



Updated July 2, 2024

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, WA. 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.

LRHW Fielding Delayed Until FY2025

According to a June 2024 Government Accountability Office (GAO) report to Congress,

The Army missed its goal of fielding its first LRHW battery—including missiles— by fiscal year 2023 due to integration challenges. Based on current test and missile production plans, the Army will not field its first complete LRHW battery until fiscal year 2025. Before the Army can field an operational system, it must conduct a successful end-to-end missile flight test using the Army’s launch system.

GAO further notes,

The LRHW integration issues discovered during testing also affect missile production. The Army cannot complete the missiles for the first battery until a successful test demonstrates that the current design works. LRHW officials stated that once a successful flight test is achieved, the first production missile will be delivered within approximately six weeks and the first battery of eight missiles will be delivered within approximately 11 months. If the Army discovers issues with missile performance in flight testing, missile deliveries and the fielding of the first operational LRHW system could be further delayed.

Successful LRHW Flight Test

On June 28, 2024 DOD announced,

The U.S. Navy and U.S. Army recently completed an end-to-end flight test of a hypersonic missile from the Pacific Missile Range Facility, Kauai, HI. The test provided data on the end-to-end performance of the Conventional Prompt Strike and Long- Range Hypersonic Weapon All Up Round.

Reportedly, the two-stage missile was launched from a ground stand from Hawaii across the Pacific Ocean more than 2,000 miles to a test range in the Marshall Islands, with the missile flying its intended course and releasing the glide body, which flew to the target.

FY2025 LRHW Budgetary Information

Table 1. 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.

Considerations for Congress

Possible oversight considerations for Congress could include the following:

Additional LRHW Testing

Now that the Army has achieved a successful end-to-end test flight of the LRHW, the Army has stated that “once a successful flight test is achieved, the first production missile will be delivered within approximately six weeks and the first battery of eight missiles will be delivered within approximately 11 months.” If the Army proceeds with its stated course of action, it is possible that the first production missiles would be delivered to the Army in mid-August 2024. Given this short timeline between missile production and fielding to the first LRHW battery, Congress might examine what additional testing is planned to be conducted with the newly produced missiles before they are delivered to the first LRHW battery.

LRHW Missile Costs

According to a January 2023 CBO 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,” contends, regarding hypersonic weapons, “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 sustained combat operations in various theaters of operations.

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