gain confidence in the missile. So, we can do two things at once here. We can work on the Army’s launcher and perhaps do an end-to-end test with the missile with everything but the launcher, to gain confidence in the C-HGB. Because that’s the most important thing that has to work.

It was also noted this new testing effort was “definitely going to be months, not weeks,” and could possibly run into next summer.

FY2025 LRHW Budgetary Information

Table I. FY2025 LRHW Budget Request

Funding Category	Total Request (\$M)
RDT&E	\$538
Procurement (Missiles)	\$744

Source: Assistant Secretary of the Army (Financial Management and Comptroller), *U.S. Army FY2025 Budget Highlights*, March 2024, p. 33.

Notes: RDT&E = Research, Development, Test & Evaluation; \$M = U.S. dollars in millions.

According to the Army’s *FY2025 Budget Highlights*, the funds requested in Army’s FY2025 budget request are intended to

Deliver an experimental prototype LRHW with residual combat capability in 2024 at the Battery Level as part of the Long-range Fires Battalion in support of Multi-Domain Operations. Continues the development of the LRHW Common Hypersonic Glide Body (CHGB) and provide incremental funding for the All Up Round plus Canister (AUR+C) and CHGBs for basic load and reload AUR+C and test/training/ certification AUR+Cs. FY 2025 procures the third LRHW Battery’s Ground Support Equipment (GSE) and the basic load of eight All-Up Round + Canister (AUR+C).

Considerations for Congress

Possible oversight considerations for Congress could include the following.

LRHW Testing, Costs, and Fielding Plans

The Army’s November 2023 decision to revise its LRHW testing methodology seemingly suggests past testing difficulties might have been more significant than previously believed. It was also noted that even if this dual-path subcomponent testing regime proves successful, it could be a number of months before the LRHW becomes operational. Based on this new approach, potential considerations for Congress could include how many successful LRHW flight tests will be required before the Army declares the LRHW operational, and how does a potential six-month or greater program delay affect the Army’s LRHW program costs and fielding plans?

LRHW Missile Costs

According to a January 2023 Congressional Budget Office study, “U.S. Hypersonic Weapons and Alternatives,” purchasing 300 Intermediate-Range Hypersonic Boost-Glide Missiles (similar to the LRHW) was estimated to cost \$41 million per missile (in 2023 dollars). A January 2023 Center for Strategic and International Studies report, “The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan,” noted when discussing hypersonic weapons, contends “their high costs limits inventories, so they lack the volume needed to counter the immense numbers of Chinese air and naval platforms.”

Given concerns about how LRHW missile costs could influence LRHW inventories, policymakers might decide to further examine LRHW missile costs as well as quantities of LRHW missiles needed to support potential combat operations in various theaters of operations.

Andrew Feickert, Specialist in Military Ground Forces

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