

Air & Missile Defense (AMD) Catalog



CENTER FOR ARMY LESSONS LEARNED

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Air Defense Articles and Resources Catalog

Center for Army Lessons Learned

Mr. Timmy Wilson Lead Analyst

Mr. Donald Haus Contributing Analyst

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Introduction

"None of this is going to matter if you're dead. And that's why you need air defense." General Mark Milley, then U.S. Army Chief of Staff, said those words as he defined the Army's six modernization priorities in October of 2017. General Milley's remarks are spot-on and recent combat operations in the Ukraine, Syria, and Southwest Asia validate them. His words clearly state that air and missile defense (AMD) is No. 5 on his list of six modernization priorities, but air and missile defense is not his second to last priority - it is the pre-eminent priority, on a list of few, which mandates resourcing. That is a point which must resonate with all.

"None of this is going to matter if you're dead. And that's why you need air defense." General Mark Milley, then U.S. Army Chief of Staff

General Milley also said in 2017, "We will reform our entire battlefield air and missile defense capability...which has tragically atrophied over the years." As one of the Army's original six modernization priorities, the Army has moved aggressively to rebuild the Army's air and missile defense capabilities. Key initiatives include reestablishing a short-range air defense (SHORAD) force and capability, while continuing to improve capabilities to counter the cruise and ballistic missile threat; addressing the 360-degree threat aspect; and achieving an integrated air defense command and control capability which optimizes capabilities, while simultaneously mitigating the potential for fratricide.

https://www.realcleardefense.com/articles/2020/06/16/none_of_this_is_going_to_matter_if_youre_dead_modernizing_integrated_air_and_missile_defense_must_remain_arms_top_priority_115381.html

Air Defense Artillery (ADA) Modernization

<https://www.defensenews.com/smr/road-to-warsaw/2016/06/14/us-army-grapples-with-short-range-air-defense-gap-in-europe/>

<https://www.defensenews.com/digital-show-dailies/dsei/2017/09/15/from-flying-tiger-to-iron-dome-a-shorad-renaissance-is-underway/>

<https://www.army.mil/standto/archive/2019/03/29/>

https://www.army.mil/article/224074/army_rebuilding_short_range_air_defense

<https://www.dvidshub.net/news/339225/ccdcs-road-map-modernizing-army-air-and-missile-defense>

<https://www.businessinsider.com/us-army-building-up-air-defenses-against-drones-cruise-missiles-2020-12>

<https://www.csis.org/analysis/five-types-international-cooperation-missile-defense>

https://www.army.mil/article/245530/m_shorad_system_bolsters_armys_air_defense_capabilities

https://tradocfcoeccafcoepfwprod.blob.core.usgovcloudapi.net/ada-journal/archive/ada-journal/2022/PB_44_21_3_ADAJ_Web_Final.pdf

<https://www.csis.org/analysis/role-integrated-air-and-missile-defense-strategic-deterrence>

<https://www.nationaldefensemagazine.org/articles/2021/5/12/army-revamps-to-pursue-new-air-and-missile-defense-tech>

<https://www.ausa.org/articles/realign-air-defense-structure>

<https://www.csis.org/analysis/battle-networks-and-future-force>

<https://www.csis.org/analysis/extending-horizon-elevated-sensors-targeting-and-missile-defense>

<https://www.defensenews.com/news/2021/10/11/the-skies-are-no-longer-safe-so-these-soldiers-are-preparing-to-defend-them/>

<https://www.defensenews.com/news/2021/10/13/fort-sill-is-at-the-center-of-the-armys-plans-for-big-cannons-missiles/>

<https://www.csis.org/analysis/seeking-alignment-missile-defense-and-defeat-2022-budget>

<https://www.csis.org/analysis/complex-air-defense-countering-hypersonic-missile-threat-0>



Maneuver Short Range Air Defense (M-SHORAD)

“The M-SHORAD, which integrates existing guns, missiles, rockets and sensors onto a Stryker A1 vehicle, is the Army’s newest addition in a variety of modernization efforts. The system is designed to defend maneuvering forces against unmanned aircraft systems, rotary-wing and residual fixed-wing threats.”

<https://www.army.mil/article/245530/m-shorad-system-bolsters-armys-air-defense-capabilities>

“Maneuver-Short Range Air Defense (M-SHORAD) is an Air Defense Artillery capability which moves and maneuvers in direct support of Brigade Combat Teams (BCT) to destroy, neutralize or deter low altitude aerial threats, including Group 3 UAS, rotary wing and fixed wing aircraft.”

<https://www.leonardodrs.com/what-we-do/products-and-services/m-shorad/>

<https://www.defensenews.com/smr/road-to-warsaw/2016/06/14/us-army-grapples-with-short-range-air-defense-gap-in-europe/>

<https://www.defensenews.com/smr/army-modernization/2020/03/24/us-army-to-wrap-up-early-testing-of-short-range-air-defense-system-soon/>

<https://www.dvidshub.net/news/383319/soldiers-get-hands-with-new-air-defense-system>

<https://breakingdefense.com/2020/10/gdls-gets-1-2b-for-144-army-anti-aircraft-strykers/>

<https://www.dvidshub.net/news/394541/m-shorad-brings-new-significance-armys-air-defense-capabilities>

<https://www.defensenews.com/land/2021/04/23/first-short-range-air-defense-systems-deploy-to-europe/>

https://www.defenseworld.net/2021/04/24/u-s-army-in-germany-receives-first-short-range-air-defense-m-shorad-system.html#.Ygp2mt_MJ7g

<https://www.army-technology.com/news/5-4-ada-stryker-m-shorad-system/>

<https://www.military.com/daily-news/2021/04/27/army-fields-first-new-air-defense-strykers-europe.html>

<https://www.dvidshub.net/news/407062/target-5th-battalion-4th-air-defense-artillery-regiment-becomes-first-unit-live-fire-armys-new-m-shorad>

<https://www.defensenews.com/land/2021/10/11/first-platoon-of-short-range-air-defense-systems-get-workout-ahead-of-bigger-events/>

<https://www.defensenews.com/news/2021/10/11/the-skies-are-no-longer-safe-so-these-soldiers-are-preparing-to-defend-them/>

<https://nationalinterest.org/blog/buzz/army-paves-way-new-air-defense-tactics-195262>

<https://insidedefense.com/daily-news/m-shorad-fielded-counter-russian-threats-deemed-not-yet-operationally-effective-suitable>

<https://insidedefense.com/daily-news/army-plan-could-double-m-shorad-buy>

https://www.army.mil/article/254592/historic_4_60_ada_reactivated_with_fort_sill_ceremony

<https://www.defensenews.com/land/2022/03/30/us-armys-short-range-air-defense-capability-will-grow-to-a-battalion-by-years-end/>

<https://www.defensenews.com/land/2022/03/30/us-armys-short-range-air-defense-capability-will-grow-to-a-battalion-by-years-end/>



Directed Energy Maneuver SHORAD (DE M-SHORAD)

“The Directed Energy Maneuver Short Range Air Defense (DE M-SHORAD) system is a 50-kilowatt laser weapon mounted on a Stryker infantry carrier vehicle. Instead of a Stinger missile, think of a high-powered beam of energy directed at a target.”

<https://taskandpurpose.com/military-tech/army-stryker-laser-weapons-system-shorad/>

“Intended to help protect Divisions and Brigade Combat Teams from UAS and RAM threats...”

https://www.army.mil/article/249239/army_advances_first_laser_weapon_through_combat_shoot_off

“The directed energy weapon system — part of the U.S. Army’s Directed Energy Maneuver-Short Range Air Defense, or DE M-SHORAD — acquires, tracks, targets and defeats mortars and large drones in complex swarming scenarios.”

<https://www.raytheonintelligenceandspace.com/what-we-do/advanced-tech/lasers>

“The DE M-SHORAD effort is aimed at protecting soldiers against various aerial threats, including unmanned aircraft systems, rotary-wing aircraft, rockets, artillery, and mortars.”

https://www.photonics.com/Articles/Raytheon_Partners_with_Kord_to_Take_on_Aerial/a68050

<https://www.northropgrumman.com/what-we-do/land/short-range-air-defense-shorad/>

<https://www.defensenews.com/land/2018/02/13/us-army-could-get-laser-for-short-range-air-defense-in-under-five-years/>

<https://www.defensenews.com/land/2019/08/01/northrop-and-raytheon-to-compete-to-build-laser-weapon-for-short-range-air-defense/>

<https://www.defensenews.com/land/2021/08/18/northrop-bows-out-of-competition-to-build-laser-weapon-for-strykers/>

<https://www.army-technology.com/news/kbr-demonstrates-de-m-shorad-capabilities/>

<https://www.defensenews.com/digital-show-dailies/ausa/2021/10/12/lockheed-plans-to-pitch-air-defense-laser-weapon-in-future-army-competition/>

<https://www.defensenews.com/land/2022/01/13/army-readies-to-deliver-first-set-of-strykers-with-50-kilowatt-laser-weapons/>

<https://www.inceptivemind.com/stryker-mounted-high-energy-laser-defeat-multiple-mortars-large-drones/24768/>

<https://newatlas.com/military/stryker-combat-vehicle-mounted-laser-weapon-defense-mortar-rounds/>

https://www.photonics.com/Articles/Raytheon_Partners_with_Kord_to_Take_on_Aerial/a68050



Integrated Air and Missile Defense/Integrated Battle Command System (IAMD/IBCS)

“Army Integrated Air and Missile Defense (AIAMD) integrates current and future Air and Missile Defense (AMD) Sensors, Weapons, and Mission Command technologies into an Integrated Fire Control System, provides a single air picture, increases defended area, and provides flexibility in systems deployment. The Integrated Battle Command System (IBCS) is the fire control and operational center capability that provides greater defense effectiveness than what can be provided in the current single sensor fire unit construct.” <https://asc.army.mil/web/portfolio-item/ms-aiamd-2/>

“The Integrated Air and Missile Defense Battle Command System (IBCS) connects sensors and effectors never designed to work together into one command and control system so warfighters can see and act on data across the entire battlefield more swiftly.” <https://www.northropgrumman.com/what-we-do/land/integrated-battle-command-system-ibcs/>

<https://www.defensenews.com/digital-show-dailies/ausa/2019/10/14/major-missile-defense-command-system-heads-toward-a-critical-test/>

<https://breakingdefense.com/2020/08/ibcs-defeats-2-missiles-in-flight-but-100s-in-simulation/>

<https://breakingdefense.com/2020/08/ibcs-army-missile-defense-passes-live-fire-test/>

<https://www.defensenews.com/land/2021/01/13/us-armys-future-battle-command-system-is-cleared-for-production/>

https://tradocfcoeccafcoepfwprod.blob.core.usgovcloudapi.net/ada-journal/archive/ada-journal/2022/PB_44_21_3_ADAJ_Web_Final.pdf

<https://www.nationaldefensemagazine.org/articles/2021/5/12/army-revamps-to-pursue-new-air-and-missile-defense-tech>

<https://www.defensenews.com/digital-show-dailies/smd/2021/08/10/us-armys-critical-missile-defense-system-will-play-role-at-project-convergence/>

<https://defence24.com/armed-forces/bcs-as-the-foundation-for-multi-domain-air-defense>

<https://www.csis.org/analysis/seeking-alignment-missile-defense-and-defeat-2022-budget>

<https://www.defensenews.com/land/2022/01/19/at-project-convergence-armys-new-battle-command-system-demonstrated-expanded-capability/>

<https://insidedefense.com/daily-news/army-missile-defense-system-directs-offensive-strike-potential-paradigm-changing-demo>

<https://www.defensenews.com/land/2022/02/09/us-armys-delayed-battle-command-system-begins-operational-testing/>

https://www.army.mil/article/255224/initial_operational_test_begins_on_army_integrated_air_and_missile_defense_system

<https://www.thedefensepost.com/2022/04/01/us-army-air-missile-system/>



Terminal High Altitude Area Defense (THAAD)

“The Terminal High Altitude Area Defense (THAAD) element provides the Ballistic Missile Defense System (BMDS) with a globally transportable, rapidly-deployable capability to intercept and destroy ballistic missiles inside or outside the atmosphere during their final, or terminal, phase of flight.”

<https://www.mda.mil/system/thaad.html>

<https://www.defensenews.com/land/2019/08/30/first-remotely-launched-terminal-missile-defense-test-deemed-a-success/>

<https://www.defensenews.com/land/2020/10/01/mda-and-army-see-successful-patriot-and-thaad-test-after-failure/>

<https://www.defensenews.com/pentagon/2021/07/12/house-appropriators-fund-hawaii-missile-defense-radar-but-cut-dollars-for-guam/>

<https://www.csis.org/analysis/seeking-alignment-missile-defense-and-defeat-2022-budget>

<https://www.defensenews.com/land/2022/01/21/thaad-in-first-operational-use-destroys-midrange-ballistic-missile-in-houthi-attack/>



Iron Dome

“Iron Dome is an Israeli mobile missile defense system designed to intercept short-range rockets and artillery. It comprises the lowest tier of Israel’s missile defense architecture, intended to counter unguided rocket and drone attacks from the Palestinian Territories and Hezbollah-controlled Lebanon.”

<https://missilethreat.csis.org/defsys/iron-dome/>

“Iron Dome detects, analyses and intercepts a range of incoming threats, including C-RAM, precise guided missiles, cruise missiles, unmanned aerial vehicles and air-breathing threats.”

<https://www.army-technology.com/news/iron-dome-marks-10th-anniversary-of-first-operational-intercept/>

<https://www.defensenews.com/digital-show-dailies/dsei/2017/09/15/from-flying-tiger-to-iron-dome-a-shorad-renaissance-is-underway/>

<https://www.defensenews.com/digital-show-dailies/smd/2018/08/08/army-takes-serious-steps-toward-interim-cruise-missile-protection-capability/>

<https://www.defensenews.com/global/mideast-africa/2019/02/06/can-iron-dome-cut-it-for-indirect-fire-protection-us-army-is-buying-a-couple-systems-to-find-out/>

<https://www.defensenews.com/digital-show-dailies/smd/2019/08/12/its-official-us-army-inks-iron-dome-deal/>

<https://www.defensenews.com/land/2020/03/09/army-to-conduct-shoot-off-for-future-indirect-fires-protection-capability/>

<https://www.defensenews.com/land/2021/02/15/iron-dome-plans-being-finalized-as-us-army-begins-training-on-systems/>

https://tradocfcoeccafcoepfwprod.blob.core.usgovcloudapi.net/ada-journal/archive/ada-journal/2022/PB_44_21_3_ADAJ_Web_Final.pdf

https://www.army.mil/article/249633/army_executes_iron_dome_defense_system_live_fire_at_white_sands_missile_range

<https://www.defensenews.com/news/your-army/2021/08/25/soldiers-knock-down-airborne-threats-with-new-missile-defense-system/>

<https://www.politico.com/news/2021/09/14/us-army-iron-dome-weapons-ukraine-511787>

<https://www.defensenews.com/congress/budget/2021/09/21/new-continuing-resolution-includes-63b-for-afghans-1b-for-iron-dome/>

<https://www.defensenews.com/land/2021/10/07/iron-dome-heads-to-missile-defense-experiment-in-guam/>

https://www.stripes.com/theaters/asia_pacific/2021-10-22/guam-missile-defense-iron-dome-israel-3330839.html

https://www.stripes.com/theaters/asia_pacific/2021-11-24/guam-iron-dome-missile-defense-system-israel-3737051.html

<https://www.defensenews.com/land/2021/12/09/congress-drops-army-mandate-to-buy-more-iron-dome-defenses-against-cruise-missiles/>

<https://www.csis.org/analysis/seeking-alignment-missile-defense-and-defeat-2022-budget>

https://www.army.mil/article/254406/army_seeks_public_input_on_study_of_possible_iron_dome_sites

<https://www.defensenews.com/land/2022/03/29/us-army-prepares-to-choose-homes-for-iron-dome-weapons/>



Indirect Fire Protection Capability (IFPC)

“The Indirect Fire Protection Capability Increment 2 – Intercept (IFPC Increment 2-I) Block 1 System is a mobile, ground-based weapon system designed to defeat unmanned aircraft systems (UAS) and cruise missiles.”

https://asc.army.mil/web/portfolio-item/ms-ifpc_inc_2-i/

“The IFPC Inc 2 is a mobile, ground-based system designed to defeat subsonic cruise missiles, Group 2/3 unmanned aircraft systems, rockets, artillery, mortars and other aerial threats.”

https://www.army.mil/article/250595/army_announces_contract_award_for_indirect_fire_protection_capability_increment_2

<https://www.defensenews.com/digital-show-dailies/smd/2018/08/08/army-takes-serious-steps-toward-interim-cruise-missile-protection-capability/>

<https://www.defensenews.com/digital-show-dailies/ausa/2018/10/10/army-nearing-strategy-on-way-ahead-for-indirect-fire-protection-capability/>

<https://www.defensenews.com/land/2019/04/25/army-reworking-enduring-plans-for-indirect-fires-protection-system/>

https://tradocfcoeccafcoepfwprod.blob.core.usgovcloudapi.net/ada-journal/archive/ada-journal/2022/PB_44_21_3_ADAJ_Web_Final.pdf

<https://www.defensenews.com/land/2020/03/09/army-to-conduct-shoot-off-for-future-indirect-fires-protection-capability/>

<https://www.defensenews.com/land/2021/08/24/heres-who-the-us-army-has-tapped-to-build-an-enduring-capability-to-counter-drones-and-cruise-missiles/>

<https://www.defensenews.com/flashpoints/afghanistan/2021/08/30/us-defense-system-downed-rockets-in-kabul-attack/>

<https://www.defensenews.com/land/2021/09/24/us-army-mints-deal-with-dynetics-to-build-system-to-counter-drones-and-cruise-missiles/>

<https://www.defensenews.com/digital-show-dailies/ausa/2021/10/11/us-army-lockheed-find-faster-path-to-field-air-and-missile-defense-radar/>

<https://www.csis.org/analysis/seeking-alignment-missile-defense-and-defeat-2022-budget>



Patriot

“Patriot is a long-range, all-altitude, all-weather air defence system to counter tactical ballistic missiles, cruise missiles and advanced aircraft.” <https://www.army-technology.com/projects/patriot/>

<https://www.militarytimes.com/news/your-military/2019/09/26/200-air-and-missile-defense-soldiers-set-to-deploy-to-saudi-arabia/>

<https://www.defensenews.com/breaking-news/2019/10/17/heres-who-will-build-the-armys-new-missile-defense-radar/>

<https://www.defensenews.com/smr/army-modernization/2020/03/17/raytheon-plows-ahead-to-build-us-armys-future-radar/>

<https://www.militarytimes.com/news/your-military/2020/05/07/us-pulls-patriot-missiles-fighter-aircraft-from-saudi-arabia-amid-dispute/>

<https://www.defensenews.com/land/2020/10/01/mda-and-army-see-successful-patriot-and-thaad-test-after-failure/>

<https://www.defensenews.com/land/2021/10/11/army-closes-in-on-replacement-for-patriot-air-defense-system/>

<https://www.cnn.com/2022/03/10/politics/us-patriot-missile-defense-system-explainer/index.html>

<https://www.airforcemag.com/arctic-edge-brings-armys-patriot-avenger-systems-to-alaska-for-the-first-time%EF%BF%BC/>

<https://www.armytimes.com/news/your-army/2022/03/21/soldiers-integrate-air-defense-for-the-first-time-in-major-alaska-exercise/>

<https://www.thedefensepost.com/2022/03/23/us-army-patriot-defense-alaska/>

<https://www.politico.com/news/2022/04/08/u-s-patriot-missile-system-slovakia-00024116>

<https://www.militarytimes.com/news/pentagon-congress/2022/04/08/patriot-missile-battery-heading-to-slovakia-amid-ukraine-invasion-response/#:~:text=Patriot%20missile%20battery%20heading%20to%20Slovakia%20amid%20Ukraine%20invasion%20response,-By%20Meghann%20Myers&text=The%20Army%20will%20send%20a,that%20country's%20air%20defense%20capabilities.>

<https://www.airforcemag.com/article/honing-the-arctic-edge/>

<https://warriormaven.com/russia-ukraine/patriot-missiles-f-35s-nato-russia-ukraine>

<https://www.defensenews.com/global/europe/2022/05/24/poland-requests-six-additional-patriot-batteries-from-the-united-states/>

Joint Air and Missile Defense (AMD)



Project Convergence

“Project Convergence is the Joint Force experimenting with speed, range, and decision dominance to achieve overmatch and inform the Joint Warfighting Concept and Joint All Domain Command and Control. A campaign of learning, it leverages a series of joint, multi-domain engagements to integrate artificial intelligence, robotics, and autonomy to improve battlefield situational awareness, connect sensors with shooters, and accelerate the decision-making timeline.”

<https://armyfuturescommand.com/convergence/>

<https://www.defensenews.com/digital-show-dailies/ausa/2020/10/12/at-project-convergence-the-us-army-experienced-success-and-failure-and-its-happy-about-both/>

<https://www.defensenews.com/digital-show-dailies/smd/2021/08/10/us-armys-critical-missile-defense-system-will-play-role-at-project-convergence/>

<https://www.defensenews.com/training-sim/2021/09/07/at-next-project-convergence-7-scenarios-will-test-american-tech-against-adversaries/>

<https://www.nationaldefensemagazine.org/articles/2021/12/17/armys-project-convergence-continues-on-10-year-learning-curve>

<https://insidedefense.com/daily-news/army-missile-defense-system-directs-offensive-strike-potential-paradigm-changing-demo>

<https://www.defensenews.com/land/2022/01/19/at-project-convergence-armys-new-battle-command-system-demonstrated-expanded-capability/>

<https://insidedefense.com/daily-news/army-missile-defense-system-directs-offensive-strike-potential-paradigm-changing-demo>



Avenger

“The Avenger is a mobile short-range air defense missile system. It provides mobile protection for ground units against low-flying aircraft, helicopters, unmanned aerial vehicles and cruise missiles.” <http://www.military-today.com/missiles/avenger.htm>

<https://www.airforcemag.com/arctic-edge-brings-armys-patriot-avenger-systems-to-alaska-for-the-first-time%EF%BF%BC/>

<https://www.armytimes.com/news/your-army/2022/03/21/soldiers-integrate-air-defense-for-the-first-time-in-major-alaska-exercise/>

<https://www.airforcemag.com/article/honing-the-arctic-edge/>



Stinger

“The lethal surface-to-air missile (SAM) can be deployed for defense against all classes of helicopters, unmanned aerial vehicles (UAVs), cruise missiles, as well as low-level fixed and rotary-wing aircraft.” <https://www.army-technology.com/projects/stinger-man-portable-air-defence-system-manpads/>

<https://www.raytheonmissilesanddefense.com/what-we-do/counter-uas/effectors/stinger-missile>

<https://armedservices.house.gov/press-releases?ID=3D96CE66-74C9-4CFC-B9CB-7A0769545A06>

<https://breakingdefense.com/2022/03/exclusive-hasc-leaders-want-next-gen-stinger-replacement-as-stockpile-dwindles-due-to-ukraine/>

<https://www.popsci.com/technology/new-stinger-weapon-development/>

<https://www.defensenews.com/land/2022/04/07/us-army-initiates-plan-to-replace-stingers-with-next-gen-interceptor/>

<https://www.thedefensepost.com/2022/04/08/us-army-stinger-replacement/>

<https://www.thedrive.com/the-war-zone/45131/the-fim-92-stinger-sam-may-finally-get-a-replacement>

<https://insidedefense.com/daily-news/army-pushes-60-million-stinger-replacement-funding-unfunded-priorities-list>

<https://www.army-technology.com/comment/us-army-rfi-manpads/>

<https://www.defensedaily.com/army-details-stinger-replacement-plan-aims-to-start-production-of-10000-missiles-in-fy-27/army/>

<https://www.defensenews.com/congress/2022/05/11/stinger-shortcut-us-army-seeks-special-funding-for-missile-supply-chain/>

Miscellaneous

<https://www.airuniversity.af.edu/JIPA/Display/Article/2743721/the-second-nagorno-karabakh-war-takeaways-for-singapores-ground-based-air-defen/>

<https://media.defense.gov/2021/Aug/24/2002838133/-1/-1/1/Ho%20-%20Nagorno-Karabakh%20War.PDF>

<https://www.ausa.org/sites/default/files/publications/SL-20-2-Integrated-Air-and-Missile-Defense-in-Multi-Domain-Operations.pdf>

https://www.realcleardefense.com/articles/2022/02/26/what_the_us_army_must_do_to_prepare_for_a_war_with_russia_818872.html

<https://eurasianimes.com/as-nato-russia-tensions-soar-us-led-military-alliance-sees-gaping-holes-in-its-air-defense-capabilities/>

<https://missiledefenseadvocacy.org/alert/implementing-shorad/>

<https://www.armytimes.com/news/your-army/2022/02/23/these-soldiers-will-reinvent-cavalry-over-the-next-two-years/>