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The U.S. Army's Long Range Hypersonic Weapon (LRHW)

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

The Army's Long-Range Hypersonic Weapon (LRHW) (**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. Extremely accurate, ultrafast, maneuverable and survivable, hypersonics can strike anywhere in the world within minutes. For the battery, the task force and the U.S. Army, they provide a critical strategic weapon and a powerful deterrent against adversary capabilities.

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 Long Range Hypersonic Weapon (LRHW) system will provide the Army a prototype 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 common with the Common Hypersonic Glide Body (C-HGB), and the Navy 34.5 inch booster. Additionally, the LRHW is to use an existing command and control (C2) network, the Advanced Field Artillery Tactical Data System (AFATDS).

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 is to serve as the common two-stage booster for the Army's LRHW and the Navy's Conventional Prompt Strike (CPS) system, which is intended to be fired from both surface vessels and submarines.

What Is Anti-Access/Area Denial (A2/AD)?

A Department of Defense (DOD) term used to describe "Chinese and Russian approaches that seek to prevent U.S. forces from gaining or using access to overseas bases or critical locations, such as ports and airfields, while denying U.S. forces the ability to maneuver within striking distance of their territory. Collectively, these actions could significantly constrain U.S. military interventions or raise their costs."

Source: Chris Dougherty, "*Moving Beyond A2/AD*," Center for a New American Security, December 3, 2020.

Common Hypersonic Glide Body (C-HGB)

The C-HGB is reportedly based on the Alternate Re-Entry System previously developed by the Sandia National Laboratories and the U.S. Army. Dynetics, a subsidiary of Leidos, is currently under contract to produce C-HGB prototypes for the Army, Navy, and the Missile Defense Agency. The C-HGB "uses a booster rocket motor to accelerate to well-above hypersonic speeds, and then jettisons the expended rocket booster." According to Dynetics, the C-HGB is to be maneuverable, making it more difficult to detect and intercept and "can travel at Mach 5 or higher ... at least five times faster than the speed of sound or up to 13,000 miles per hour." The C-HGB is intended to be able to destroy targets by virtue of its velocity alone.

LRHW Organization and Units

The LRHW is to be organized into batteries—a designation given to company-sized units of field and air defense artillery. Initially, each battery reportedly is to have four launchers, each with two missiles, a mobile battery operations center, and a number of support vehicles such as the Army's currently deployed Heavy Expanded Mobility Tactical Truck (HEMTT) to transport the LRHWs.

Reportedly, the 5th Battalion, 3rd Field Artillery Regiment at Joint Base Lewis-McChord, Washington, is 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 Pacific-oriented I Corps also stationed at Joint Base Lewis-McChord. Other LRHW batteries are planned for Strategic Long Range Fires battalions in each of the four remaining MDTFs scheduled for activation. It is not known if the Army plans to stand up more than the five LRHW batteries assigned to MDTFs or if any LRHW units will be assigned to the Army National Guard.

LRHW Testing Activities

Reportedly, on October 20, 2021, the Army and Navy conducted three successful tests of "hypersonic weapon component prototypes." During a separate test that same day, a booster rocket carrying a hypersonic glide vehicle reportedly failed a test flight. The Army plans three flight tests of the C-HGB before the first battery is fielded in FY2023, with the first flight test planned for first quarter FY2022, the second in fourth quarter FY2022, and the third in the second quarter FY2023.

FY2022 Budgetary Information

Table 1. FY2022 LRHW Budget Request

Funding Category	Total Request ($M)
RDT&E	$300

Source: Department of Defense Fiscal Year 2022 Budget Estimates, Army Justification Book 2a of 2, RDT&E, Volume II, Budget Activity 4, May 2021, p. 639.

Notes: RDT&E = Research, Development, Test & Evaluation: **$M** = U.S. Dollars in Millions;

Table 2. FY2022 LRHW Defense Authorizations and Appropriations

Funding Category	Authorized ($M)	Appropriated ($M)
RDT&E	$300.9 (S. 1605)	$300.9 (H.R. 4432) $310.4 (S. 3023)

Sources: Rules Committee Print 117-21, Text of House Amendment to S. 1605, p. 1826; H.Rept. 117-88 to accompany H.R. 4432, p. 241; Explanatory Statement to accompany Senate Appropriations Committee-released Department of Defense Appropriations Act, 2022, p. 157.

Potential Issues for Congress

LRHW Costs

An article suggests the Army's LRHW missile could cost $106 million per missile and the program could add as much as $7 billion to the Army's budget over the next few years. The Senate Armed Services Committee suggested:

> To better understand future costs and inform future decisions, the committee directs the Army to refine the cost estimate for additional currently-designed hypersonic glide body missiles that are to be acquired. Additionally, the committee directs the Army to assess alternatives to the current LRHW missile, to include lower-cost alternative glide bodies and air-breathing hypersonic technologies and to provide a briefing on the assessment to the Senate Armed Services Committee not later than January 15, 2022.

Given congressional interest in LRHW costs, it is possible that less costly versions could be developed in the future.

LRHW Flight Testing

While LRHW booster and warhead technologies are not new and have been tested in various configurations over the preceding years, it can be argued that the three planned flight tests of the LRHW might not be sufficient to fully validate the missile's performance. Congress might examine the Army's test and evaluation plan for the LRHW, especially given its initial high cost and central role in future Army plans.

LRHW Overseas Basing

On March 30, 2021, the Chief of Staff of the Army discussing the LRHW reportedly noted, "The politics of where they're based, how they're based, will be up to the policymakers and the diplomats." Given the 1,725 mile range limitation of the LRHW, the inability to secure overseas basing rights for these units could limit or negate their effectiveness. On December 1, 2021, the Secretary of the Army reportedly suggested the LRHW "will likely be fielded in the United States, rather than in allied countries near China" and "the Army is ready, when called upon, to be able to put those kinds of capabilities in the region. But it's really [the State and Defense departments] that will take the lead in those discussions." Given the importance of LRHW basing, Congress might examine ongoing Army efforts to secure LRHW basing in both Europe and the Pacific region.

Additional Resources

CRS Report R45811, *Hypersonic Weapons: Background and Issues for Congress*, by Kelley M. Sayler.

CRS Report R46721, *U.S. Army Long-Range Precision Fires: Background and Issues for Congress*, by Andrew Feickert.

CRS In Focus IF11797, *The Army's Multi-Domain Task Force (MDTF)*, by Andrew Feickert.

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