Atlantic Council
SCOWCROFT CENTER
FOR STRATEGY AND SECURITY

ISSUE BRIEF

# Friend-sourcing military procurement: Technology acquisition as security cooperation

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## Introduction

In the United States, the military procurement bureaucracy tends to sponsor development of new technologies to fill requirements. The bureaucracy also largely seeks domestic sources for all new charismatic military megafauna: aircraft, ships, ground vehicles, and missile systems. Security "cooperation" in US policy and practice is largely a one-way process, neglecting the benefit of learning and sourcing from other countries. However, Russia's invasion of Ukraine, and China's concomitant threats from India to Korea, point to the need for coordinating the industrial capabilities of allies. As the United States faces simultaneous competition with two revisionist, nuclear-armed, major-power rivals, not to mention a challenging budgetary and fiscal environment, the additional research and development (R&D) costs assumed by the Department of Defense through its disregard of foreign suppliers, while never ideal, are no longer tenable.

Law, regulation, and policy can conspire against good economic thinking, though with clear exemptions. The Department of Defense Authorization Act for 1983 prohibited the construction of naval vessels in foreign shipyards, unless the president first informs Congress of a national security need otherwise (10 U.S.C. §§ 7309–7310). The Buy American Act of 1933 demands preference for domestic manufactures in federal procurement, though this is waived for imports from dozens of allied countries through reciprocal agreements (41 U.S.C. §§ 8301–8305). Note, though, that these laws say nothing of where products are designed, merely where they are manufactured. Further, the Federal Acquisition Streamlining Act of 1994 mandates a "preference for commercial products . . . to the maximum extent practical," with "market research . . . before developing new specifications for a procurement" (10 U.S.C. § 3453). Official policy periodically reemphasizes this mandate for off-the-shelf procurement.[1]

The **Scowcroft Center for Strategy and Security** works to develop sustainable, nonpartisan strategies to address the most important security challenges facing the United States and its allies and partners. The Center honors General Brent Scowcroft's legacy of service and embodies his ethos of nonpartisan commitment to the cause of security, support for US leadership in cooperation with allies and partners, and dedication to the mentorship of the next generation of leaders.

***Forward* Defense**, housed within the Scowcroft Center, generates ideas and connects stakeholders in the defense ecosystem to promote an enduring military advantage for the United States, its allies, and partners. Our work identifies the defense strategies, capabilities, and resources the United States needs to deter and, if necessary, prevail in future conflict.

1 See, for example, Frank Kendall et al., *Business Systems Requirements and Acquisition*, Department of Defense Instruction 5000.75, Change 2, January 24, 2020, 5, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/500075p.PDF?ver=2020-01-24-132012-177.

An aerial view of the Pentagon, Washington, DC, May 15, 2023. DoD photo by US Air Force Staff Sgt. John Wright.

Much of the procurement bureaucracy in the Defense Department seems not to understand the exemptions and the mandates for off-the-shelf procurement of military capabilities. In contrast, the US Special Operations Command, imbued with its own procurement authority, has been far more open to procuring military systems off the shelf, and then heavily customizing them against specific military needs. The US Coast Guard, housed under the Department of Homeland Security, has also long preferred off-the-shelf solutions, often of foreign design and even manufacture—and with much less customization. Indeed, decades of procurement debacles and the economics of international commerce indicate that broad domestic preference is wrongheaded. At least three reasons point to the need for broader sources of supply:

- **Quality**: With military off-the-shelf solutions, many of the qualities are observable, from performance in testing to actual use in battle. In developmental programs, quality is not so observable ex ante, and may disappoint ex post. Global procurement invites buyers to find the best equipment available anywhere, and often from countries with competitive advantages in particular industries.

- **Urgency**: Off-the-shelf solutions may be sought as interim solutions to immediate military problems. If not restrained by production capacities or bottlenecks, they will arrive presently. What is purchased immediately may then suffice for anticipated problems, becoming enduring solutions, if the political and technological conditions do not too greatly change in the long run. In contrast, technological development requires greater lead time, delaying fielding.

- **Economy**: Off-the-shelf solutions may come at lower upfront prices, if the development costs are spread among multiple national customers, or otherwise already amortized. With *domestic* development, the cost is disproportionately borne by the sponsoring government, and this roughly averages 20 percent of the life-cycle cost of more advanced systems. Spending on R&D competes with spending on procurement, but, in fielding capabilities, the measure of merit is procurement. Simultaneously, when immediate needs are adequately filled by off-the-shelf procurements, monies can be husbanded for developing systems targeted at more chal-

lenging, long-range problems. Later, the wider supply base for the off-the-shelf system, which should remain largely interoperable with foreign versions, will contribute to lower sustainment costs.

Because autarky is illusory, greater "friend-sourcing" can provide US forces with quick access to proven, economical solutions, while maintaining the option for domestic production when that is strategically desirable.[2] Informal consortia of allied buyers could then naturally divide responsibilities for development and production, through an emergent but controlled market process. Allowing US forces more opportunities to acquire military technologies abroad would then restructure security cooperation as a two-way process, with the avid participation of friendly countries. As Ukrainian President Volodymyr Zelenskyy recently described Kyiv's emerging military-industrial cooperation with the United States, "Ukraine does not want to depend only on partners. Ukraine aims to and really can become a donor of security for all our neighbors once it can guarantee its own safety."[3] Access to that sort of battled-hardened experience is part of the return on US assistance.

## Research questions

Historical case studies can provide tangible evidence as to how well friend-sourcing approaches have fared in the recent past. The results can demonstrate whether actual procurements should more closely follow this course of action, already supported by law, policy, and economic theory. This study then poses two important and timely research questions. In the United States, since the end of the Cold War, how has the procurement of off-the-shelf systems developed for allied militaries:

1. Affected the *quality*, *availability*, and *cost* of national military capabilities?

2. Affected the long-term market for *national*, *military-industrial R&D*?

## Methodology

To answer these questions, this paper seeks to identify all recent cases of off-the-shelf military procurements in the United States, subject to some boundaries. The set is limited to major end systems—aircraft, ships, ground vehicles, and missile systems—because the international trade in subsystems among friendly countries is already much more liberal. Also, the set includes only those US procurements undertaken since the end of the Cold War because global security dynamics changed radically at that point. Note that this excludes from consideration, for example, the US Army's procurement of its Austrian-designed Family of Medium Tactical Vehicles, and the US Marine Corps' procurement of LAV-25 armored vehicles, as these both began in the 1980s.

This paper further restricts the set to systems already in use by US forces, so that a firm decision for adoption, and some record of operation, can be observed. The study includes, however, customizations of off-the-shelf systems, as most countries have needs for subsystems (radios, racks, left- or right-hand drive, etc.) specific to their own military services, and modest customization is common in the international arms trade.

After review of histories and the author's consultations with a wide set of experts on US military procurement, this paper identifies only nine cases—two missile systems, four aircraft, one ship, and two armored vehicles—in this set (see Appendix 1 for a summary):

- The RGM-184A Naval Strike Missile (NSM)
- The Norwegian Advanced Surface-to-Air Missile System (NASAMS)
- The UH-72A Lakota helicopter
- The MH-139A Grey Wolf helicopter
- The HC-144 Ocean Sentry maritime patrol aircraft
- The C-27J Joint Cargo Aircraft
- The *Sentinel*-class Fast-Response Cutter
- The RG-31 mine-protected vehicle
- The Stryker LAV III Interim Armored Vehicle

2 Steven Grundman and James Hasik, "Innovation Before Scale: A Better Business Model for Transnational Armaments Cooperation," *RUSI Journal* 161, no. 5, December 2016, https://www.tandfonline.com/doi/abs/10.1080/03071847.2016.1253366?journalCode=rusi20.

3 "Kyiv Does Not Want to Rely Solely on Allied Military Aid, Says Ukraine's Zelensky," *Straits Times*, December 7, 2023, https://www.straitstimes.com/world/europe/kyiv-does-not-want-to-rely-solely-on-allied-military-aid-zelenskiy.

Neither the author nor the Atlantic Council intends to endorse or oppose the specific platforms mentioned or the procurement choices made. Rather, the following section outlines how these systems were procured and what advantages the acquiring service derived from the purchase. The following assessment section gathers lessons from the case studies in aggregate to inform how the Department of Defense should consider friend-sourcing more military procurement.

## Historical cases of successful US military friend-sourcing

### RGM-184A Naval Strike Missile

The RGM-184A NSM is a 400 kilogram, jet-powered, sea-skimming, anti-ship cruise missile. In September 2014, seeking a lightweight but lethal anti-ship missile for its littoral combat ships (LCSs), the US Navy test-fired Kongsberg's NSM from the USS *Coronado*. In 2015, the Navy undertook a competitive procurement to equip its LCSs. Kongsberg and Raytheon announced a teaming arrangement to bring the Norwegian missile to the United States.[4] Boeing initially offered an extended-range RGM-84 Harpoon, and Lockheed Martin a surface-launched version of its AGM-158C Long-Range Anti-Ship Missile. The latter two firms, however, withdrew their entries in 2017. In May 2018, the Navy selected the NSM for its *Independence*-class LCSs, its *Freedom*-class LCSs, and its *Constellation*-class frigates. The Marine Corps subsequently selected the NSM to equip its new land-based, mobile anti-ship missile batteries, with two NSMs mounted on each robotic Joint Light Tactical Vehicle (see below), deemed the Navy-Marine Expeditionary Ship Interdiction System (NMESIS).

The missiles are mostly built in Norway, as they have been in production there since 2007, and they cost "slightly less than the Raytheon Tomahawk Block IV cruise missile."[5] In a press release, Raytheon noted that undertaking final assembly and testing of an already operational missile "saves the United States billions of dollars in development costs and creates new high-tech jobs in this country."[6] More labor, at possibly higher cost, would be required in the United States if production were fully domesticated, and Kongsberg and Raytheon have discussed a second production line to deliver yet more missiles.[7] Navigation is provided by satellite, inertial, and terrain contour matching; terminal guidance relies on imaging infrared and a target-image database. With the latter technologies, the NSM is designed to strike specific, vulnerable points on an enemy ship, and detonate

The USS *Gabrielle Giffords* (LCS 10) launches a Naval Strike Missile (NSM) during an exercise. Photo by Chief Petty Officer Shannon Renfroe, US Navy.

4 Sam LaGrone, "Raytheon and Kongsberg Team to Pitch Stealthy Norwegian Strike Missile for LCS," *USNI News*, US Naval Institute, April 9, 2015, https://news.usni.org/2015/04/09/raytheon-and-kongsberg-team-to-pitch-stealthy-norwegian-strike-missile-for-lcs.

5 Sam LaGrone, "Raytheon Awarded LCS Over-the-Horizon Anti-Surface Weapon Contract; Deal Could Be Worth $848M," *USNI News*, May 31, 2018, https://news.usni.org/2018/05/31/raytheon-awarded-lcs-horizon-anti-surface-weapon-contract-deal-worth-848m.

6 Comment by Taylor W. Lawrence, president of Raytheon Missile Systems, in "US Navy Selects Naval Strike Missile as New, Over-the-Horizon Weapon: Raytheon, Kongsberg Will Partner to Deliver Advanced Missile," press release, Raytheon on PR Newswire, June 1, 2018, https://raytheon.mediaroom.com/2018-06-01-US-Navy-selects-Naval-Strike-Missile-as-new-over-the-horizon-weapon.

7 Megan Eckstein, "Kongsberg, Raytheon Ready to Keep Up as Naval Strike Missile Demand Grows," *Defense News*, October 27, 2021, https://www.defensenews.com/naval/2021/10/27/kongsberg-raytheon-ready-to-keep-up-as-naval-strike-missile-demand-grows/.

US High Mobility Artillery Rocket Systems (HIMARS) and Norwegian National Advanced Surface-to-Air Missile System (NASAMS) units counter a simulated threat at sea together. Courtesy Photo, US Naval Forces Europe-Africa/US Sixth Fleet.

with its void-sensing fuse at the point of maximum damage. A single missile can thus render even a large warship hors de combat.

The NSM was initially developed by and for Norway. Missiles for mobile coastal defense batteries were quickly sold to Poland. Since then, the NSM has been adopted as well by Australia, Belgium, Canada, Indonesia, Latvia, the Netherlands, Malaysia, Romania, Spain, and the United Kingdom.

In summary, with the NSM, the Navy and Marine Corps obtained one of the best anti-ship missiles in the world, from a running production line, and at a cost below that of its best alternative in inventory. The US Navy and Air Force have continued to fund development of other, longer-range cruise missiles.

## Norwegian Advanced Surface-to-Air Missile System

The NASAMS (pronounced NAY-sams) is a ground-based, anti-aircraft missile system. NASAMS was developed in the 1990s by Kongsberg and Hughes Aircraft to replace the Nike Hercules batteries of the Royal Norwegian Air Force. (Raytheon acquired Hughes Aircraft in 1997.) NASAMS integrates Raytheon's MPQ-36A Sentinel trailer-mounted radar and AIM-120 Advanced Medium-Range Air-to-Air Missile (AMRAAM) with Kongsberg's launcher and battle-management system. In an apparently sole-source deal, the US Army procured several launchers for the medium-range air defense of Washington, DC, in 2005, and they have served in that role ever since, at a variety of locations in Virginia, the District of Columbia, and Maryland.[8] The NASAMS case is remarkable in that the Norwegian-US team integrated two off-the-shelf components *from a US manufacturer* into

8 Andrew Feikert, "National Advanced Surface-to-Air Missile System," Congressional Research Service, IF12230, December 1, 2022, https://crsreports.congress.gov/product/pdf/IF/IF12230; and Tyler Rogoway, "America's Capitol Is Guarded By Norwegian Surface-to-Air Missiles," *Jalopnik*, April 3, 2014, https://jalopnik.com/americas-capitol-is-guarded-by-norwegian-surface-to-ai-1556894733.

its system before providing that system as an off-the-shelf product back to the US military.

The United States was the third user of NASAMS, after Norway and Spain. NASAMS is now in service with thirteen countries, including Australia, Chile, Finland, Hungary, Indonesia, Lithuania, the Netherlands, and Oman.[9] In 2022 and 2023, the United States, Norway, Lithuania, and Canada all provided NASAMS units to Ukraine.[10] The Canadian purchase is notable because Canada itself had no ground-based air defenses; the Canadian federal government simply identified a cost-effective and already-available system to send.[11]

In summary, with the NASAMS, the US Army obtained a medium-range air defense system that remains at the forefront of air defense against the most challenging (Russian) threats, from a running production line, and at a cost that global customers still willingly pay. The US Army and Navy have continued to fund several other families of medium- and long-range air defense missiles.

### UH-72A (EC145) Lakota utility helicopter

The EC145 is a twin-turboshaft, utility helicopter capable of carrying nine passengers. In its Light Utility Helicopter program of 2005, the US Army sought a proven helicopter

A new UH-72A Lakota Light Utility Helicopter at Hohenfel Army Airfield. Photo by Sgt. 1st Class JMRC PAO, Joint Multinational Readiness Center.

9 "Lithuania Acquires More NASAMS Air Defense from Kongsberg," press release, Kongsberg, December 14, 2023, https://www.forecastinternational.com/emarket/eabstract.cfm?recno=294263.

10 Joe Gould, "US to Send Ukraine Advanced NASAMS Air Defense Weapons in $820 Million Package," *Defense News*, July 1, 2022, https://www.defensenews.com/pentagon/2022/07/01/us-to-send-ukraine-advanced-nasams-air-defense-weapons-in-820-million-package/; and "Norway Donates Additional Air Defence Systems to Ukraine," Norwegian government, December 13, 2023, https://www.regjeringen.no/en/aktuelt/noreg-donerer-meir-luftvern-til-ukraina/id3018411/.

11 David Pugliese, "Canadian Military Eyes New Ground-Based Air Defence System at a Cost of $1 Billion," *Ottawa Citizen*, May 2, 2022, https://ottawacitizen.com/news/national/defence-watch/canadian-military-eyes-new-ground-based-air-defence-system-at-a-cost-of-1-billion.

for logistical and medical missions within the United States. In its request for proposals (RFP), the Army specifically sought only off-the-shelf aircraft, and received such offers from Bell, AgustaWestland (now Leonardo), and Eurocopter (now Airbus Helicopters). In June 2006, the Army selected a version of Eurocopter's EC145, and designated it the UH-72A Lakota. The EC145 first flew in 1999 and was itself developed from the MBB/Kawasaki BK 117, which had first flown in 1979.

All UH-72s have been assembled at Airbus's factory in Columbus, Mississippi. The program has experienced no significant delays. The UH-72 was competitively sourced, and the Army has been sufficiently satisfied with its performance and cost-effectiveness that the service has purchased 481 of the aircraft. Along the way, the Army awarded Airbus further orders under the original contract to fully recapitalize its fleet of training helicopters.[12] The Army's Lakota was subsequently upgraded into the UH-72B, as Airbus continued to develop its EC145 into the H145M.[13]

Military versions of the EC145 have also been in service with the military forces of thirteen other countries: Albania, Belgium, Bolivia, Cyprus, Ecuador, France, Germany, Hungary, Kazakhstan, Luxembourg, Serbia, Thailand, and the Cayman Islands. The US Army has several times rebuffed suggestions that the domestic-service helicopters could be deployed overseas, asserting that adding armor and decoys would be uneconomical. However, in December 2023, Airbus and the German Defense Ministry announced a deal for at least sixty-two H145Ms, configured as either commando transports or missile-firing anti-tank helicopters.[14] In this way, the case provides an example of a US military service overestimating its need for technological development when an off-the-shelf product would suffice.

In summary, with the EC145, the US Army obtained a proven helicopter in wide military service around the world, relatively quickly, and at a price that won a competitive tender. The US Army continued to fund rotorcraft development, though more notably of tilt-rotor aircraft through its Future Long-Range Assault Aircraft program.

### MH-139A (AW139) Grey Wolf helicopter

The AW139 is a twin-turboshaft, utility helicopter capable of carrying up to fifteen passengers.

In the late 1960s, Bell Helicopter developed its UH-1 Huey helicopter, a workhorse of the Vietnam War, into the twin-engine UH-1N Twin Huey, to meet a requirement of the Royal Canadian Air Force.[15] The US Air Force began buying Twin Hueys in 1970, for a variety of utility functions. About forty-five years later, the USAF was ready to replace them, seeking up to eighty-four aircraft for passenger transport and other utility functions. The aircraft had two particularly important roles: flying commandos to any missile silos in Wyoming, Montana, and North Dakota that might come under attack, and evacuating government officials from Washington, DC should the capital city again come under attack.[16] The USAF initially planned a sole-source award to Lockheed Martin's Sikorsky for UH-60s. Under the Economy Act of 1932 (31 U.S.C. § 1535), an agency can select a system already in service with another branch of government in lieu of a competitive procurement. Congressional objections soon scuttled that idea, whether to provide others an opportunity to bid or simply because the UH-60 might not have been the best-value solution.[17] In September 2016, the USAF released a request for information (RFI) from industry, and in December, a draft RFP.[18]

12 Gareth Jennings, "US Army Retires 'Creek' Training Helo," *Jane's*, February 19, 2021, https://www.janes.com/defence-news/news-detail/us-army-retires-creek-training-helo.

13 Jen Judson, "Airbus Unveils B-model Lakota Helos to Enter US Army Fleet Next Year," *Defense News*, August 28, 2020, https://www.defensenews.com/land/2020/08/28/airbus-unveils-b-model-lakotas-will-enter-us-army-fleet-in-2021/.

14 Sebastian Sprenger, "Germany Spends $2.3 billion on Airbus Light Attack Helicopters," *Defense News*, December 14, 2023, https://www.defensenews.com/global/europe/2023/12/14/germany-spends-23-billion-on-airbus-light-attack-helicopters/; and "Airbus Helicopters and German Armed Forces Sign Largest H145M Contract," press release, Airbus Helicopters, via Defense-Aerospace.com, December 14, 2023, https://www.defense-aerospace.com/germany-orders-up-to-82-airbus-h145m-armed-helicopters/.

15 Garrett Reim, "Retrospective: How the UH-1 'Huey' Changed Modern Warfare," *Flight Global*, December 12, 2018, https://www.flightglobal.com/helicopters/retrospective-how-the-uh-1-huey-changed-modern-warfare/130259.article; and José Gabriel Pugliese, "El Bell 212 en la Fuerza Aérea," *Aerospacio* (official magazine of Argentina's air force), October 28, 2008.

16 Joseph Trevithick, "Dark Horse Contender Boeing Snags Air Force Deal to Replace Aging UH-1N Hueys with MH-139," *War Zone*, September 24, 2018, https://www.twz.com/23803/dark-horse-contender-boeing-snags-air-force-deal-to-replace-aging-uh-1n-hueys-with-mh-139.

17 Colin Clark, "Dozen Lawmakers Object to Sole-Source UH-1N Replacement," *Breaking Defense*, April 18, 2016, https://breakingdefense.com/2016/04/slow-down-air-force-dozen-lawmakers-object-to-sole-source-uh-1n-replacement/.

18 Tyler Rogoway, "USAF Asks for Bids to Finally Replace Its Antique UH-1N Hueys," *War Zone*, December 3, 2016, https://www.twz.com/6318/usaf-asks-for-bids-to-finally-replace-its-antique-uh-1n-hueys.

A MH-139A Grey Wolf's successful live hoist test. Photo by Samuel King Jr. 96th Test Wing Public Affairs.

The Air Force asked for a proven helicopter, and in response, five companies or teams offered four types of aircraft. Sikorsky offered its HH-60U Pave Hawk, already in service with the USAF. Sierra Nevada offered to rebuild existing, out-of-service US Army UH-60As to a -60U configuration. Airbus offered its UH-72A, already (see above) in service with the US Army. Textron's Bell Aircraft offered its UH-1Y, already in service with the US Marine Corps, which was developed in the 1990s under a perhaps questionable sole-source contract.[19] Leonardo teamed with Boeing to offer a military version of the Italian company's AW139. That aircraft had been developed initially by Agusta (later AgustaWestland, now Leonardo) and Bell in the late 1990s, though Agusta bought Bell's interest in the program in 2005.

The Air Force rejected the Airbus and Bell offerings outright as too small and short-ranged for the missile security mission. In September 2018, the service chose the AW139. At the announcement, Air Force Secretary Heather Wilson told the assembled that "strong competition drove down costs for the program, resulting in $1.7 billion in savings to the taxpayer."[20] In this instance, the Federal Acquisition Streamlining Act beat the Economy Act at economy. At first delivery, in December 2019, the service named it the

19 Ryan E. Von Rembow, "The UH-1Y Was a Mistake: An Argument for the MH-60S," *Marine Corps Gazette* 99, no. 1, January 2015, https://www.mca-marines.org/wp-content/uploads/2018/12/Gazette-January-2015.pdf.

20 Brian W. Everstine, "The Grey Wolf Arrives," *Air & Space Forces*, March 1, 2020, https://www.airandspaceforces.com/article/the-grey-wolf-arrives/.

MH-139A Grey Wolf.[21] Flight testing started in 2020, but did not conclude for several years. Leonardo and Boeing agreed to some requested modifications, and the aircraft had some unexpected difficulties with FAA certification.[22] Low-rate production started in Philadelphia in March 2023.[23] The Grey Wolves are today built on the north side of Philadelphia, where Leonardo has been building AW139s since 2007, and they are then customized on the south side of Philadelphia, by Boeing.

Prior to the Air Force's purchase, AW139s were flying with at least three air services in the United States: the New Jersey State Police (since 2012), the Maryland State Police (2012), and the Los Angeles City Fire Department (2013). Miami-Dade Fire Rescue joined that group in 2020. Air forces or other public flying services in twenty-four other countries also operate AW139s.

In summary, with the AW139, the US Air Force obtained a proven helicopter in wide military service around the world, with a two-year delay, though at a price that won a competitive tender. The Air Force had not spent significant sums previously on rotorcraft development, and, with relatively few requirements for rotary-wing aircraft, the service has not since.

### HC-144 (CN-235) Ocean Sentry maritime patrol aircraft

The CN-235 is a twin-turboprop, fixed-wing cargo aircraft capable of carrying fifty-one passengers or thirty-five paratroopers. In May 2003, the US Coast Guard selected the CN-235-300M maritime patrol aircraft from the European Aeronautic Defence and Space Company (EADS) as part of its "Deepwater" program to recapitalize much of its aircraft and ship fleets.[24] In February 2004, Deepwater contractor Lockheed Martin ordered the first two aircraft from EADS on the Coast Guard's behalf.[25] The service had specifically requested a proven, off-the-shelf aircraft to replace its HU-25 Guardian jets, Dassault Falcon 20s similarly purchased off the shelf in the early 1980s and originally developed in the early 1960s. The CN-235 was developed, starting in 1980, by a joint venture of Spain's Construcciones Aeronáuticas SA (CASA, then part of EADS, now Airbus) and Industri Pesawat Terbang Nusantara (IPTN, now Indonesian Aerospace). The first flight was in 1983, and production began in 1986.

Deliveries to the USCG proceeded slowly, with the availability of funding. The first unit arrived in December 2006, and the eighteenth in October 2014, at which point the Coast Guard retired its last HU-25. The aircraft were largely built in Spain but fitted out with equipment specific to the Coast Guard at EADS's facility in Mobile, Alabama. The USCG had initially intended to procure thirty-six, but the availability of surplus C-27Js (see the next case study) led the service to reduce its plan by half. By September 2017, the Coast Guard's HC-144 fleet had flown for one hundred thousand hours—more than that of any country with CN-235s besides France and South Korea. At that point, more than two hundred CN-235s were flying in more than twenty-four countries.[26]

The US Air Force also flies a few CN-235s within its Special Operations Command.[27] Notably, Air Force Special Operations also flies twenty Dornier 328 twin-engine turboprops, termed C-146A Wolfhounds; and a few CN-212 Aviocars from CASA, termed C-41As.[28]

In summary, with the CN-235, the US Coast Guard obtained a proven turboprop aircraft in wide military ser-

21 Valerie Insinna, "The Air Force Picks a Winner for its Huey Replacement Helicopter Contract," *Defense News*, September 24, 2018, https://www.defensenews.com/breaking-news/2018/09/24/the-air-force-picks-a-winner-for-its-huey-replacement-helicopter-contract/; and Insinna, "The US Air Force's UH-1N Huey Replacement Helicopter Has a New Name," *Defense News*, December 19, 2019, https://www.defensenews.com/air/2019/12/19/the-air-forces-uh-1n-huey-replacement-helicopter-got-a-new-name-today/.

22 Stefano D'Urso, "MH-139 Grey Wolf Finally Enters Developmental Testing," *Aviationist*, August 28, 2022, https://theaviationist.com/2022/08/28/mh-139-enters-developmental-testing/.

23 "US Air Force Decision Commences Low Rate Production of Boeing/Leonardo MH-139 Grey Wolf," press release, Leonardo, March 9, 2023, https://www.leonardo.com/documents/15646808/24917778/ComLDO_Boeing_Leonardo_MH-139A_MilestoneC_09_03_2023_ENG.pdf?t=1678369973868.

24 "US Coast Guard Acquires EADS CASA CN-235," EADS press release, May 12, 2003.

25 "Lockheed Martin Selects EADS CASA CN-235-300M for U.S. Coast Guard's Deepwater Maritime Patrol Aircraft Solution," press release, Lockheed Martin, February 18, 2004, https://investors.lockheedmartin.com/news-releases/news-release-details/lockheed-martin-selects-eads-casa-cn-235-300m-us-coast-guards.

26 Lawrence Specker, "Airbus, Coast Guard Celebrate 100,000 Hours in the Air," Alabama Media Group's AL.com, September 22, 2017, https://www.al.com/news/mobile/2017/09/airbus_coast_guard_celebrate_1.html.

27 Joseph Trevithick, "Shadowy USAF Spy Plane Spotted Over Seattle Reportedly Reappears Over Syria," *War Zone*, June 30, 2019, https://www.twz.com/17511/shadowy-usaf-spy-plane-spotted-over-seattle-reportedly-reappears-over-eastern-syria; and "C-146A Wolfhound," fact sheet, US Air Force, March 2021, https://www.af.mil/About-Us/Fact-Sheets/Display/Article/467729/c-146a-wolfhound/.

28 Joseph Trevithick, "Shedding Some Light on the Pentagon's Most Shadowy Aviation Units," *War Zone*, July 3, 2020, https://www.twz.com/8125/shedding-some-light-on-the-pentagons-most-shadowy-aviation-units.


An HC-144A Ocean Sentry medium-range surveillance aircraft arrives at Coast Guard Air Station Washington. Photo by Chief Petty Officer Sarah Foster, US Coast Guard District 5.

vice around the world, at the pace it desired, and at an ongoing total cost that the service continues to support. The Coast Guard has generally not spent significant sums on aircraft development, and specifically not multiengine, fixed-wing aircraft development, preferring off-the-shelf purchases.

### C-27J Joint Cargo Aircraft

The C-27J Spartan is a twin-turboprop, fixed-wing cargo aircraft capable of carrying sixty passengers or forty-six paratroopers.

In the early 2000s, the US Army and the US Air Force individually were seeking ideas for twin-engine turboprop transport aircraft. The Army sought to replace its C-23 Sherpas, C-12 Hurons, and C-26 Metroliners with a common fleet. The USAF sought to supplement its C-130s with a smaller aircraft capable of flying from shorter fields, particularly in Iraq and Afghanistan. In March 2006, Under Secretary of Defense Ken Krieg instructed the two services to combine all these requirements into plans for a single airplane, the JCA.[29]

Lockheed Martin offered a shortened version of its four-engine C-130. In August 2006, the Army (which was managing the program for the Air Force as well) eliminated that aircraft from the program. CASA, teamed with Raytheon, offered its C-295 aircraft, a larger derivative of the CN-235, developed in the 1990s. Alenia, teamed with L3 Communications, offered its C-27J Spartan. The latter had begun development in 1996 as an improvement of the Aeritalia (later Alenia, later Leonardo) G.222. The USAF had purchased ten G.222s in 1990, designating them C-27As. The C-27J would feature more powerful engines and the glass cockpit of the C-130J, which explains the choice of modifying letter. The first flight was in September 1999, and the Italian air force ordered twelve that November.[30]

29 John T. Bennett, Jen DiMascio, and Ashley Roque, "Wanted: A Bona-Fide 'Bug Smasher,'" *Inside the Air Force* 17, no. 12 (2006): 8–10.

30 "C-27J Conducts Successful First Flight," *Defense Daily*, September 29, 1999; and Andy Nativi, "Italian Order Launches C-27J," *Flight Global*, November 17, 1999.


A C-27J aircraft lands in North Dakota. Courtesy Photo, North Dakota National Guard Public Affairs.

In June 2007, the US Army and US Air Force jointly chose the C-27J as the JCA.[31] The Army planned to buy seventy-five for the National Guard, and the Air Force seventy for both the Air National Guard and its component of Special Operations Command. The Army soon found the aircraft very useful for relieving the workload of its Chinook heavy helicopter fleet.[32] The Air Force, however, was never enthused about splitting the mission with the Army, and questions of the economy of the arrangement persisted.[33] In 2009, Defense Secretary Robert Gates decided to transfer all the aircraft to the Air Force. In 2012, Defense Secretary Leon Panetta decided just to retire the entire fleet, as the United States reefed back its enthusiasm for counterinsurgency. Over the next two years, fourteen of the surplus aircraft were provided to the US Coast Guard, and another seven went back to the Army for its Special Operations Aviation branch.[34]

Prior to the US order, the C-27J had been ordered by Italy, Greece, Bulgaria, and Lithuania. Australia, Chad, Kenya, Mexico, Peru, Romania, Slovakia, Slovenia, and Zambia ordered aircraft subsequently.[35]

In summary, with the C-27J, the US Army and Air Force initially obtained a proven turboprop aircraft in wide military service around the world, relatively quickly, and at a com-

31 Gayle S. Putrick, "C-27J Tapped for Joint Cargo Aircraft," *Air Force Times*, June 13, 2007.

32 Philip Ewing, "Far from DC Battles, C-27 Gets Glowing Reviews," *DoD Buzz*, April 24, 2012, https://web.archive.org/web/20120427214404/http:/www.dodbuzz.com/2012/04/24/far-from-dc-battles-c-27-gets-glowing-reviews/.

33 Sandra I. Erwin, "Military Services Competing for Future Airlift Missions," *National Defense*, November 2005, https://www.nationaldefensemagazine.org/articles/2005/10/31/2005november-military-services-competing-for-future-airlift-missions.

34 Aaron Mehta, "US SOCOM to Get 7 C-27Js from USAF," *Defense News*, November 1, 2013, https://archive.ph/20131101201655/http:/www.defensenews.com/article/20131101/DEFREG02/311010012#selection-857.0-867.16; and Jon Hemmerdinger, "US Coast Guard to Acquire USAF's remaining C-27J Spartans," *Flight Global*, January 6, 2014, https://www.flightglobal.com/us-coast-guard-to-acquire-usafs-remaining-c-27j-spartans/112099.article.

35 Craig Hoyle, "Bulgaria Accepts Its Last C-27J Transport," *Flight Global*, March 31, 2011; and Hoyle, "Romania Accepts First C-27J Spartans," *Flight Global*, December 4, 2011.


The Coast Guard Cutter *Bernard C. Webber* is the Coast Guard's first *Sentinel*-class Fast Response Cutter. Courtesy Photo, US Coast Guard Atlantic Area.

petitive price that they were willing to pay. Those aircraft continue to fly for the United States, just with different services or branches than initially intended. That is more a matter of changing requirements than the quality, availability, or cost of the aircraft. Regarding development funding, the US Air Force has only once spent a large sum on new multiengine fixed-wing aircraft since the C-17 Globemaster III program in the 1990s. Its recent orders for KC-46 Pegasus aerial refueling aircraft included development funds, but under the fixed-price deal, Boeing (the contractor) would eventually come to assume most of that cost through repeated overruns.

### *Sentinel*-class (Damen Stan 4708) fast response cutter

The Damen Stan 4708 is a 42 meter patrol ship designed for a variety of naval and maritime constabulary missions.

In March 2007, the US Coast Guard terminated its contract with Lockheed Martin and Northrop Grumman to modify its 110-foot *Island*-class cutters with a 13 foot midship hull extension, intended to produce a more capable ship with an extended service life. The *Island*-class ships had been built in the 1980s by Bollinger Shipyards of Louisiana to an off-the-shelf design of the 1960s by Britain's Vosper Thornycroft, which had been sold to several other naval forces, including those of Qatar, Abu Dhabi, and Singapore.[36] The concept was reasonable in principle, as hull plugs are not uncommon in naval architecture and shipbuilding. The problem was that the *Island*-class ships were already proving susceptible to late-in-life hull cracking, but neither the service nor the contractors were fully forthcoming with one another about the difficulties. After taking delivery of eight of the rebuilt ships, the Coast Guard terminated the program, and indeed withdrew the eight from service.[37]

In September 2008, the USCG awarded a contract, after an open competition, to Bollinger to build a replacement class of "fast response cutters." The Coast Guard had ex-

36 Frank N. McCarthy, "The Coast Guard's New Island in the Drug War," *Proceedings of the United States Naval Institute*, February 1986.

37 Trevor L. Brown, Matthew Potoski, and David M. Van Slake, *Complex Contracting: Government Purchasing in the Wake of the US Coast Guard's Deepwater Program* (Cambridge, UK: Cambridge University Press, 2013), 173–179.

pressly requested an off-the-shelf solution, with at least two vessels from the parent design in patrol boat service for one year, or one vessel in patrol boat service for at least six years. Bollinger brought a design based on the Damen Stan ("Standard") 4708 patrol vessel, by Damen Shipyards of the Netherlands. With options, the fixed-price contract called for twenty-four to thirty-six cutters. The first, USCGC *Bernard C. Webber* was launched in April 2011 and commissioned in April 2012. The Coast Guard was sufficiently pleased with the cost and quality that the service now has fifty-four in service, and another eleven in sea trials, under construction, or planned. Bollinger's work has been noticed, bringing forth suggestions that the US Navy could also purchase 4708s to replace its *Cyclone*-class patrol boats, and perhaps for other uses.[38]

Three ships of the design had entered service in 2004 and 2005 in South Africa as the *Lilian Ngoyi* class of environmental inshore patrol vessels. In its explanation of the decision, the Coast Guard described Damen as an "internationally recognized ship designer with more than 30 shipyards and related companies worldwide [and] 4,000 vessels in service since [it was] founded in 1929."[39] The 4708 was itself a development of the Damen Stan 4207, which has served in the navies, coast guards, or maritime constabularies of Albania, the Bahamas, Barbados, Bulgaria, Canada, Honduras, Jamaica, Mexico, the Netherlands, Nicaragua, the United Kingdom, Venezuela, and Vietnam.

In summary, with the *Sentinel* class, the US Coast Guard obtained a proven patrol ship whose preceding designs were in wide military service around the world, and at a price that led to procurement of scores more. The first ship was not available for forty-three months after contract signing, which is neither particularly fast nor slow by historical US standards. By avoiding much development spending with the Damen Stan 4708, the USCG saved those funds for its next-larger class of cutters in the Deepwater recapitalization program, of a wholly new design: the *Heritage*-class offshore patrol cutter.

### RG-31 Charger (Nyala) mine-resistant armored vehicle

The RG-31 Nyala is a four-wheeled, all-wheel-drive, armored troop carrier, specifically designed for resistance to land mines. In 1996, the US Army purchased a few RG-31 mine-protected vehicles to equip its landmine disposal squads on peacekeeping duty in Bosnia. Later described as a "rolling bank vault" of a troop carrier, the RG-31 had been developed in South Africa from the Mamba, an earlier mine-protected troop carrier that was built on a Unimog truck chassis and powered by a Mercedes-Benz six-cylinder diesel.[40] The "Bush Wars" of the 1970s and 1980s had culminated by the 1994 election that marked the end of apartheid, but part of the legacy was a remarkable industrial capability for developing armored vehicles. However, through a series of licensing arrangements and corporate mergers, the marketing rights for the RG-series vehicles in North America resided with GDLS-Canada. The vehicles were thus built in South Africa, but fitted out in Ontario, at the same plant that produced Strykers (see below).[41]

By the middle of 2003, the US-led coalition's occupation of Iraq had elicited attacks by insurgents with leftover land mines and more improvised explosive devices (IEDs). Eager to get into the market of supplying the bomb squads, General Dynamics Land Systems looked globally in 2003 for an off-the-shelf solution and remembered its license for the RG series of vehicles.[42] The US Army then ordered a small number of additional RG-31s. Service on the ground in Iraq created impressions of quality. In an urgent request to Quantico in 2003, the 1st Marine Brigade in Anbar Province requested one thousand mine-protected armored vehicles "similar to the South African RG-31, Casspir, or Mamba."[43]

In June 2004, General John Abizaid, the commander of US Central Command, which oversaw all military operations in both Iraq and Afghanistan, sent a message to the Joint Chiefs of Staff explaining his situation and requesting help.

38 Collin Fox, "Two Birds with One Stone: A New Patrol Craft and Unmanned Surface Vessel," *Proceedings of the United States Naval Institute*, February 2019, https://www.usni.org/magazines/proceedings/2019/february/two-birds-one-stone-new-patrol-craft-and-unmanned-surface.

39 "Sentinel Class Patrol Boat Media Round Table," briefing by Rear Admiral Gary T. Blore, Assistant Commandant for Acquisition, and Captain Richard Murphy, *Sentinel*-Class Project Manager, September 30, 2008, https://web.archive.org/web/20090220012354/http:/uscg.mil/acquisition/newsroom/pdf/sentinelmediabrief.pdf.

40 John Carlson, "For Iowans on Streets of Iraq, War 'Never Gets Routine,'" *Des Moines Register*, October 2, 2005.

41 This discussion follows James Hasik, *Securing the MRAP: Lessons Learned in Marketing and Military Procurement* (College Station: Texas A&M University Press, 2021), chapter 3.

42 Author's telephone interview with Chris Chambers, former chairman of the board, BAE Systems Land Systems South Africa, September 23, 2015.

43 Ronald Heflin, "Universal Need Statement, Hardened Engineer Vehicle," mimeograph provided by Mike Aldrich of Force Protection Industries. The request was undated, but the approval by Marine Forces Pacific was dated December 12, 2003.

Soldiers connect L-Rod Bar Armor to an RG-31 Mine Resistant Ambush Protected vehicle at Kandahar Airfield, Afghanistan. Photo by Staff Sgt. Stephen Schester, 16th Mobile Public Affairs Detachment.

His most poignant statement was that "IEDs are my No. 1 threat. I want a full court press on IEDs . . . a Manhattan-like Project." In November 2004, the Army ordered a further fifteen RG-31s. The vehicles were priced well below $1 million each—far below the price of a Stryker or Bradley troop carrier.

The Army's enthusiasm grew in February 2005, when the service entered into a $78 million contract for another 148 RG-31s from Canadian Commercial Corporation, the national armaments marketing firm, on behalf of GDLS. In that contract, the armored trucks were oddly termed "ground effect vehicles," and the Army's official nickname would be Charger. Deliveries took some time, as the supply line stretched almost the length of the Atlantic Ocean. Deliveries were scheduled to continue, however, through December 2006.[44]

The first fatality in an RG-31 did not occur until May 2006. Early on, the US armed forces also ordered vehicles from

44 E. B. Boyd and Brian L. Frank, "A New Front: Can the Pentagon Do Business with Silicon Valley?" *California Sunday Magazine*, October 2015.

Force Protection Industries of South Carolina. These were not off the shelf, but rather had been developed domestically with technology licensed from the South African government. Eventually, the Army and the Marine Corps ordered over one thousand RG-31s, and thousands of other vehicles termed MRAPs—Mine-Resistant, Ambush-Protected vehicles—from multiple domestic producers.

In 2005, the Army and the Marines began work on an ambitious project for the Joint Light Tactical Vehicle (JTLV)—a vehicle only slightly larger than a Humvee, but with the protection of an MRAP. Developing the JLTV would ultimately require ten years, and full-rate production would not begin until 2019. During this time, US troops were protected from land mines by MRAPs, including RG-31s, and the origins of all that work reside in South Africa.

In summary, with the RG-31, the US Army obtained an armored vehicle long proven against land mines, relatively quickly, and at a price far below that of its other troop-carrying armored vehicles. While procuring the RG-31, and afterward, the US Army and Marine Corps would spend large sums developing the JLTV.

### Stryker Light Armored Vehicle III

The LAV III is an eight-wheeled, all-wheel-drive, armored troop carrier, designed for higher road speeds and lighter weight than comparable tracked vehicles.

In June 1999, less than a week after assuming office, US Army Chief of Staff General Eric Shinseki signaled his intention to restructure much of the service.[45] The immediate impetus came from the Army's difficulty over the preceding several months with deploying its Task Force Hawk, of attack helicopters and accompanying ground troops, from Germany to Albania for the Kosovo War. As analysts at RAND later described the problem, the Army needed to "expand ground force options to improve joint synergies."[46] As Shinseki would more clearly say, its light forces were too light for fighting opponents with heavy weaponry, and its heavy forces too heavy for strategic mobility.[47] Neither bookend of capability had properly contributed to the overall war-fighting effort.

In October 1999, Shinseki described a plan to rebuild the Army around motorized formations equipped with wheeled armored vehicles small enough to fit on C-130 Hercules transport aircraft.[48] In February 2000, General Motors (GM) Canada and GDLS announced that they would together enter the pending competition with a version of the Canadian LAV III, itself a development of the Piranha series of armored vehicles, first developed in the early 1970s by the Swiss firm MOWAG (Motorwagenfabrik AG). Back in 1983, the US Marine Corps had procured a version of the Piranha I, armed with a 25 millimeter (mm) cannon, for reconnaissance and screening duties.

GM Canada held the license from MOWAG to build the vehicles in London, Ontario. The Army would later also receive offers from United Defense LP (UDLP) for a combination of remanufactured M113A2 tracked troop carriers and M8 medium tanks, from ST Engineering for Bionix tracked troop carriers, and another from GD for six-wheeled, Austrian-designed Pandur armored vehicles. Neither UDLP nor ST Engineering seem to have taken account of Shinseki's strong and openly stated preference for wheels, though UDLP did suggest that a split purchase could include its tracked tank.

In March 2000, the Army reequipped the 3rd Infantry Brigade of the 2nd Infantry Division—a heavy brigade with Abrams tanks and Bradley fighting vehicles—at Fort Lewis, Washington, with LAV IIIs borrowed from the Canadian Army, and a variety of other vehicles under consideration.[49] In April 2000, the Army released an RFP for the Interim Armored Vehicle (IAV). The program was so named because almost simultaneously, the Army launched its Future Combat Systems (FCS) program to reequip all its heavy brigades (and eventually the "interim" brigades as well) with a common fleet of medium-weight vehicles of entirely new design. In March 2002, the Army selected a team of Boeing

45 Erin Q. Winograd, "Intent Letter Says Heavy Forces Are Too Heavy: Shinseki Hints at Restructuring, Aggressive Changes for the Army," *Inside the Army* 11, no. 25 (1999), http://www.jstor.org/stable/43984647.

46 John Gordon IV, Bruce Nardulli, and Walker L. Perry, "The Operational Challenges of Task Force Hawk," *Joint Force Quarterly*, no. 29, Autumn/Winter 2001–2002, 57, https://ndupress.ndu.edu/portals/68/Documents/jfq/jfq-29.pdf.

47 Gordon, Nardulli, and Perry, "The Operational Challenges of Task Force Hawk," 57.

48 Catherine MacRae, "Service Wants to Be Lighter, Faster, More Lethal: Army Chief of Staff's 'Vision' Is Focused on Medium-Weight Force," *Inside the Pentagon* 15, no. 41 (1999), http://www.jstor.org/stable/43995956.

49 Kim Burger, "Brigade Combat Team Has Trained Mostly on LAVs: Soldiers Give Praise for Wheeled, Tracked Vehicles at Ft. Lewis," *Inside the Army* 12, no. 39 (2000): 1, 11–12, http://www.jstor.org/stable/43985049; and "Rigorous Training Expected to Increase Comfort Level: Brigade Team Soldiers Give Up Tanks, Firepower with 'Hard Feelings,'" *Inside the Army* 12, no. 39 (2000): 1, 8–10, http://www.jstor.org/stable/43985046.

and SAIC to oversee development of the fourteen different vehicular and aerial systems, manned and unmanned, within the FCS.[50]

In November 2000, after reviewing the four more-of-less off-the-shelf proposals, the Army awarded GM and GD a contract for 2,131 vehicles, in a variety of variants of the LAV III, to equip six brigades by 2008. Shinseki had wanted the first vehicles by the end of 2001, but at contract award, that schedule was clearly infeasible.[51] The US Army's order was far larger than any yet received, and the US vehicle required a significant redesign from the Canadian standard, with more armor (resistant to 14.5 mm armor-penetrating rounds) but less firepower (a remote 12.7 mm machine gun rather than a manned 25 mm turret). Thus, the first new-production Strykers to equip further brigades would not arrive until 2003. In those numbers, the price was considered reasonable, at roughly $1.42 million each. This considerably exceeded the procurement price of the M113 alternative, but the Stryker's life-cycle costs were expected to be lower.[52]

In November 2003, the 3rd Brigade from Fort Lewis deployed to Iraq with Strykers. Also that year, GD consolidated the design-and-production arrangement by buying both GM Defense Canada and MOWAG. The next year, Shinseki's successor as chief of staff, General Peter Schoomaker, became similarly enthused about the Stryker. In seeking what he called an "infantry-centric army," in which troops were not defined by their means of conveyance to the battlefield, he specifically noted that Stryker brigades brought twice as many dismounts to the field as brigades equipped with Abrams and Bradleys.[53] The Strykers were also performing well in combat. Through early 2004 in Iraq, they had survived attacks from at least fifty-five IEDs, twenty-four RPGs, and a 500 pound car bomb without a single fatality.[54]

On the other hand, the Army's effort to field a version of the Stryker with a 105 mm assault gun did not fare as well. The service purchased enough to equip each of eventually eight Stryker brigades with twelve guns, but retired all the vehicles in 2022.[55] Then again, the Army's goal of "Future Combat Systems" as survivable as Abrams tanks but somehow fitting on C-130 aircraft did not survive past 2005.[56] Development continued for several years, but without tangible progress. In April 2009, Defense Secretary Robert Gates canceled most of the FCS program, which had not produced any operational vehicles, despite $19 billion in spending and six years of effort.[57]

Because the vehicles were considered an interim solution, the Army initially chose to forego developing its own maintenance depot for Strykers, and to instead rely substantially on GDLS through an arrangement the US military calls contractor logistics support (CLS). The Army's reliance on CLS was, in retrospect, a costly one, but it did subsequently facilitate modifying the vehicles for greater survivability, after battlefield lessons in Iraq and Afghanistan.[58] After the FCS program was clearly terminated, the Army began assuming more of the maintenance burden organically.

While only the US Army employs its customized Stryker series, LAV IIIs have been procured to equip land forces in Canada, Chile, Colombia, New Zealand, and Saudi Arabia. Piranha IIIs have been procured to equip land forces in Belgium, Botswana, Brazil, Denmark, Moldova, Ireland, Romania, Spain, Sweden, and Switzerland. In 2011, GDLS began producing an upgraded version, the LAV 6, for the

50 Andrew Feickert, *The Army's Future Combat System (FCS): Background and Issues for Congress*, Congressional Research Service, RL32888, November 30, 2009, https://crsreports.congress.gov/product/pdf/RL/RL32888/20.

51 Steven Lee Myers, "Army's Armored Vehicles Are Already Behind Schedule," *New York Times*, November 18, 2000, https://www.nytimes.com/2000/11/18/us/army-s-armored-vehicles-are-already-behind-schedule.html.

52 William M. Solis et al., *Military Transformation: Army's Evaluation of Stryker and M-113A3 Infantry Carrier Vehicles Provided Sufficient Data for Statutorily Mandated Comparison*, GAO-03-671, US Government Accounting Office, May 2003, https://www.gao.gov/assets/gao-03-671.pdf.

53 James Kitfield, "Army Chief Struggles to Transform Service during War," *Government Executive*, October 29, 2004, https://www.govexec.com/federal-news/2004/10/army-chief-struggles-to-transform-service-during-war/17929/; and Grace Jean, "Army Transformation Modeled After Stryker Units, *National Defense*, October 2005, https://www.nationaldefensemagazine.org/articles/2005/10/1/2005october--army-transformation-modeled-after-stryker-units.

54 Daniel Gouré, "Stryker Success," *Defense News*, November 15, 2004.

55 Stephen Losey, "The Army Is Ditching All of Its Stryker Mobile Gun Systems," Military.com, May 12, 2021, https://www.military.com/daily-news/2021/05/12/army-ditching-all-of-its-stryker-mobile-gun-systems.html.

56 Sandra Erwin, "For Army's Future Combat Vehicles, Flying by C-130 No Longer Required," *National Defense*, November 2005, https://www.nationaldefensemagazine.org/articles/2005/10/31/2005november-for-armys-future-combat-vehicles-flying-by-c130-no-longer-required.

57 See *Army Strong: Equipped, Trained and Ready: Final Report of the 2010 Army Acquisition Review*, Department of the Army, June 2011, 163, https://breakingdefense.com/wp-content/uploads/sites/3/2011/07/213465.pdf.

58 E-mail message to the author from Christopher Cardine, former program manager for the US Army and executive for General Dynamics Land Systems, April 2, 2024.


A US Army Soldier drives an Interim Armored Vehicle Stryker out of a C-17 Globemaster III. Photo by Senior Airman Tryphena Mayhugh, 62nd Airlift Wing Public Affairs.

Canadian Army and the Saudi National Guard. In 2019, GDLS began building a development of the LAV 6, the Armoured Combat Support Vehicle (ACSV), to replace the Canadian Army's M113s and LAV IIs. In 2022 and 2023, the United States sent surplus Strykers to Ukraine, and Canada sent new ACSVs.[59] In November 2023, the United States offered a coproduction deal to build Strykers, including air-defense variants, in India for the Indian Army.[60]

In summary, with the LAV III, the US Army obtained an armored vehicle in wide service around the world, though somewhat more slowly than hoped, and at a price and

59 David Akin, "As NATO Summit Ends, Canada Promises More Military Aid to Ukraine," *Global News* (Canada), June 30, 2022, https://globalnews.ca/news/8958186/canada-military-aid-ukraine/.

60 Inder Singh Bisht, "US to Co-Produce Stryker Armored Vehicle with India," *Defence Post*, November 13, 2023, https://www.thedefensepost.com/2023/11/13/us-produce-stryker-india/?expand_article=1; and Manjeet Negi, "US Offers India Air Defence Version of Stryker Armoured Fighting Vehicles," *India Today*, November 30, 2023, https://www.indiatoday.in/india/story/us-offers-air-defence-system-equipped-stryker-infantry-combat-vehicles-to-india-2469243-2023-11-30.

life-cycle cost deemed acceptable. The Army's heavy reliance on contractor logistics support was, in retrospect, a costly decision, but one which centralized management of upgrades at an important juncture. The Army spent a modest sum on development of the LAV IIIs, which required customization for its particular preferences. However, this was a small fraction of the funds spent developing the Future Combat Systems, the later and then-cancelled Ground Combat Vehicle, and the current effort with the Optionally Manned Fighting Vehicle. None of these programs have delivered vehicles to the field, but Strykers continue to serve.

## Assessment

The Stryker was first procured by the Army in 2000, during the Clinton administration. Six of the systems were procured starting between 2003 and 2008, during the comparatively free-trading George W. Bush administration, for which military-industrial cooperation with allies was a priority. Two of the systems were adopted in 2018, during the comparatively protectionist Trump administration. Plans for accepting off-the-shelf concepts for those two requirements, however, got their start during the preceding Obama administration. While the US Air Force's twenty-year drama of aerial tanker procurements from Boeing—and not Airbus—does provide a counterpoint, all the military services but the Space Force have smoothly adopted at least one major system of foreign design. The summary record of these procurements has been largely positive.

**Buying foreign military hardware off the shelf has generally brought the US military proven systems of lasting quality.**

In the first seven cases described, the US Army, Navy, Marine Corps, Air Force, and Coast Guard bought off-the-shelf systems to provide enduring capabilities, in lieu of developing new systems, and all seven are still in US service. The Army bought the RG-31 to provide a present capability, while also funding (with the Marine Corps) the development of enduring capabilities, culminating in that of the Joint Light Tactical Vehicle. For years along the way, the RG-31 provided very valuable protection to US troops against land mines. The Army similarly bought the Stryker LAV III to provide an interim capability, but it never succeeded in developing an enduring replacement. The Stryker thus continues in the Army's force structure and inventory more than twenty years on. As the Army's first program manager for Stryker recently put it, "The Army likes the vehicle, and still likes the vehicle"—for if it did not, it would not persist in service.[61]

Note also that the Defense Department would not have entrusted the air defense of the federal capital to NASAMS for eighteen years if it had meaningful questions about its capabilities.

This finding in evidence comports with the logic of the market. Off-the-shelf products generally feature observable quality. Indeed, if one is trying to sell an important system to the Americans, it is wise to bring a quality product. Any US military service is an important customer to whom a sale conveys great reputation.

**Buying foreign military hardware off the shelf has *mostly* fulfilled US military needs comparatively quickly.**

The RG-31 was procured in an emergency and was available in small quantities within months. The NASAMS was not quite procured in an emergency, but its immediate availability was appreciated, with fresh memories of the aerial attack on the Pentagon in 2001. The NSM was sought urgently, in that the rising threat from the Chinese navy could not be adequately opposed with the US Navy's existing anti-ship missiles. The Stryker (or any interim armored vehicle) was sought quickly, because the Army chief of staff was embarrassed by his service's failure to contribute during the Kosovo War. Its service in Iraq was impressive, but only because it was available three years after contract award. That proved adequate under the circumstances, even though General Shinseki initially had much quicker delivery in mind.

In all the other cases, the driving motivation for an off-the-shelf procurement was either economy or assured quality. This does not mean that speed was wholly unimportant. The MH-139A arrived after a flight-testing delay of a few years, and the *Sentinel*-class cutters also did not arrive quickly. In none of those cases, however, did the procuring service experience operationally damaging delays.

This finding also comports with the logic of the market. Off-the-shelf products generally can be provided more quickly, sometimes because the production process is running, and always because significant product development lead time is not required.

61 Author's interview with Donald Schenk, retired brigadier general, US Army, December 12, 2023.

**Buying foreign military hardware off the shelf has generally brought the US military cost-competitive matériel.**

Three of the cases were not fully competitive procurements. The NSM was chosen as the Navy's next anti-ship missile after Boeing and Lockheed Martin withdrew from the competition, apparently because neither could quite offer the combination of capabilities the Navy sought in a ship-killing missile for a small ship. The case of the NASAMS seems to have been a sole-source procurement, without a record of a competition. The case of the RG-31 was similarly a sole-source emergency purchase.

The remaining six cases were all competitive procurements, which indicates that foreign-designed systems have repeatedly delivered value for money to the US armed forces.

This finding further comports to the logic of the market. Any US military service is a customer with great buying power. As noted above, concluding the sale reinforces the seller's reputation, which can be leveraged for many years in pursuing other sales. For these two reasons, offerers have strong incentives to bring good deals to American buyers.

**Buying foreign military hardware off the shelf has had no strong effect on US capacity for military-industrial R&D.**

The nine off-the-shelf procurements neatly fall into five industries. None have seen a strong effect from this pattern of spending.

- In the two cases of *missile manufacturing*, the United States purchased two different missile systems, the NSM and NASAMS, from the same original designer, Kongsberg of Norway. On both projects, Kongsberg has cooperated with one of the US national champions in guided missiles, Raytheon. Over that time of the ongoing procurement, the US Defense Department has spent many more billions on missile development, for both offensive and defensive missions.

- In two cases of *rotorcraft manufacturing*, the Army bought hundreds of EC145s, and the Air Force is planning to buy scores of AW139s. The Army could have paid a contractor to design a wholly new aircraft for utility and training purposes, but the marginal advantage in an industry with a slow cycle of technological development could not be cost effective. The Air Force's requirements may have been somewhat more demanding, but a new design for a fleet of less than one hundred helicopters would be similarly foolish.

- In two cases of *fixed-wing transport aircraft manufacturing*, the Coast Guard, the Army, and the Air Force took delivery of just eighteen CN-235s and twenty-one C-27Js. Developing new aircraft for small fleets would be a very bad use of money. The special operations commands of the US services understand this well, and thus sources most of their aircraft from existing designs.

- In the one case of *shipbuilding*, the Coast Guard's off-the-shelf purchase of the 300 ton *Sentinel*-class cutter freed up money for the development of the 3000 ton *Heritage*-class cutter—a much larger project. Additionally, none of this spending by the Coast Guard seems to have affected the Navy's spending on ship design and development.

- In two cases of *armored vehicle manufacturing*—those of the RG-31 and the Stryker—the Army did continue to spend large sums on follow-on systems: the JLTV and the FCS.

## Recommendations

Since the end of the Cold War, the US armed forces have quite successfully taken into service nine major, off-the-shelf systems of foreign design. Again, this is good because a preference for the already available for federal procurement is federal law. Most of these products have been manufactured in the United States, and all have been serviced there. This is reasonable because the United States has huge industrial capacity and some strategic interest in domestic servicing. More pointedly, this technology transfer has effectively constituted security assistance from allies—a valuable concept too often overlooked by military policymakers.

### Formulating a strategic framework

The federal government can better avail itself of the advantages in quality, speed, and economy offered by allies' proven solutions, by adopting a two-part analytical framework for considering their procurement.

***Consider the global extent of the market***

Seven of the nine systems in this study were widely adopted by military forces around the world before a US military service purchased them. In all other cases, the procuring

services had long lists of satisfied customers to consult for insights into the equipment. For future procurements, if the needs of the service do not genuinely exceed the global state-of-the art, the best design should be sought from any friendly source. As several of these cases demonstrate, for large production runs, production can be brought to the United States, if desired.

***Measure the technological speed of the industry***

Seven of the systems in this study represented modest technological developments. Only the Naval Strike Missile constituted a great advancement over preceding options on the market. In all other cases, the procuring services were purchasing systems from industries with modest cycle speeds of technological development. Four of the procurements were from industries with substantially commercial underlying technologies and observably slow paces of change: helicopters and multiengine fixed-wing aircraft. If firms around the world are investing over the long-term for gradual technological progress, then a program to develop a wholly new system is duplicative.

## Educating the procurement bureaucracy

Despite the logic, the procurement bureaucracy—outside US Special Operations Command and the Coast Guard—may remain disinclined to seek proven solutions, and especially those of foreign provenance. In the short run, this puts the onus of securing best value on the political leadership of the military departments and defense agencies. For better quality, speed, and economy, these leaders must meet military desires for novel equipment with demands for frank justification and global market research. This approach fits within the civil-military model of military innovation, which holds that beneficial change most often comes when "statesmen intervene in military service doctrinal development, preferably with the assistance of maverick officers from within the service."[62]

This last point addresses a longer-term approach. In the apparatus of any administrative state, career bureaucrats greatly outnumber appointees.[63] Even if they are economically minded, the politicians cannot oversee everything. The "positive arbitrariness" of their occasional intervention can produce useful results, but it is also no way to build enduring institutional capacity.[64] Officials beyond the mavericks need further schooling in the mandate for and economy of buying military systems off the shelf. This means education in the market research techniques of routinely surveying global markets for military off-the-shelf solutions that can inform processes for developing requirements for new procurements. In theory, educational opportunities exist through the Defense Acquisition University, the Eisenhower School of the National Defense University, and the military acquisition elective courses at the various other war colleges.

The benefits could be far-reaching. Procuring what others have already developed can permit the military to focus its R&D funds on its most challenging problems. Then, when war comes, procuring agencies and industrial enterprises will better understand, as organizations, how to put others' designs into production here to meet the immediate needs of mobilization.

62 Adam Grissom, "The Future of Military Innovation Studies," *Journal of Strategic Studies* 29, no. 5 (2006); citing Barry R. Posen, *The Sources of Military Doctrine: France, Britain, and Germany between the World Wars* (Ithaca, NY: Cornell University Press, 1984), 222–36.

63 Dave Oliver and Anand Toprani, *American Defense Reform: Lessons from Failure and Success in Navy History* (Washington, DC: Georgetown University Press, 2022).

64 Douglas Bland, "Foreword," xviii, in Alan Williams, *Reinventing Canadian Defence Procurement: A View from the Inside* (Montreal: McGill-Queen's University Press, 2006).

## Appendix 1

### Recent Cases of Foreign Military Off-The-Shelf Procurement in the United States

| System | Procuring Services | Date Acquired by US Service | Country of Origin | Number of Countries Adopting |
|---|---|---|---|---|
| RGM-184A Naval Strike Missile | Navy, USMC | 2018 | Norway | 13 |
| Norwegian Adv. Surface-to-Air Missile System | Army | 2005 | Norway | 13 |
| UH-72A Lakota helicopter | Army | 2006 | Germany | 14 |
| MH-139A Grey Wolf helicopter | USAF | Pending | Italy | 25 |
| HC-144 Ocean Sentry maritime patrol aircraft | USCG | 2006 | Spain | 24 |
| C-27J Joint Cargo Aircraft | Army, USAF | 2007 | Italy | 14 |
| *Sentinel*-class Fast Response Cutter | USCG | 2012 | Netherlands | 15 |
| RG-31 mine-protected vehicle | Army | 2003 | South Africa | ~18 |
| Stryker LAV III “interim” armored vehicle | Army | 2003 | Canada | 16 |

## About the author

**James Hasik** is a political economist studying innovation, industry, and international security. Since September 2001, Hasik has been advising industries and ministries on their issues of strategy, planning, and policy. His work aims to inform investors, industrialists, technologists, and policymakers on how to effect, economically, a secure future.

## Acknowledgments

The Atlantic Council is grateful to Airbus for its generous sponsorship of this paper.

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