

The complexity of United States (U.S.) contingency operations encourages ingenuity when considering options for responsive long range surface fires. The M142 High Mobility Artillery Rocket System (HIMARS) has provided an unparalleled, reliable, all-weather surface-to-surface option since 2005 serving the United

Extending the Army's Reach by Sea

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States, Singapore, United Arab Emirates and Ukraine to name a few. The Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM) includes a precision Global Positioning System (GPS)-guided inertial navigation system (INS) making them very reliable and precise. The Army Tactical Missile System (ATACMS) has a 500lb GPS guided warhead with a maximum range of 300 kilometers; and its successor, the Precision Surface Missile (PrSM), will achieve an even greater range in the near future. The M142 5-ton Medium Tactical Vehicle XM1140A1 chassis is versatile and can maneuver through tough terrain at speeds up to 90 kilometers per hour with cruising range of 480 kilometers. Most recently, Ukraine's use of the HIMARS during the Russo-Ukrainian war illustrates the platform's deep strike capabilities. The accuracy, dependability and range achieved by ATACMS and M31A1 227mm Guided Multiple Launch Rocket (GMLRS) has allowed Ukraine to destroy high payoff targets with precision. The Ukrainians forced wholesale changes in the Russian military logistics system as the Russians were compelled to move their supply depots out of range of the HIMARS. Ukraine's greatest effects with the HIMARS were achieved by using it to strike fixed or semi-fixed high payoff targets, such as logistic or command and control sites in the deep area, while simultaneously using fires in the close area on Russian maneuver. The standard fire mission processing time, according to Training Circular (TC) 3-09.8, is under

11 minutes while delivering a precision strike with low Circular Error of probability (CEP) and minimal collateral damage concerns. All of that being said, there are restraints associated with HIMARS operations and servicing strategic targets. For example, the HIMARS battalion has a very limited off-forward operating base (FOB) capability, often restricted to designated geographically assigned position areas for artillery (PAA) thus limiting what targets it can engage. Movement can only be accomplished with strict adherence to protection and security protocols. For these reasons, combatant commands find themselves over reliant on air to surface capabilities to counter hostility. This over reliance exhausts air frames, pilots and crucial supplies of guided bomb units and small diameter bombs.

One option to offset the effects of time and distance is HIMARS rapid insertion or HIRAIN. HIMARS can be rapidly inserted into a remote location by loading up to 90 thousand pounds of M142 equipment onto an MC-130 Hercules or C17 Globemaster and transporting it in order to extend the reach while reducing enemy detection. The crew and launcher exit upon landing, conduct a precision strike and immediately load back onto the aircraft and vacate the area. The launcher autonomously tracks the location while in the air through 'Hot Panel' software that links to the aircraft's GPS enhancing speed and efficiency. Unfortunately, this capability also comes with its own limitations. First and foremost, there is the lack of expeditionary remote landing zones capable of accommodating a large aircraft. Second, the operation often requires host nation (HN) approval which is restrictive or denied altogether. Additionally, the aircraft is unable to transport a sustainable amount of ATACMS or GMLRS pods along with equipment and crew. HIRAIN is, at best, more suitable for one or two deliberate strikes as opposed to offering a long-term solution.

In the interim, HIMARS Afloat may be a viable long-term approach that not only extends the Army's range but demonstrates component interoperability. HIMARS Afloat mitigates many of the obstacles previously mentioned while reducing the reliance on United States Air Force (USAF) manned and unmanned air to surface capabilities, which can become predictable and over utilized. Furthermore, KC-135 Stratotanker fuel plans are costly, dangerous and complex; air assets are threatened by surface-to-air missile

(SAMS) threat; and red weather interrupts or delays operations. HIMARS Afloat addresses these issues and involves loading a launcher onto specific variants of naval vessels and launching missiles from sea. The concept was proven successful by 5th Battalion, 11th Marines in 2017 during exercise Dawn Blitz. The unit effectively engaged a training target from 70 kilometers using M31A1 GMLRS from the USS Anchorage (Rader, 2017).



(Image retrieved from <https://www.pacom.mil/Media/News/Spotlight/Article/1351282/anchorage-conducts-high-mobility-artillery-rocket-system-shoot-during-db17/>)

Launching a missile from sea offers several strategic advantages versus launching from land. There are no HN cooperation agreements required on international waters allowing more freedom of maneuver. Air clearance is achieved more expediently via the Navy senior air defense officer and the sector air defense coordinator. Launch points of origin (POO) are pushed further away from friendly positions decreasing the enemy's ability to detect and thus reducing predictability. Additionally, it frees up the USN Tomahawk Land Attack Missile (TLAM) stockpile and keeps the Navy from reallocating a destroyer off current mission. TLAMs are effective but costly at \$2 million per missile compared to the \$1.7 million ATACMS, and they require more robust planning and programming time than ATACMS. Furthermore, TLAMs travel at 500 miles per hour and can take up to two hours to reach maximum range, allowing the target to displace—not to mention they are more susceptible to GPS jamming. ATACMS travel at supersonic speeds, reaching the target in under seven minutes at maximum range and striking at nearly 1,500 miles per hour which not only minimizes detection by enemy radar but reduces the potential displacement of the target. Using

HIMARS in this capacity alleviates stress to USAF airframes and munitions while removing them from the threat of enemy SAMS and providing an all-weather solution when air to surface options become degraded and time is of the essence.

The 138th Field Artillery Brigade and 1-623rd Field Artillery Battalion served in the Central Command (CENTCOM) area of responsibility (AOR) in support of Operation Inherent Resolve (OIR) 2023 – 2024 and conducted the initial planning for HIMARS Afloat. The intent of this paper is to emphasize lessons learned that were captured throughout the planning process. The following are recommendations, considerations and requirements. First and foremost, Navy vessels are floating on unpredictable waters and moving at speeds of 15–17 knots. There are variables like pitch (the rolling back and forth along a y-axis), the yaw (rotating motion along an x-axis) or heel (a rolling side to side motion.) The ship itself is equipped with static hull features known as skegs or bilge keels and other mechanisms to stabilize and apply countermeasures to the movement. Current HIMARS software is not compliant with movement. In 2020, the Joint Software Safety System Technical Review Process (JSSSTRP-AUG2020) approved the software package for sea launched ATACMS from shipboard HIMARS (SLASH). SLASH version 8.2 is acquired through the universal fielding module (ULM), and once loaded, it accommodates the pitch/roll rates equal to or less than eight degrees and provides a 400mil/20-degree fan to achieve a targeting solution. Equally important to note is the requirement for the ship to maintain proper predefined heading for a specified period of time requiring full synchronicity between the HIMARS officer in charge and the ship captain. The 138th fire control element determined that as the range to the target increases, so does the time to effectively plan for the target. The range fan provides a sight picture of approximately 22– degrees—as the ship advances, the sight picture expands. So, a ship traveling at three knots would allow almost two hours for target execution at minimum range whereas a ship traveling at the same speed and tracking a target at max range would have a lot more time due to the expansion of the range fan at further distances.

Other considerations to consider is the communication plan for fire direction. The ship's organic assets can be utilized but require firewall

exemption requests (FERS) for Advanced Field Artillery Tactical Data Systems (AFATDS). Army mission command systems are fully supported via the USCENTCOM Southwest Asia AOR (SWA) communications network architecture. The Combined Air & Space Operations Center (CAOC) can send digital traffic directly to the HIMARS fire direction control (FDC) via AFATDS for expedient fire mission processing. For dynamic targeting, an MQ-9 Reaper is equipped with laser rangefinder designator capable of producing a category one (CAT I) grid that is sent to the CAOC to be processed directly to the onboard AFATDS. Additionally, hazards to personnel, aircrafts on board and the hull of the ship need to be addressed and mitigated. Lockheed Martin manufactures a 5.5' x 7.5' concrete deck pad that is placed directly under the blast area. Since ATACMS launch at 54.7 degrees, this forces the blast almost straight into the ground, and the deck pad protects the ship from debris and blast. New designs with alternate materials are currently being tested. As for personnel and equipment, proper safety precautions and safe distances should be briefed to all personnel to mitigate injuries from debris, exhaust and toxic gas.

A designated port of debarkation (APOD) must be identified early on in the planning. This is accomplished by working with the ship captain, naval liaison officers and the port itself. In order to mount the launcher to the ship, there are eight specific mounting straps that must be acquired. These straps are configured in such a way to secure the chassis while allowing suspension movement during launch. The ship must be equipped with a crane for lifting the launcher onto the deck as well as a forklift for moving the blast pad and in support of ammo handling procedures. The chosen vessel must have a hanger for storing the five-ton chassis along with an additional launcher for backup as well as an armory magazine large enough to store ATACMS pods. Ship variants able to support include expeditionary sea based (ESB), expeditionary dock transfer (T-EDT), expeditionary fast transport (T-EFT) and other amphibious assault class ships. Sustainment for up to 20 Soldiers must be taken into consideration as well. Billeting, meals, medical supplies and other personnel requirements must be taken into account indefinitely.

The U.S. continues to confront sophisticated and fully developed hybrid threats in named

defensive operations throughout the globe. Effective response considers every operational requirement and capability (FM 3-60). As the U.S. reduces the number of forces in the Middle East, Multi-Domain Operations like Maritime SLASH is the innovative interoperability required to deter hostility, particularly in the USCENTCOM area of responsibility.

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