CSBA

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# DIAMOND IN THE ROUGH

## THE PAST, PRESENT, AND FUTURE OF NATO'S ISR FORCE


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## ABOUT THE AUTHORS

**Travis Sharp** is a Senior Fellow at the Center for Strategic and Budgetary Assessments. He directs the defense budget studies program and works to inform policymakers, senior leaders, and the public about issues related to resourcing national security. He also serves as a lieutenant commander in the U.S. Navy Reserve and is a lecturer at The John Hopkins University's Paul H. Nitze School of Advanced International Studies. In 2023–2024, he served as a staff member on the National Defense Strategy Commission, a congressionally mandated bipartisan review group. He has held positions with academic and policy organizations, including The George Washington University's Institute for Security and Conflict Studies, the Office of the Secretary of Defense, and the Center for a New American Security. His research has appeared in *The Journal of Strategic Studies*, *Defense and Peace Economics*, *International Affairs*, and other outlets.

**Ryan Kaufman** is a Visiting Fellow at the Center for Strategic and Budgetary Assessments, where his work centers on U.S. defense strategy, emerging technologies, and the future of warfare. He previously served as an active-duty naval officer, completing multiple deployments to Japan and South Korea and tours at U.S. Strategic Command and the Pentagon. He continues to serve in the U.S. Navy Reserve. He is currently pursuing a Ph.D. in political science at The George Washington University.

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**Cover graphic:** The RQ-4D Phoenix, NATO's high-altitude, long-endurance surveillance aircraft. Photo credit: Northrop Grumman.

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# Executive Summary

NATO is not as prepared as it could be to deter and defeat Russian aggression. Inadequate military surveillance is one major reason why. Persistent monitoring of key geographic areas is a prerequisite to effective response. Yet the Ukraine War has exposed gaps in the readiness, capabilities, and connectivity of NATO's intelligence, surveillance, and reconnaissance (ISR) enterprise.[1]

Thankfully, NATO already has a capability that can anchor the future surveillance network needed to contain Russia: NATO ISR Force (NISRF). The problem is that too few policymakers and experts know about it, so NISRF receives less recognition and investment than it deserves.

NISRF is a NATO command that operates a fleet of five RQ-4D high-altitude long-endurance unmanned aircraft systems (UAS) based in Sigonella, Italy. The fleet reached initial operational capability in 2021. NATO, not member states, owns the aircraft. NISRF processes, exploits, and disseminates data collected by its unarmed RQ-4Ds and data gathered from myriad external sources, including national collection by NATO members. NISRF has proved its worth since Russia invaded Ukraine. In 2024 alone, it delivered over 1,000 flying hours and over 8,500 intelligence products, averaging one product every hour.[2]

Despite its capability and proven performance, NISRF is underappreciated. Many military specialists have never heard of it. Those acquainted with it often have little sense of its history or mission. This ignorance is bewildering. NISRF is a multi-billion-dollar UAS fleet of highly sophisticated aircraft that have 15 years of remaining service life. It is supported by expertly trained personnel and can monitor Russian military provocations throughout Europe.

1 Gordon B. "Skip" Davis Jr., *The Future of NATO C4ISR: Assessment and Recommendations After Madrid* (Washington, DC: Atlantic Council, March 2023), 6–7, https://www.atlanticcouncil.org/in-depth-research-reports/report/the-future-of-nato-c4isr-assessment-and-recommendations-after-madrid/.

2 NATO, "2024 Wrap-Up: A Year of Success for NISRF," January 14, 2025, https://nisrf.nato.int/home/newsroom/news-2025/2024-wrapup-a-year-of-success-for-nisrf.

NATO force development is easy to criticize for being disjointed and slow, but NISRF is a diamond in the rough. NATO should unlock NISRF's full potential by establishing more operating sites and expanding the fleet with new aircraft. The alliance should make these investments in 2026 to keep pace with the Russian threat.

## Report Findings

**Past**: NISRF was known as NATO Alliance Ground Surveillance (AGS) Force before changing its name in 2023. NATO initiated AGS in 1992 to acquire an aircraft that could match the Gulf War successes of the U.S. Joint Surveillance Target Attack Radar System (JSTARS) aircraft. AGS spent the next 30 years trapped in delays and disagreements until its five RQ-4Ds finally became operational in 2021. AGS survived three decades in bureaucratic purgatory—a rare and surprising survival story—because the threat it addressed kept reappearing during the intermittent wars NATO fought and observed. Conflicts in Bosnia, Kosovo, Afghanistan, Iraq, and Libya demonstrated that, regardless of operational context, NATO needed to track enemy ground forces that were massing and maneuvering. NATO could not rely on member nations, especially the United States, to meet all its airborne surveillance needs.

**Present**: NISRF is well positioned to lead the collection, synthesis, and dissemination of intelligence to support NATO decision-making. The force may be small, but it is a significant portion of the long-endurance UAS available to NATO. Despite its potential, NISRF is not operating at maximum effectiveness. Four limitations have hampered its performance: personnel shortages, basing locations, aircraft sensors, and interoperability standards. NATO is considering improvements in these areas, so there is now an opportunity to strengthen NISRF.

**Future**: NISRF must contribute to peacetime deterrence and be prepared to transition to wartime defense if deterrence fails. In peacetime, the force should perform "Deterrence by Detection," an operational concept developed by CSBA, by maintaining persistent presence in five priority geographic areas to identify adversary forces for strategic indications and warning. In wartime, the force should support forward defense by conducting dynamic targeting near the forward edge of the battle area and peripheral sectors to identify adversary forces for operational engagement.

To fulfill these requirements, NISRF needs more locations and capabilities. NATO should:

- establish additional operating sites in Finland, Poland, Greece, and Norway, and
- buy five MQ-4Cs and five MQ-9Bs so NISRF owns 15 total aircraft.

Purchasing 10 new aircraft would incur a one-time procurement cost of $1.2 billion to $1.8 billion, according to CSBA estimates. Flying three times more aircraft could triple NISRF's annual operating cost, pushing it from about $350 million in 2025 to over $1 billion per year.

Although NATO can afford expenditures of that size under its existing defense spending target, NISRF should pursue efficiencies so operating costs do not grow proportionally with fleet size. Relying on contractor-operated UAS would be one way to obtain high-quality surveillance at less cost.

With more operating sites and aircraft, NISRF could satisfy peacetime requirements; however, it could only fulfill wartime requirements if it interoperated with the national forces of NATO members. NATO must continue working to improve the doctrinal and technological challenges of interoperability.

Strengthening NISRF would enable it to play a larger role in high-profile missions essential to European security. Those missions include monitoring Ukraine to enforce the terms of any future peace agreement, tracking Russia's shadow fleet of smuggling vessels, surveilling locations in which Russian asymmetric operations may occur, and watching the disposition of Russian forces along NATO's borders.

## Why Strengthening NISRF Matters

**1. Reducing NATO Reliance on U.S. Capabilities**. Strengthening NISRF would help NATO reduce its reliance on U.S. military surveillance capabilities. Although American and alliance leaders have long desired that outcome, progress has always been underwhelming. The reelection of President Donald Trump changed the equation. Unprecedented urgency now exists for burden shifting within NATO. Improving NISRF would permit NATO to show the United States that it is making progress. NISRF is an important symbol of the alliance's ability to defend itself. The alliance should not rely entirely on member-state contributions, whether from the United States or other nations, for all the UAS needed to deter and defeat Russia aggression. Having a NATO-owned UAS fleet provides the alliance with essential flexibility and autonomy.

**2. Appealing to Trump's Instincts**. Improving NISRF should appeal to the Trump administration, based on how the president tends to evaluate international issues. The U.S. financial contribution to NISRF is modest. If the force receives new aircraft, as the report recommends, profits will almost certainly flow to U.S. companies. From Trump's perspective, then, strengthening NISRF would reduce European freeriding, cost Americans little, and earn money for U.S. firms. Those would be big wins in his book. They also would be good policy from a non-Trump perspective, as the report argues.

**3. A Worthy Investment with Larger NATO Budgets**. NISRF is a worthy recipient of the extra funding generated by NATO's raising its defense spending target in 2025. Too little attention has been devoted to where the allies should direct their increased expenditures. NATO has forcefully expressed its desire to invest in UAS, but it has frequently been vague about which programs merit investment. The report cuts through that ambiguity by taking a strong stance: NATO should immediately spend more on NISRF.

**4. Monitoring the Peace in Postwar Ukraine**. NISRF could monitor Ukraine to help enforce the terms of any future peace agreement. Proposals for postwar security have called for using ISR and airpower to underwrite a cessation of hostilities. NISRF is a natural choice to lead that mission, particularly if it receives the additional capabilities recommended in the report.

**5. Deterrence by Detection (DbD)**. The report continues CSBA's work on DbD by showing how NISRF can anchor the concept in Europe. Spotlighting NISRF, an unsung multinational entity, parallels CSBA's last DbD study, which examined the Indo-Pacific Partnership for Maritime Domain Awareness.[3] Policymakers continue to express interest in DbD. The report refills the pool of ideas while demonstrating the concept's continued relevance to Europe.

**6. Wartime Value of Nonstealthy Long-Endurance UAS**. The report goes beyond previous DbD research by detailing wartime roles for the nonstealthy long-endurance UAS at the heart of the concept. CSBA's past work emphasized the value of these aircraft for peacetime deterrence. The aircraft must also provide value in wartime, however; otherwise, countries will be less willing to invest in them. By illustrating wartime roles, the report challenges the common claim that nonstealthy long-endurance UAS would play little part in great power war.[4] The report sides with optimists who see these aircraft as very valuable if employed appropriately.[5]

3 Travis Sharp, Thomas G. Mahnken, and Tim Sadov, *Extending Deterrence by Detection: The Case for Integrating Unmanned Aircraft Systems Into the Indo-Pacific Partnership for Maritime Domain Awareness* (Washington, DC: CSBA, July 2023), https://csbaonline.org/research/publications/extending-deterrence-by-detection-the-case-for-integrating-unmanned-aircraft-systems-into-the-indo-pacific-partnership-for-maritime-domain-awareness.

4 Michael Peck, "The Reign of the Reaper Drone May Be Coming to an End," *Business Insider*, May 17, 2025, https://www.businessinsider.com/reign-of-drones-like-us-reaper-may-be-ending-2025-5.

5 Andrew Metrick, "Bad Idea: UAVs Aren't Usable in Contested Environments," Center for Strategic and International Studies, December 4, 2017, https://defense360.csis.org/bad-idea-uavs-contested-environments/.

CHAPTER 1

# Slow-Motion Adaptation: Intermittent Wars and NATO's Alliance Ground Surveillance Program, 1991–2021

In February 2021, NATO designated as operational its fleet of five RQ-4D Phoenix unmanned aircraft systems (UAS) based in Sigonella, Italy. The moment was decades in the making, and its timing proved fortuitous. One year later, Russia invaded Ukraine, precipitating Europe's biggest security crisis since World War II. The small fleet and its command—known before 2023 as NATO Alliance Ground Surveillance (AGS) Force and since then as NATO Intelligence, Surveillance, and Reconnaissance (ISR) Force—responded ably to Russian aggression. It surveilled tactical targets in and around Ukraine and strategic targets in Russia.[6] It integrated new software to track ships in the Black and Baltic Seas.[7] In 2024 alone, it delivered over 1,000 flying hours and over 8,500 intelligence products, averaging one product every hour.[8]

These achievements resulted from a process that had started 30 years earlier. In 1992, NATO initiated the AGS program to acquire an aircraft that could match the Gulf War successes of the U.S. Joint Surveillance Target Attack Radar System (JSTARS) aircraft. AGS spent the next 20 years trapped in delays, disagreements, and budget cuts. A breakthrough

6 Elisabeth Gosselin-Malo, "Inside the NATO Alliance's RQ-4D 'Phoenix' Drone Operations," *The War Zone*, July 20, 2022, https://www.twz.com/inside-the-nato-alliances-rq-4d-phoenix-drone-operations.

7 NATO, "NATO AGS Force Receives RQ-4D Aircraft Back with Upgraded Capabilities," September 19, 2022, https://ac.nato.int/archive/2022/NAGSF_return_of_MarMd_222.

8 NATO, "2024 Wrap-Up: A Year of Success for NISRF," January 14, 2025, https://nisrf.nato.int/home/newsroom/news-2025/2024-wrapup-a-year-of-success-for-nisrf.

finally came in 2012, when a consortium of NATO nations signed a $1.7 billion contract with Northrop Grumman to buy five RQ-4Ds adapted from the firm's Global Hawk. Despite the breakthrough, NATO spent another decade preparing before the fleet finally came online in 2021.

How did AGS survive 30 years without being snuffed out by shifting NATO politics and priorities? This chapter argues that AGS endured because the threat it addressed—enemy ground movement and maneuver—kept reappearing in different forms during the intermittent wars NATO fought and observed. Conflicts in Bosnia, Kosovo, Afghanistan, Iraq, and Libya demonstrated that, regardless of operational context, NATO needed to track enemy ground forces as they massed and maneuvered. NATO could not rely on member nations, especially the United States, to meet all its airborne surveillance needs. The contrast between how the U.S. and other allies' militaries performed in the wars accentuated NATO's surveillance deficit.

## "A Bit of a Saga": The History of AGS

### Gulf War: JSTARS Inspires AGS

The effectiveness of JSTARS during the Gulf War inspired NATO to create the AGS program. Produced by Northrop Grumman, JSTARS combined intelligence collection and battle management. It detected, located, and tracked mobile missile launchers, mechanized vehicles, and supply convoys using moving target indicator (MTI) and synthetic aperture radar (SAR) imaging systems that could function at night and in poor weather. Flying at standoff distances from enemy forces, it passed target information to air and ground commanders or operated as a battle manager itself, vectoring fighter aircraft to strike ground targets.

The Gulf War presented an ideal context for JSTARS's capabilities (Figure 1). The U.S.-led coalition gained and kept air superiority, and Iraqi ground units presented vulnerable targets. Air strikes were effective due to distinct lines separating the opposing forces, limited civilian vehicle activity, and open terrain with few mountains. JSTARS thrived in these conditions. With a typical nighttime mission lasting 10–12 hours, the two JSTARS aircraft deployed during the war together flew 49 combat missions, located over 1,000 critical enemy targets, and managed over 750 strike sorties.[9] This output was impressive considering the two aircraft were prototypes. Indeed, the JSTARS program was still in the testing phase.

9 Peter Grier, "Joint STARS Does Its Stuff," *Air Force Magazine*, June 1991, https://www.airandspaceforces.com/article/0691stars/; and Thomas C. Hone, Mark D. Mandeles, and Sanford S. Terry, *Gulf War Air Power Survey*, vol. I, pt. II, *Command and Control* (Washington, DC: Department of the Air Force, 1993), 327, https://media.defense.gov/2010/Sep/27/2001329802/-1/-1/0/gulf_war_air_power_survey-vol1.pdf.

## FIGURE 1: JSTARS ARRIVES IN SAUDI ARABIA DURING THE GULF WAR, JANUARY 12, 1991

**Source**: U.S. Army Intelligence Center of Excellence.[10]

JSTARS enabled combat success. As the U.S. government's *Gulf War Air Power Survey* concluded, "In Desert Storm, JSTARS stole the show."[11] In the Battle of Khafji, JSTARS detected attacking Iraqi troops and directed coalition aircraft to counterattack.[12] The rapid response neutralized the Iraqi offensive, saving coalition ground forces from having to counterattack, which kept the campaign plan on schedule. A few weeks later, JSTARS found a large Iraqi convoy retreating from Kuwait City along Highway 80 and initiated a wave of coalition airstrikes that resulted in the "highway of death" (Figure 2). Brigadier General John Stewart, intelligence director for Army Central Command, called JSTARS "the single most valuable intelligence and targeting collection system in Desert Storm."[13]

10 Lori Stewart, "JSTARS Arrives in Saudi Arabia," U.S. Army Intelligence Center of Excellence, January 10, 2025, https://www.dvidshub.net/news/488913/jstars-arrives-saudi-arabia-12-jan-1991.

11 Hone et al., *Gulf War Air Power Survey*, 324.

12 Thomas G. Mahnken and Barry D. Watts, "What the Gulf War Can (and Cannot) Tell Us About the Future of Warfare," *International Security* 22, no. 2, Fall 1997, 155–156.

13 Lori Tagg, "JSTARS Plays Critical Role in Operation Desert Storm," U.S. Army, January 16, 2015, https://www.army.mil/article/141322/jstars_plays_critical_role_in_operation_desert_storm.

## FIGURE 2: JSTARS SCOPE IMAGE OF IRAQI RETREAT FROM KUWAIT, FEBRUARY 26–27, 1991


**Source**: Grumman Aerospace Corporation.[14]

Influenced by this wartime success, NATO's Defence Planning Committee pledged in May 1992 to seek new reconnaissance and surveillance capabilities for the changing security environment.[15] This declaration jump-started its pursuit of a capability like JSTARS, which it called AGS.[16]

NATO wanted AGS to pair with its existing airborne warning and control system (AWACS) fleet. As NATO Secretary General Willy Claes stated, AGS would provide "a capability for

14 Grumman advertisement in *Air Force Magazine*, November 1991, 17, https://www.airandspaceforces.com/app/uploads/1991/11/Nov1991.pdf.

15 NATO communique, May 27, 1992, https://www.nato.int/fr/about-us/official-texts-and-resources/official-texts/1992/05/27/ministerial-communique.

16 "Why NATO Needs Joint Stars," *NATO's Sixteen Nations* 39, no. 3–4 (special issue), 1994, 20. NATO leaders typically did not characterize AGS as emulating JSTARS's Gulf War success because they did not want to be seen as merely copying the United States. This special issue of *Sixteen Nations* magazine, however, provides overwhelming evidence of JSTARS's inspirational effect on AGS.

the ground picture complementary to the one that AWACS provides for the air picture."[17] Through AGS, alliance members would acquire a capability they could not afford by themselves. Unfortunately for NATO, AGS would encounter more difficulties than anyone imagined. As a NATO official once remarked in an understatement, "It's been a bit of a saga."[18]

## Bosnia: JSTARS Shows AGS's Broad Relevance

AGS picked up speed slowly. By March 1993, NATO's Conference of National Armaments Directors started studying options.[19] In 1995, the Defence Planning Committee endorsed as AGS's objective a "minimum essential NATO-owned and -operated core capability supplemented by interoperable national assets."[20] This goal was far more modest than preliminary proposals calling for 50 aircraft.[21] The high costs of such ambitious plans attracted little support in NATO, particularly as military spending declined after the Cold War.

AGS started slowly because the stakes were high. Industrial benefits would flow to the winners of AGS contracts. The biggest prize in monetary terms was the aircraft. NATO intended to select a platform already in service or under development. The U.S.-produced JSTARS was an obvious contender, and the Bill Clinton administration lobbied hard for it.[22] European governments opposed the United States winning all the business. They also worried that the United States would withhold sensitive data. As a result, European alternatives to JSTARS soon emerged, including the UK's ASTOR fixed-wing aircraft and two heliborne systems (France's HORIZON and Italy's CRESO).[23]

As this debate intensified, the conflict in Bosnia and Herzegovina showed the need for AGS. JSTARS served again as the test case. U.S. officials believed deploying JSTARS to Bosnia would highlight its effectiveness and help it win the AGS competition.[24] JSTARS's results in Bosnia, however, would be less triumphant than in the Gulf.

17 NATO release (95)80, September 7, 1995, https://archives.nato.int/vis-it-by-nato-secretary-general-to-alliance-ground-surveillance-capability-project-office.

18 "NATO Launches Alliance Ground Surveillance System," *Janes Defence Weekly*, September 28, 2009.

19 Robin Beard, "NATO Armaments Cooperation in the 1990s," *NATO Review* 41, no. 2, March–April 1993, 26, https://archives.nato.int/nato-review-128.

20 NATO communique M-DPC/NPG-2(95)117, November 29, 1995, https://www.nato.int/en/about-us/official-texts-and-resources/official-texts/1995/11/29/final-communique.

21 Eric H. Biass and Roy Braybrook, "Northrop Grumman Joint Stars," *Armada International* 21, no. 5, October–November 1997, 53.

22 White House Pushes JSTARS in NATO Competition," *Inside the Pentagon* 12, no. 35, August 29, 1996.

23 NATO release (95)19, February 28, 1995, https://archives.nato.int/alliance-moves-ahead-on-project-for-nato-wide-ground-surveillance-system.

24 Harry V. Phillips, "Does the Joint Surveillance Target Attack Radar System (JSTARS) Support Military Peace Operations? A Case Study of JSTARS Support to Operation JOINT ENDEAVOR," master's thesis, U.S. Army Command and General Staff College, 1998, 85–86, 116–118, https://apps.dtic.mil/sti/citations/ADA350041.

NATO did not use JSTARS for the no-fly-zone or air-campaign phases in Bosnia. Planners deemed the risk of getting shot down to be too high.[25] After the Dayton Peace Accords ended the war, however, JSTARS flew in Operation Joint Endeavor (December 1995–December 1996), the NATO-led peace enforcement mission. The aircraft monitored the zone of separation and reported violations to political leaders, including the Serbs.[26] The mountainous terrain was challenging because it impeded JSTARS's view of the ground, a phenomenon known as radar shadowing.[27] Military and civilian vehicle traffic also intermixed on roadways, hindering positive identification of Serbian military movement.[28]

Despite these difficulties, JSTARS monitored and produced evidence of enemy ground movements (or lack thereof, which was also important intelligence). The aircraft protected friendly forces crossing the Sava River into Bosnia, surveilled mass grave sites, and confirmed surface-to-air missile (SAM) locations.[29] Military officials praised the aircraft's defensive role overwatching allied forces, a change from its offensive role orchestrating airstrikes in the Gulf War.[30] Other aircraft helped with these missions, including the RQ-1 Predator UAS, which made its operational debut in Bosnia.

Tactical commanders frequently requested JSTARS SAR imagery, exasperating some JSTARS support personnel who considered the requests excessive.[31] Higher-level commanders also hungered for SAR imagery. As Sheila Widnall, U.S. Air Force secretary, remarked, "The NATO commander enforcing the separation has taken to slapping those [SAR] pictures down in front of the Serbs, saying: 'See, you can't do anything we don't know about!'"[32]

In Bosnia, JSTARS demonstrated AGS's applicability to peacekeeping, a vastly different context than the Gulf War. According to Claes, Bosnia proved NATO needed better surveillance of ground threats.[33] Later descriptions of AGS by NATO invoked its peacekeeping

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25 Richard L. Sargent, "Aircraft Used in Deliberate Force," in Robert C. Owen, ed., *Deliberate Force: A Case Study in Effective Air Campaigning* (Maxwell Air Force Base, AL: Air University Press, January 2000), 241, https://www.airuniversity.af.edu/Portals/10/AUPress/Books/B_0074_OWEN_DELIBERATE_FORCE.pdf.

26 Collin A. Agee, "Joint STARS in Bosnia: Too Much Data, Too Little Intel?" *Military Intelligence Professional Bulletin* 22, no. 4, October–December 1996, 7, https://www.ikn.army.mil/apps/MIPBW/MIPB_Issues/MIPB%20Oct%201996.pdf.

27 JSTARS's radar had an oblique view of ground targets when flying a standoff orbit. Mountains obstructed this oblique view, resulting in a radar blind spot behind the obstruction.

28 Kristin M. Baker, "Operation JOINT ENDEAVOR: Joint STARS in the Balkans," *Military Intelligence Professional Bulletin* 22, no. 4, October–December 1996, 27, https://www.ikn.army.mil/apps/MIPBW/MIPB_Issues/MIPB%20Oct%201996.pdf.

29 Phillips, "Does JSTARS Support Military Peace Operations?", 120.

30 Ronald R. Fogleman, testimony before the Senate Appropriations Defense Subcommittee, April 17, 1996, S. Hrg. 104-756, 278.

31 "Bids for Battlefield Radar Face Skepticism," *Janes Defence Weekly*, September 25, 1996.

32 Biass and Braybrook, "Northrop Grumman Joint Stars," 53.

33 NATO release (95)80.

role.[34] This language shift exemplified how AGS survived in NATO: by staying continually relevant to current operations.

### Kosovo: AGS Propelled by Dependence on the United States and JSTARS Limitations

The Bosnia war deepened NATO support for AGS, but it did not convince the alliance to buy JSTARS. In November 1997, the Conference of National Armaments Directors rejected a U.S. proposal to fast-track acquisition of four to six JSTARS aircraft.[35] It instead recommended continuing "to search intensively for fresh concepts and acquisition options."[36] This search would drag on for 10 years as rival industrial consortia competed over the aircraft, radar, and ground stations. The ins and outs of this competition are of only minor interest to strategic analysts.[37] The most striking feature continued to be how intermittent wars drove AGS.

The Kosovo War continued that trend. The United States deployed JSTARS during Operation Allied Force (March–June 1999), the NATO air campaign to defend the Kosovar Albanians. The aircraft conducted both intelligence collection and battle management, as it had in the Gulf War.

JSTARS's intelligence collection received relatively high marks, especially in the preparatory phase before NATO bombing began. Analysts credited it with identifying patterns of life at military facilities, tracking enemy convoys, and discovering radar sites.[38] Once NATO's air campaign kicked off, though, intelligence collection proved challenging. As in Bosnia, radar shadowing occurred due to Kosovo's mountainous terrain and JSTARS flying at standoff range to avoid SAMs. Serbian forces also evaded detection by minimizing ground force concentrations that JSTARS could spot.[39]

When Serbian ground forces were forced into the open during the war's final weeks, JSTARS detected them and, in its battle manager role, directed attacks by other aircraft. The airstrikes inflicted only modest damage relative to the Gulf War, but by suppressing Serbian

34 NATO release (97)137, November 7, 1997, https://archives.nato.int/statement-by-permanent-chairman-of-natos-conference-of-national-armaments-directors-2.

35 "USA Seeks Larger Force for Ground Surveillance," *Janes Defence Weekly*, March 18, 1998.

36 NATO communique M-NAC-D-2(97)149, December 2, 1997, https://www.nato.int/fr/about-us/official-texts-and-resources/official-texts/1997/12/02/final-communique.

37 On this period, see Pierre A. Chao, "NATO AGS—Finally Ready to Fly?" (Washington, DC: Center for Strategic and International Studies [CSIS], July 2004), https://csis-website-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/media/csis/pubs/0407_natoags.pdf.

38 Timothy P. Albers, "Joint Surveillance Target Attack Radar System: Unlimited Potential—Limited Resources," master's thesis, U.S. Army Command and General Staff College, 2001, 57, https://apps.dtic.mil/sti/citations/ADA396589.

39 Barry R. Posen, "The War for Kosovo: Serbia's Political-Military Strategy," *International Security* 24, no. 4, Spring 2000, 62–66.

activity they enabled other military operations and diplomacy to end the conflict.[40] Military officials recognized JSTARS's contribution to these war-terminating dynamics.[41]

The Kosovo War affected the AGS program in two ways. First, it highlighted NATO's dependence on U.S. military capabilities. In Kosovo, the United States met 95 percent of NATO's intelligence requirements using its satellites, UAS, and manned aircraft such as JSTARS.[42] Every strike sortie conducted by European aircraft required, on average, three U.S. support planes, including JSTARS.[43] A German official voiced the clear implication: "If we look back at the air war over Kosovo, the only people who could do the targeting there were the Americans because only they had the assets. We never want to be in that position again."[44]

After the war, NATO pushed European nations to reduce reliance on the United States. Admiral Guido Venturoni, chairman of the NATO Military Committee, called for a "re-balancing of the transatlantic relationship," with members contributing "considerably more input than previously" to intelligence gathering, including AGS.[45] NATO formed the Defence Capabilities Initiative and named AGS the top priority, citing "particularly critical and long-standing deficiencies" in intelligence, surveillance, and target acquisition.[46] By exposing those deficiencies, the Kosovo War hardened NATO's commitment to AGS.

Second, the Kosovo War demonstrated JSTARS's limitations, bolstering NATO's desire to select another aircraft for AGS. Mountainous terrain degraded JSTARS's performance. The aircraft could not fly closer to targets to obtain a better overhead radar view because, with a maximum altitude of 42,000 feet, it could be downed by SAMs such as the SA-6 used by the Serbs. An aircraft flying at a higher altitude, however, could maintain a better radar view while staying above the maximum engagement altitude of SAMs.

By 1999, Northrop Grumman's RQ-4 Global Hawk had emerged as a high-altitude (over 60,000 feet) unarmed UAS capable of transcending JSTARS's limitations. NATO was already considering UAS as a long-term option for AGS.[47] The Kosovo War accelerated that

40 Benjamin S. Lambeth, *NATO's Air War for Kosovo: A Strategic and Operational Assessment* (Santa Monica, CA: RAND Corporation, 2001), 55–56, https://www.rand.org/pubs/monograph_reports/MR1365.html.

41 Tony Capaccio, "JSTARS Led Most Lethal Attacks on Serbs," *Defense Week*, July 6, 1999.

42 David S. Yost, "The NATO Capabilities Gap and the European Union," *Survival* 42, no. 4, Winter 2000–2001, 104.

43 Carla Anne Robbins, "To All but Americans, Kosovo War Appears a Major U.S. Victory," *Wall Street Journal*, July 6, 1999.

44 "ILA 2004: Germany Looks Beyond AGS to National Intelligence Needs," *Janes Defence Weekly*, May 21, 2004.

45 Guido Venturoni, "The Washington Summit Initiatives: Giving NATO the 'Tools' to Do Its Job in the Next Century," *NATO Review* 47, no. 3, Autumn 1999, 10–11, https://archives.nato.int/nato-review-160.

46 NATO communique M/NAC/D/1(01)89, June 7, 2001, https://archives.nato.int/statement-on-defence-capabilities-initiative-issued-at-meeting-of-nac-in-defence-ministers-session-held-in-brussels-on-7-june-2001.

47 Edward von Kospoth, "The AGS Enigma—Reflections on a Fading Dream," *Military Technology* 23, no. 10, October 1999, 68.

process, pushing UAS—specifically Global Hawk—to the front of the conversation.[48] The fact that Northrop produced both Global Hawk and JSTARS mattered in this context. Selecting Global Hawk for AGS would secure for Northrop, and by extension the United States, the industrial benefits lost when JSTARS was rejected. Along with that political consideration, Global Hawk's capabilities resolved some of the problems JSTARS faced in Kosovo and Bosnia. The wars in Afghanistan and Iraq would prove Global Hawk's value.

## Afghanistan and Iraq: Global Hawk Becomes Focus of AGS

By 2001, AGS discussions began focusing on a mixed fleet of manned and unmanned aircraft. This mixed-fleet option would hold sway for years until NATO decided in 2007 to pursue a UAS-only force. Cost concerns helped push AGS toward UAS. Yet that factor was neither new nor decisive. Rather, the key influences were Afghanistan and Iraq. Although the two wars were thoroughly different from one another, together they demonstrated the deadliness of ground threats to NATO forces and the ability of UAS to reduce those dangers. Without that real-world demonstration, AGS would have remained paralyzed by debate within NATO.

In Afghanistan and Iraq, JSTARS's 10–12-hour endurance was limiting.[49] Persistent surveillance was needed to track enemy fighters who used caves, dispersion, and communications discipline to evade detection. Global Hawk filled the void by leveraging its over 30-hour endurance and varied sensors, which included MTI, SAR, electro-optical, and infrared imaging.

In 2001–2002, Global Hawk captured over 15,000 images of enemy ground targets during 50 combat missions in Afghanistan. Brigadier General John Kimmons, intelligence director at U.S. Central Command, called the aircraft "an imagery intelligence workhorse."[50] Its success resulted in part from its responsiveness to ad hoc tasking. Commanders directed it to key geographic areas and kept it there for prolonged periods. In late 2001, for example, Global Hawk used infrared sensing to spot enemy lookouts and conduct battle damage assessment during the Battle of Tora Bora (Figure 3).[51] Although the battle infamously did not result in killing or capturing Osama bin Laden, it showed Western leaders the benefits of persistent surveillance supplied by UAS.[52]

48 "A Clear Picture," *Janes Defence Weekly*, January 5, 2001.

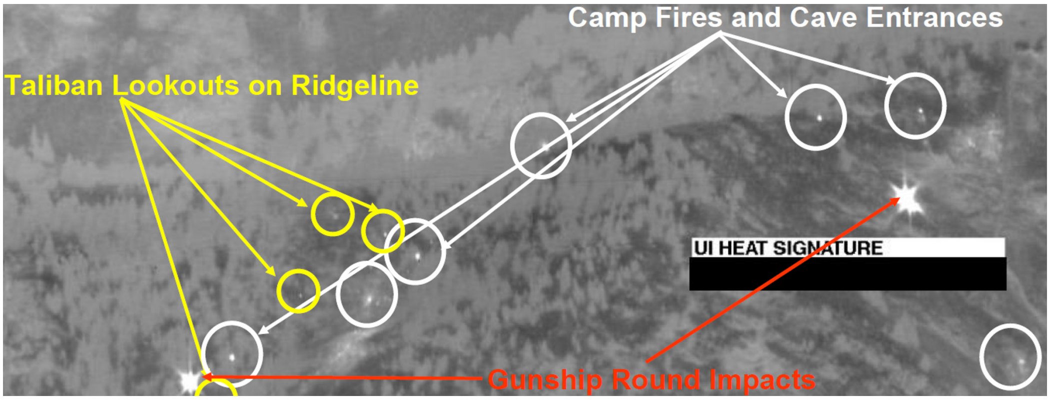
49 Price T. Bingham, "Ground Radar Surveillance and Targeting," *Joint Force Quarterly* 35, 2004, 93.

50 "Defense Watch," *Defense Daily*, December 16, 2002.

51 Rebecca Grant, "Eyes Wide Open," *Air Force Magazine*, November 2003, https://www.airandspaceforces.com/article/1103eyes/.

52 Benjamin S. Lambeth, *Air Power Against Terror: America's Conduct of Operation Enduring Freedom* (Santa Monica, CA: RAND Corporation, 2005), 340–342, https://www.rand.org/pubs/monographs/MG166-1.html.

## FIGURE 3: GLOBAL HAWK INFRARED IMAGE OF TORA BORA CAVE COMPLEX, DECEMBER 10, 2001




**Source**: Northrop Grumman.[53]

In Iraq, Global Hawk performed commendably during the U.S.-led coalition's initial offensive to overthrow Saddam Hussein's regime. It partnered with JSTARS to track Iraqi Republican Guard formations, even during severe sandstorms that blinded other sensors. In one acclaimed mission, its uninterrupted all-weather surveillance enabled airstrikes that battered Iraq's elite Republican Guard Medina Division south of Baghdad.[54] U.S. military sources credited Global Hawk with accelerating the Republican Guard's defeat by several days.[55] They also praised it for finding nearly 40 percent of Iraq's armor despite flying only 3 percent of imagery collection missions.[56] That statistic resulted from its long endurance, which allowed it to surveil more targets per sortie than JSTARS or other aircraft.

As the conflicts in Afghanistan and Iraq slid into counterinsurgency campaigns, Global Hawk continued to contribute. Its capabilities expanded as upgraded variants and better data processing came online. Leveraging its large sensor footprint, which could survey a 40,000-square-mile area (roughly the size of South Korea) every 24 hours, the aircraft patrolled porous border areas to find insurgent activity (Figure 4).[57] By repeatedly imaging a location over time, it could detect changes in vehicle traffic and even soil excavation.[58] These

53 Sam McKeehan, "Lessons Learned in Fielding a UAS in the Combat Theater," February 28, 2008, 17, https://ndia.dtic.mil/wp-content/uploads/2008/test/THURSDAY/ThurI/McKeehan.pdf.

54 John Croft, "Send in the Global Hawk," *Smithsonian Magazine*, January 2005, https://www.smithsonianmag.com/air-space-magazine/send-in-the-global-hawk-8601982/.

55 Rowan Scarborough, "Hovering Spy Plane Helps Rout Iraqis," *Washington Times*, April 3, 2003.

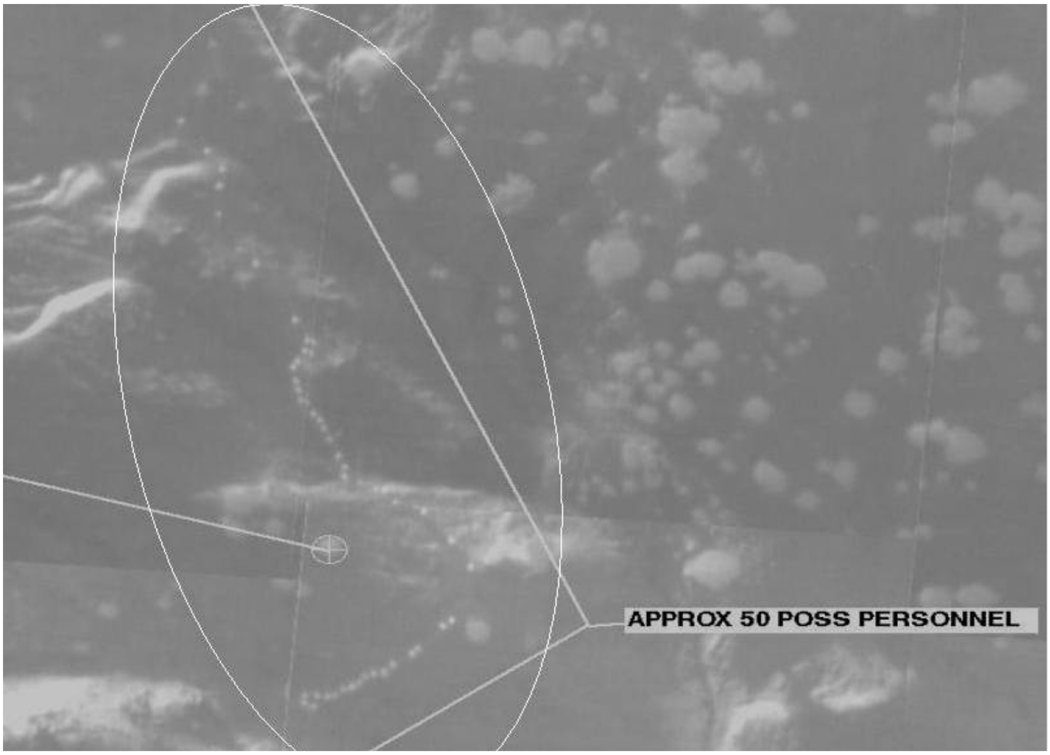
56 Sue Baker, "First Production Global Hawk Rolls Out," U.S. Air Force, August 8, 2003, https://www.af.mil/News/Article-Display/Article/138735/first-production-global-hawk-rolls-out/.

57 Amy Butler, "Global Hawk UAV Supports Border Ops in Iraq," *Aviation Week*, March 12, 2007.

58 On change detection and synthetic aperture radar more generally, see Robert M. Clark, *Intelligence Collection* (Thousand Oaks, CA: CQ Press, 2014), chap. 12.

were key indicators of the improvised explosive devices that killed thousands of coalition troops during the wars.

### FIGURE 4: GLOBAL HAWK INFRARED IMAGE OF EASTERN AFGHANISTAN, MAY 2, 2002




**Source**: Northrop Grumman.[59]

NATO was closely attuned to these contributions, especially in Afghanistan where the alliance led the International Security Assistance Force after August 2003. Analysts cited Global Hawk's protection of NATO forces in Afghanistan as proof of the advantages AGS would give NATO in the future.[60] Later in the war, NATO's press office published a fictitious vignette in which an AGS-affiliated Global Hawk watched over NATO personnel following a complex attack by Afghan insurgents.[61] Releasing this vignette encapsulated how a morphing enemy ground threat delivered a steady rationale for AGS. That ground threat took a different form in Afghanistan than it did in Kosovo or Bosnia, but AGS's flexible capabilities meant it remained relevant regardless of operational context.

59 McKeehan, "Lessons Learned," 23.

60 Sandra I. Erwin, "NATO Radar-Aircraft Project Gains Broader Political Clout," *National Defense*, August 2003, https://www.nationaldefensemagazine.org/Articles/2003/8/1/2003August%20NATO%20RadarAircraft%20Project%20Gains%20Broader%20Political%20Clout.

61 NATO, "Alliance Ground Surveillance to Protect NATO Forces," updated July 30, 2012, https://web.archive.org/web/20240702045154/https://www.nato.int/cps/en/natohq/news_87930.htm.

By 2007, the ongoing wars had shown the value of UAS. This demonstration of effectiveness was essential to NATO deciding that year to pursue only Global Hawks for AGS.[62] Switching from a mixed fleet to all Global Hawks cut AGS's cost in half, from $4-to-$5 billion to $2.2 billion, an attractive proposition for NATO.[63] As analysts noted at the time, however, those cost savings were enticing only because Global Hawk had succeeded in Afghanistan and Iraq.[64] If the aircraft had performed poorly, NATO would not have selected it on cost grounds alone. Letting financial considerations overrule military effectiveness would have been politically untenable for NATO.

Global Hawk's proven value against ground threats in Afghanistan and Iraq was a prerequisite for AGS advancing to its next phase within NATO. That phase would witness the climax of the AGS saga, but not its end.

### Libya: Reliance on United States Triggers AGS Breakthrough

After agreeing to use only Global Hawks in AGS, NATO worked to bring the force into being. Northrop Grumman, now designated the AGS prime contractor, formed a transatlantic consortium to produce the aircraft, radar, and ground stations.[65] In early 2009, NATO selected Sigonella as the AGS base. Later that year, alliance members signed a memorandum that launched program management activities. In a matter of months, AGS had advanced further than it had in the preceding 15 years.

Despite this progress, AGS still faced the challenge of constrained resources. The 2008 global financial crisis placed downward pressure on defense budgets. In the crisis's aftermath, some NATO members balked at AGS's price—even though it was half what the alliance had planned to pay for a mixed fleet two years earlier.[66] Denmark and Canada withdrew from the program, shrinking the pool of money available for acquisition; this reduced the number of aircraft that could be bought. Analysts described AGS as "near death" at this juncture.[67]

AGS escaped death because of NATO's Operation Unified Protector in Libya. In March 2011, a U.S.–French–UK coalition launched missile strikes and established a no-fly zone to protect Libyan civilians in Benghazi. NATO later took command of the air campaign while the United States assumed a lesser role. Over the next seven months, NATO degraded Muammar Gaddafi's forces, including by attacking command and control nodes, weapons stockpiles,

62 NATO, "October 2007 CNAD Makes Progress," updated August 18, 2008, https://web.archive.org/web/20230927114300/https://www.nato.int/cps/en/natohq/news_7759.htm.

63 "NATO Resurrects a Smaller and Cheaper AGS Programme," *Janes Defence Weekly*, June 6, 2008.

64 Pierre Tran, "NATO Axes Airbus from AGS System," *Defense News*, November 19, 2007.

65 NATO, "NATO's Allied Ground Surveillance Programme Signature Finalised," September 25, 2009, https://web.archive.org/web/20221002131214/https://www.nato.int/cps/en/natohq/news_57711.htm.

66 "NATO Members Struggle to Reach AGS agreement," *Janes Defence Weekly*, February 6, 2009.

67 F. Stephen Larrabee et al., *NATO and the Challenges of Austerity* (Santa Monica, CA: RAND Corporation, 2012), 93, https://www.rand.org/pubs/monographs/MG1196.html.

and logistics sites. These air operations, controversial then and now, enabled rebel forces to gain ground, culminating in Gaddafi's defeat and death in October 2011.[68]

The Libya campaign again spotlighted NATO's reliance on U.S. surveillance capabilities. The United States flew 70 to 80 percent of the alliance's airborne surveillance missions.[69] U.S. Global Hawks were the first military UAS to arrive in Libya, where they tracked Gaddafi's troop movements and monitored refugee flows.[70] Non-U.S. NATO forces lacked the aircraft, communication networks, and trained personnel to effectively track enemy ground threats—especially in a campaign in which minimizing collateral damage was a top priority.[71] The alliance generated only eight hours of full-spectrum airborne surveillance each day, limiting the number of fighter aircraft that could safely conduct airstrikes at any given time.[72] After the war, analysts identified insufficient airborne surveillance as the biggest limitation on NATO's performance.[73]

Libya made a deep impression on NATO, and blunt U.S. criticism amplified the effect.[74] Before the air campaign ended, NATO officials were already urging European members to buy more surveillance capabilities.[75] They lamented that AGS did not yet exist because it would have helped in Libya. As one NATO document stated, "NATO's operation to protect civilians in Libya showed how important such a capability is."[76]

These sentiments spurred policy change. In February 2012, NATO agreed to an AGS funding arrangement in which the alliance collectively covered operational costs while a subset of 15 nations covered procurement costs.[77] The Libya campaign's shortcomings motivated countries to finalize the funding agreement, according to NATO officials.[78] After the funding agreement

68 Alan J. Kuperman, "A Model Humanitarian Intervention? Reassessing NATO's Libya Campaign," *International Security* 38, no. 1, Summer 2013, 105–136.

69 Ivo Daalder, "The Success of NATO Operations in Libya and the Vital Contributions of Partners Outside of NATO," U.S. Department of State, November 7, 2011, https://2009-2017-fpc.state.gov/176760.htm.

70 Spencer Ackerman, "It Was March Madness for 'Global Hawk' Spy Drone," *Wired*, June 20, 2011, https://www.wired.com/2011/06/it-was-march-madness-for-global-hawk-spy-drone/.

71 Todd R. Phinney, "Reflections on Operation Unified Protector," *Joint Force Quarterly* 73, 2014, 86–92, https://ndupress.ndu.edu/Media/News/News-Article-View/Article/577509/reflections-on-operation-unified-protector/.

72 John A. Tirpak, "NATO's Lessons from Libya," *Air Force Magazine*, June 2013, https://www.airandspaceforces.com/article/0613libya/.

73 Karl P. Mueller, "Victory Through (Not by) Airpower," in Karl P. Mueller, ed., *Precision and Purpose: Airpower in the Libyan Civil War* (Santa Monica, CA: RAND Corporation, 2015), 383, https://www.rand.org/pubs/research_reports/RR676.html.

74 "Transcript of Defense Secretary Gates' Speech on NATO's Future," *Wall Street Journal*, June 10, 2011, https://www.wsj.com/articles/BL-WB-30200.

75 David Brunnstrom, "NATO Says Must Address Weaknesses Exposed by Libya," *Reuters*, September 5, 2011, https://www.reuters.com/article/libya-nato-rasmussen-idAFLDE7840JJ20110905/.

76 NATO, "Chicago Summit Guide," May 2012, 137, https://archives.nato.int/2012-chicago-summit-guide.

77 NATO, "Alliance Ground Surveillance to Protect NATO Forces."

78 Interview with former senior NATO military official, March 18, 2025; and Eric Schmitt, "NATO Sees Flaws in Air Campaign Against Qaddafi," *New York Times*, April 14, 2012, https://www.nytimes.com/2012/04/15/world/africa/nato-sees-flaws-in-air-campaign-against-qaddafi.html.

was reached, Denmark recommitted to AGS procurement after abandoning it two years earlier. A Danish official left no doubt about what caused the reversal, noting, "the experience of…operations in Libya has made Danish participation relevant again."[79] Conforming to the long-running pattern, real-world military events had revived AGS's fortunes.

The momentum finally proved decisive. With the funding configuration set, NATO countries signed a contract with Northrop Grumman in May 2012 to buy five Block 40 Global Hawks (RQ-4D variant). This contract produced the fleet that exists today, with the RQ-4D adopting the name Phoenix—a fitting moniker given its near death and rebirth in the NATO bureaucracy. This breakthrough moment in AGS's history would not have happened without the animating spark of the Libya campaign.

## Conflicts Since 2012: Further Confirmation of AGS's Importance

After the May 2012 contract, AGS's existence was virtually assured.[80] The only remaining question was when NATO would get its aircraft. As with all things AGS, the process moved more slowly than expected. In 2015, NATO stood up the AGS Force in Sigonella.[81] Years of flight testing and base construction followed. NATO accepted deliveries of the five aircraft in 2019–2020 (Figure 5). Finally, the alliance declared the AGS Force operational in February 2021, 30 years after the Gulf War that had inspired it.

### FIGURE 5: SECOND AGS GLOBAL HAWK ARRIVES IN SIGONELLA, DECEMBER 19, 2019

**Source**: NATO.[82]

79 "Denmark Re-joins NATO AGS Programme," *Janes Defence Weekly*, December 17, 2012.

80 Interview with senior NATO military official, March 25, 2025.

81 NATO, "NATO Intelligence, Surveillance and Reconnaissance Force (NISRF)," updated July 8, 2025, https://www.nato.int/en/what-we-do/deterrence-and-defence/nato-intelligence-surveillance-and-reconnaissance-force-nisrf.

82 NATO, "Second NATO Alliance Ground Surveillance Aircraft Arrives in Europe," updated November 13, 2020, https://web.archive.org/web/20241209173358/https://www.nato.int/cps/en/natohq/photos_179535.htm.

Throughout this period, conflicts in Ukraine, Syria, and Iraq affirmed AGS's importance to NATO. These wars played a lesser role in AGS's formation because they occurred after its trajectory was locked in. Still, if they had revealed a major flaw in the AGS concept, then the alliance might have changed course. Things did not turn out that way. Instead, the wars illustrated new ground threats and confirmed the need for AGS. NATO documents from the period continued to assert that NATO was pursuing AGS "as a direct result of experience garnered from campaigns."[83]

In 2014, Russia invaded and annexed the Crimean Peninsula in Ukraine. The conflict featured a complex mix of border crossings, troop insertions, and base seizures—activities trackable with Global Hawk.[84] In response to Russia's aggression, NATO adopted the Readiness Action Plan, a package of activities and forces designed to strengthen the alliance's military posture.[85] NATO officials emphasized AGS's importance to the action plan. Secretary General Jens Stoltenberg, for example, highlighted how AGS would provide more warning time and richer information to make decisions in crises.[86] The Russian ground threat in Ukraine thus further validated AGS.[87]

The Islamic State's conquests in Syria and Iraq offered another reason why NATO needed AGS. By mid-2014, the group's militants had seized large swaths of territory and committed atrocities against the Yazidis and other minority groups. With conflicts occurring simultaneously in the Middle East and Ukraine, NATO officials acknowledged the challenges presented by its limited surveillance resources.[88] NATO and many of its members later joined the military coalition to defeat the Islamic State. In the ensuing multiyear campaign, UAS such as Global Hawk "were the platforms in greatest demand," but there were never enough.[89] The small AGS fleet would not have erased that deficit, but it could have carried some of the burden.[90]

83 Andre Haider and Martin Menzel, *NATO / Multinational Joint Intelligence, Surveillance and Reconnaissance Unit: A Feasibility Study* (Kalkar, Germany: NATO Joint Air Power Competence Centre, October 2015), 1, https://www.japcc.org/white-papers/nato-multinational-joint-intelligence-surveillance-and-reconnaissance-unit/.

84 U.S. Army Special Operations Command, *"Little Green Men": A Primer on Modern Russian Unconventional Warfare, Ukraine 2013–2014*, June 2015, 51–62, https://nsarchive.gwu.edu/document/16170-us-army-special-operations-command-little-green.

85 NATO release (14)120, September 5, 2014, https://www.nato.int/en/about-us/official-texts-and-resources/official-texts/2014/09/05/wales-summit-declaration.

86 Jens Stoltenberg, remarks to media, March 11, 2015, https://www.nato.int/en/news-and-events/events/transcripts/2015/03/11/joint-press-point.

87 Interview with former senior NATO military official, March 18, 2025.

88 "NATO Unity Needed to Counter Threats to East and South, SACEUR Urges," *Janes Defence Weekly*, September 10, 2015.

89 Becca Wasser et al., *The Air War Against the Islamic State: The Role of Airpower in Operation Inherent Resolve* (Santa Monica, CA: RAND Corporation, 2021), 303, https://www.rand.org/pubs/research_reports/RRA388-1.html.

90 Interview with former senior NATO military official, March 18, 2025.

As AGS neared operational status in 2021, NATO troops were actively involved in Kosovo, Afghanistan, and other countries. In each location, the threat of a hostile ground attack, in one form or another, remained possible. That is not surprising. The threat posed by enemy ground movement is fundamental to almost every military conflict. The pervasiveness of that threat, manifested in different forms in intermittent wars, breathed life into AGS each time it risked suffocating in NATO.

## Conclusion

Intermittent wars sustained and shaped AGS within NATO by demonstrating ubiquitous ground threats and recurrent NATO shortcomings in meeting them. The wartime effectiveness of JSTARS and, later, Global Hawk underpinned this process. Each time these aircraft performed well in war, NATO was reassured about AGS's value and relevance to future missions. Ultimately, AGS was a story of slow-motion adaptation in which NATO acquired a proven capability in response to a recurring threat it could not ignore.

Analysts often argue that UAS like the RQ-4 Global Hawk and the MQ-9 Reaper were ideal for past irregular conflicts but are unsuited for the higher-intensity conventional conflicts that are of pressing concern today.[91] From this perspective, AGS is a lagging indicator of a bygone era, its fleet of little importance to meeting the renewed Russian threat.[92] AGS bridged NATO's transformation gap, however, because it addressed a threat appearing in many wars, not just irregular ones.[93] The contributions of JSTARS in Kosovo and Global Hawk in Libya, for example, demonstrated that AGS could perform standoff surveillance in higher-threat environments. If the aircraft had failed during these challenging missions, then AGS would not have survived in the NATO bureaucracy. The fact that it did illustrates the enduring value of nonstealthy long-endurance UAS, including for countering Russia in the 2020s and beyond.

91 Robert P. Haffa Jr. and Anand Datla, "Joint Intelligence, Surveillance, and Reconnaissance in Contested Airspace," *Air & Space Power Journal* 28, no. 3, May–June 2014, 29–47.

92 Robert Tollast, "Replacing Watchkeeper: Staying Behind the Curve," Royal United Services Institute (RUSI), April 30, 2025, https://www.rusi.org/explore-our-research/publications/commentary/replacing-watchkeeper-staying-behind-curve.

93 Theo Farrell and Sten Rynning, "NATO's Transformation Gaps: Transatlantic Differences and the War in Afghanistan," *Journal of Strategic Studies* 33, no. 5, October 2010, 673–699.

CHAPTER 2

# People, Places, Sensors, Standards: NISRF's Current Limitations

In 2025, security developments in Europe illustrated the continuing need for NATO's AGS Force, which in 2023 changed its name to NATO ISR Force (NISRF). The Ukraine War required constant monitoring to track forces on the ground. Tentative proposals for postwar security in Ukraine emphasized using ISR and airpower to underwrite any prospective peace.[94] Russia's shadow fleet of maritime smuggling vessels continued to evade sanctions. Russian UAS and fighter aircraft violated the airspace of several NATO members. Russia held its long-running Zapad exercise for the first time since 2021.[95] Together, these events demonstrated the tremendous demand in Europe for high-quality military surveillance.

Given these pressing needs, what is NISRF's current level of effectiveness? This chapter assesses the force's capabilities, operations, and costs. For evidence, it draws on nongovernmental reports, NATO documents, author interviews, and flight tracker and budgetary data compiled by CSBA. These sources allow a more thorough assessment than relying on NATO public communications, which tend to brim with optimism but skimp on details.

NISRF is well positioned to lead the collection, synthesis, and dissemination of intelligence to support NATO decision-making. The force may be small, but it makes up a significant portion of the long-endurance UAS forces available to NATO, particularly given the RQ-4D's unique capability as a high-altitude collector. The force also has exhibited commendable cost-effectiveness

94 Henry Foy, Christopher Miller, and Steff Chávez, "U.S. Offers Air and Intelligence Support to Postwar Force in Ukraine," *Financial Times*, August 26, 2025, https://www.ft.com/content/66ec25a0-4af8-467f-9fbe-cf42de890a7e.

95 Zapad is a strategic command staff exercise. For more information, see Andrew S. Bowen and Anya L. Fink, *Zapad-2025: Russian and Belarusian Strategic Military Exercise* (Washington, DC: Congressional Research Service [CRS], September 2, 2025), https://www.congress.gov/crs-product/IN12602.

in recent years. Despite its potential, NISRF is not currently operating at maximum effectiveness. Four limitations have hampered its performance: personnel shortages, basing locations, aircraft sensors, and interoperability standards. NATO is actively considering improvements in these areas. A window of opportunity is open to strengthen NISRF, especially with the resources generated by the alliance's recently raised defense spending target.

## Capabilities, Operations, and Costs

NISRF is the sole UAS capability owned by NATO. It supports the alliance's Joint ISR system and responds to requirements from Supreme Headquarters Allied Powers Europe and tasking from Allied Air Command. Its fleet of five RQ-4Ds is based at Naval Air Station Sigonella in Sicily, Italy, where it is supported by military personnel from 25 NATO nations who serve as pilots, sensor operators, analysts, and maintainers.[96] Sigonella has become a nucleus for surveillance aircraft. In addition to NISRF, the base hosts U.S. Air Force RQ-4 Global Hawk, U.S. Navy MQ-4C Triton and P-8A Poseidon, and Italian Air Force MQ-9A Reaper aircraft.

### RQ-4D PHOENIX CHARACTERISTICS

Function: HALE ISR
Collection modes: SAR, Inverse SAR, MTI, AIS
Wingspan: 130.9 ft / 39.8 m
Length: 47.6 ft / 14.5 m
Height: 15.3 ft / 4.7 m
Weight: 14,950 lbs / 6,781 kg
Max takeoff weight: 32,250 lbs / 14,628 kg
Fuel capacity: 17,300 lbs / 7,874 kg
Payload: 3,000 lbs / 1,360 kg
Cruising speed: 310 knots / 357 mph / 575 kph
Range: 8,700 nm / 10,112 mi / 16,113 km
Ceiling: 60,000 ft / 18,288 m
Endurance time: 30 hours
Sensor range: 200+ nm / 230+ mi / 370+ km

**Sources**: NATO and industry publications.

The RQ-4D is a remotely piloted high-altitude long-endurance (HALE) aircraft capable of surveilling ground and maritime surface targets. It features the multiplatform radar technology insertion program (MP-RTIP) payload designed to simultaneously image stationary targets and track moving targets.[97] It also has an automated identification system (AIS) transceiver and upgraded software to detect, track, and identify maritime vessels.[98] The RQ-4D is able to disseminate collection using both beyond-line-of-sight and line-of-sight wideband data links, including Link 16.

Since 2023, NISRF has typically flown one 28-hour sortie per week.[99] A standard mission splits time evenly between SAR and MTI collection while tipping off other commands about

96 Joetey Attariwala, host, *Go Bold*, podcast, episode 77, "Brigadier-General Andy Clark, the Commanding General of NATO ISR Force (Part 1)," July 4, 2024, 29:30, https://redcircle.com/shows/0b6e1e60-3a68-4140-930d-1671830b7462/ep/c7557036-5f56-4cbb-b77f-0b8e3fce1698.

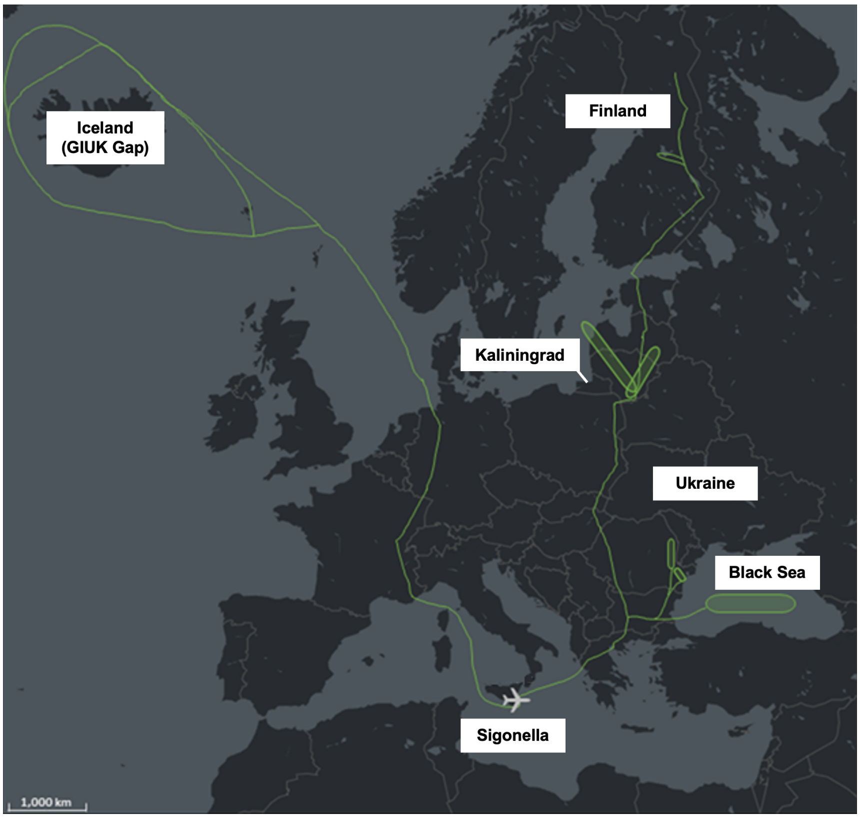
97 The payload's U.S. designation is AN/ZPY-2. On the two collection modes, see NATO, "Our Intelligence Team," December 5, 2024, https://nisrf.nato.int/home/newsroom/2024/introducing-nisrf-on-natos-social-media-channels-part-68-intelligence-team.

98 NATO, "NATO AGS Force Receives RQ-4D Aircraft Back."

99 Attariwala, *Go Bold,* episode 77, 1:03:15.

targets of interest. Most missions have covered the Black Sea and Eastern Europe border areas (Figure 6). Other notable missions have covered the Baltic Sea (including Kaliningrad), Finland's eastern border, and the Greenland-Iceland-United Kingdom (GIUK) Gap. Overall, these patrol routes confirm NISRF's focus on strategic intelligence about Russia. The force has also participated in NATO exercises—including Nordic Response 2024, Ramstein Flag 2024, Atlantic Trident 2025, and Neptune Strike 2025—to integrate with the national forces of alliance members.[100]

## FIGURE 6: NISRF PATROL ROUTES, APRIL 2023 TO JANUARY 2025




**Source**: CSBA analysis of FlightRadar24 data.[101]

100 NATO, "ISR for the Alliance in the High North: NISRF at Exercise Nordic Response 2024," March 14, 2024, https://nisrf.nato.int/home/newsroom/2024/isr-for-the-alliance-in-the-high-north-nisrf-at-exercise-nordic-response-2024; NATO, "NATO RQ-4D Force Enhances Interoperability and Data Integration During Ramstein Flag," October 9, 2024, https://ac.nato.int/ramstein-flag/news/news/nato-rq4d-force-enhances-interoperability-and-data-integration-during-ramstein-flag; NATO, "From Concept to Capability: NISRF Operates the NATO RQ-4D Phoenix from Finland," June 30, 2025, https://nisrf.nato.int/home/newsroom/news-2025/from-concept-to-capability-nisrf-operates-the-rq4d-phoenix-from-finland; and NATO, "NISRF Strengthens NATO's Maritime Vigilance During Neptune Strike," November 24, 2025, https://nisrf.nato.int/home/newsroom/news-2025/nisrf-strengthens-natos-maritime-vigilance-during-neptune-strike.

101 The FlightRadar24 data sample contained 44 flights with callsign MAGMA from April 27, 2023, to January 14, 2025. MAGMA often turned off its Automatic Dependent Surveillance-Broadcast transponder when performing missions, but some flights did not do so. CSBA used those observable flights to illustrate the patrol routes. The figure therefore excludes any routes that MAGMA flew but did not broadcast.

NISRF is not just an aviation unit; it is more like an intelligence command that owns aircraft. It has an authorized strength of 600 personnel, with the largest group of personnel supporting ISR analysis, specifically imagery analysis.[102] The analysts process, exploit, and disseminate (PED) information collected by the RQ-4D while also exploiting additional data from external sources, including national intelligence collection provided voluntarily by NATO members (often in sanitized form). NISRF is thus platform and data agnostic: Commands feed it data, and it produces actionable intelligence.[103] For example, it can correlate its organic RD-4D radar imagery with external full-motion video and signals intelligence (SIGINT) to create layered products. That multidisciplinary approach is the gold standard for intelligence support to military operations.[104] The force disseminates finished products to all 32 NATO nations and throughout the NATO military structure.

Combining organic and external collection is known as federated PED (FEDPED). NATO's use of FEDPED reflects its continued reliance on member states for intelligence. Forming NISRF has not changed this inherent characteristic of the alliance. NISRF's output illustrates the point. Approximately 25 percent of its published intelligence products originate from organic RQ-4D collection, with the remaining 75 percent originating from member-state collection and open-source intelligence.[105] NISRF's Sigonella-based staff handles much of this workload. However, 12 supporting organizations located in NATO member states also receive and fulfill requirements. Eventually, NATO hopes to have organizations in all 32 member states.[106] FEDPED has greatly improved productivity. According to a senior NATO military official, employing FEDPED has quadrupled the force's fulfillment of weekly intelligence requirements compared to relying solely on organic RQ-4D collection.[107]

Since receiving its five RQ-4Ds and becoming operational in 2021, NISRF's costs have increased to approximately $350 million per year, according to CSBA estimates corroborated by NATO officials (Figure 7).[108] These costs are covered by NATO common funding, direct contributions made by all member states. The United States has funded 28 percent of the

102 Scott Coon, "Alliance Ground Surveillance Programme: The Challenge of Training a Multinational Crew Force," *Journal of the JAPCC* 17, Spring/Summer 2013, 17, https://www.japcc.org/wp-content/uploads/Journal_Ed-17_web.pdf.

103 Joetey Attariwala, host, *Go Bold*, podcast, episode 78, "Brigadier-General Andy Clark, the Commanding General of NATO ISR Force (Part 2)," July 11, 2024, 34:15, https://redcircle.com/shows/0b6e1e60-3a68-4140-930d-1671830b7462/ep/9679674b-95d3-4665-865f-7192d0b70cc3.

104 Department of Defense (DoD), *Joint Publication 2-01: Joint and Intelligence Support to Military Operations*, July 5, 2017, B-1, https://irp.fas.org/doddir/dod/jp2_01.pdf.

105 NATO, "NISRF, One Year After the Redesign: An Interview with the Commander," October 7, 2024, https://nisrf.nato.int/home/newsroom/2024/interview-with-the-nisrf-commander.

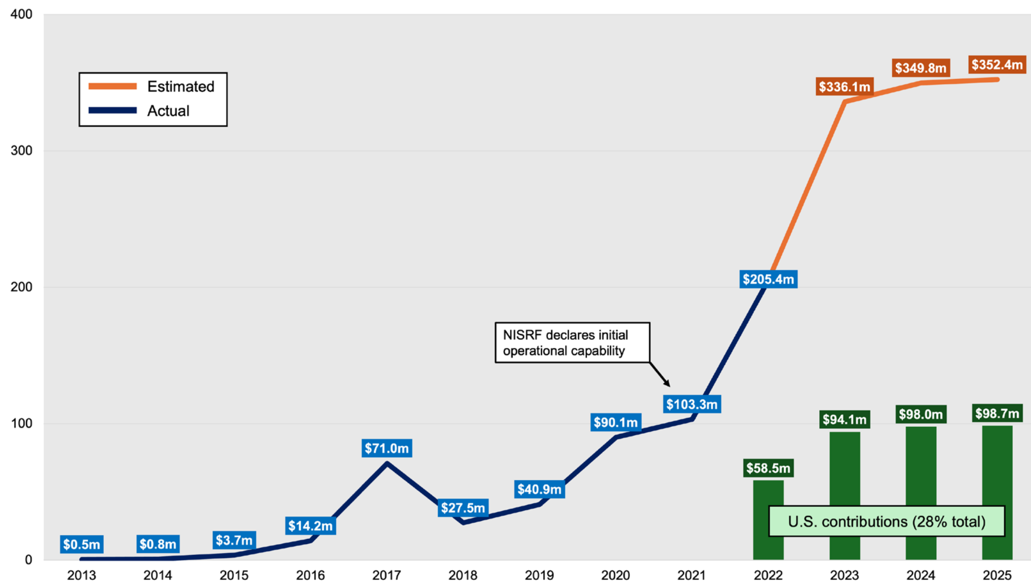
106 NATO, "NATO Alliance Ground Surveillance (AGS)/NATO ISR FORCE (NISRF)," internal memo, n.d., 2.

107 Interview with senior NATO military official, March 25, 2025.

108 Interview with senior NATO military official, March 25, 2025.

total cost in accordance with agreed-upon cost-sharing rules.[109] According to NATO officials, 75 percent of annual expenditures go to flying the aircraft.[110]

## FIGURE 7: NISRF ANNUAL OPERATING COSTS (CURRENT DOLLAR MILLIONS), 2013–2025




**Source**: NATO and Department of Defense (DoD).[111]

**Notes**: NISRF estimates for 2023–2025 were computed by taking DoD actuals for those years and dividing by the U.S. cost share of 28 percent. When this report went to press, NATO data were not available after 2022, and DoD data were not available before 2022. For that single overlapping year (2022) with both NATO and DoD actuals, the U.S. share equaled 28.5 percent—confirming the analytical approach. Additionally, NATO officials reported annual costs within 2 percent of CSBA's estimates, further validating the accuracy of the estimates.[112] NATO actuals from 2013–2022 reflect the sum of budget items 167 and 168. NATO actuals converted from euros to dollars using yearly average exchange rates.

Two things stand out about NISRF's costs. First, operating costs have remained stable since 2023 despite NISRF increasing its mission tempo and analytical output. That outcome reflects positively on the force's cost effectiveness. Second, the U.S. financial contribution to NISRF remains quite modest. For just under $100 million a year, or about 0.01 percent of

109 White House, "U.S. Contributions to NATO Capabilities," July 8, 2016, https://obamawhitehouse.archives.gov/the-press-office/2016/07/08/fact-sheet-us-contributions-nato-capabilities.

110 Interview with senior NATO military official, March 25, 2025.

111 NATO data for 2013-2022 collected from "Statement 5/1" entries in International Board of Auditors for NATO Allied Command Operations annual reports, available at https://www.nato.int/en/about-us/organization/nato-structure/international-board-of-auditors-for-nato-iban/financial-audit-reports-and-financial-statements. DoD data for 2022–2025 collected from "Subactivity Group 441" entries in U.S. Army operation and maintenance annual budget requests (Regular Army, vol. I) for fiscal years (FYs) 2024–2026, available at https://www.asafm.army.mil/Budget-Materials/.

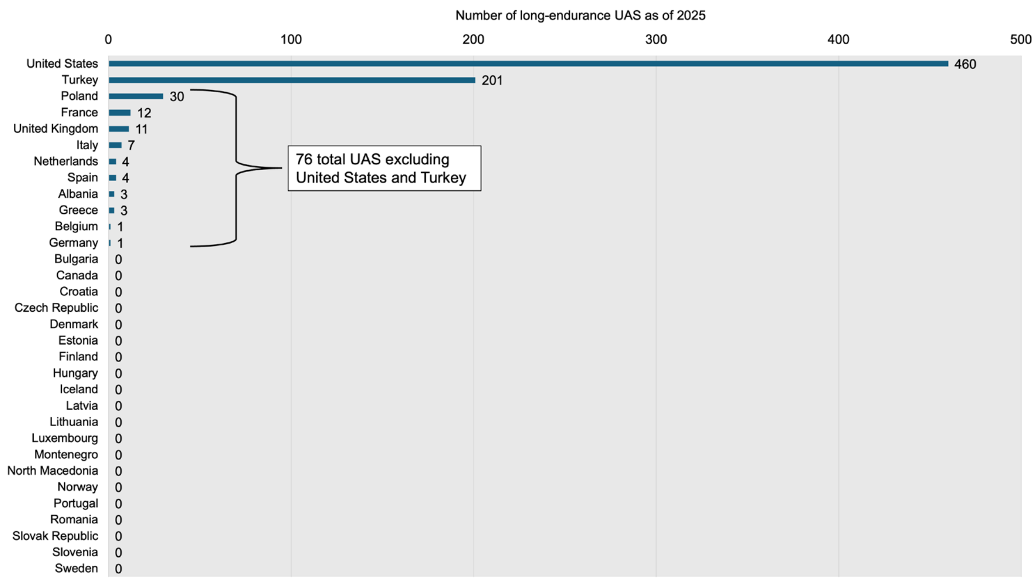
112 In a March 2025 interview, a NATO official reported annual costs of $347 million. CSBA's estimate for 2025 was $352.4 million. Interview with senior NATO military official, March 25, 2025.

the 2026 DoD budget request, the United States gains additional airborne surveillance but does not have to carry the burden alone.[113]

## Long-Endurance UAS Available to NATO

Although NISRF's fleet is small, it is a significant portion of the long-endurance UAS capability available to NATO.[114] National fleets remain the alliance's primary source for airborne surveillance, but aside from the United States and Turkey, NATO members possess relatively few of these aircraft (Figure 8). Excluding those two countries, NATO members collectively operate only 76 long-endurance UAS. Those aircraft belong to just nine nations, meaning 21 nations—two-thirds of the alliance—have none.

### FIGURE 8: LONG-ENDURANCE UAS INVENTORIES OF NATO MEMBERS, 2025




**Sources**: International Institute of Strategic Studies, *Air & Space Forces Magazine*, Aviation Week Intelligence Network.[115]

**Notes**: Figure only includes UAS with a service ceiling of at least 20,000 feet and an endurance of at least 24 hours. The total of 737 aircraft is composed of the following types: 273x MQ-9A, 204x MQ-1C, 148x TB2, 33x Anka-S, 18x Gnat 750, 17x MQ-4C, 15x Akinci, 13x Heron, 9x RQ-4B, 5x Aksungur, and 2x MQ-9B. Other reputable databases such as *Janes* report slightly different aircraft inventories.

113 The FY 2026 DoD budget request (including $113.3 billion in reconciliation funds) was $961.6 billion. The U.S. NISRF contribution of $100 million is 0.01 percent of $961.6 billion. DoD, *Defense Budget Briefing*, revised July 1, 2025, 4, https://comptroller.war.gov/Portals/45/Documents/defbudget/FY2026/FY2026_Budget_Request.pdf.

114 This section focuses only on Class III UAS. NATO, *ATP-3.3.8.1: Minimum Training Requirements for Unmanned Aircraft Systems (UAS) Operators and Pilots*, ed. B, version 1, May 2019, 2-2.

115 International Institute of Strategic Studies (IISS), *The Military Balance 2025* (London: IISS, 2025); *Air & Space Forces Magazine*, "2025 USAF & USSF Almanac: Equipment," June 20, 2025, https://www.airandspaceforces.com/article/2025-usaf-ussf-almanac-equipment/; and Aviation Week Intelligence Network (AWIN), "Global Military GA-ASI MQ-9 Fleets + Deliveries 2025–2035," October 20, 2025.

Given this context, the five NISRF aircraft are not a mere token force; rather, they are a meaningful share of the forces NATO can bring to bear in crisis and conflict, particularly if contributions by the United States, Turkey, and other UAS-possessing members prove smaller than expected.

NISRF's significance is even greater from a qualitative perspective. The UAS available to NATO are not equal, and they should not be thought of as interchangeable regardless of mission. As a HALE platform, NISRF's RQ-4D has capabilities that differ from the medium-altitude long-endurance (MALE) platforms in non-U.S. NATO members' national fleets.

By flying at high altitude, HALE UAS maintain a larger field of regard for sensing and more efficient aerodynamics. Together, these factors allow HALE UAS to fly farther and cover larger search areas than MALE UAS, all else being equal, while staying above the reach of many SAMs. The relative advantage of MALE UAS is operational versatility. With different mission packages, certain MALE UAS can carry missiles to perform air strikes, drop sonobuoys to track submarines, and perform short takeoff and landing from amphibious ships or expeditionary airfields. These varying attributes illustrate why HALE UAS and MALE UAS are not one-for-one substitutes across every mission.

NATO members are planning large expansions of their MALE UAS inventories. This positive development is nevertheless an interoperability challenge. By 2035, 53 MQ-9As and MQ-9Bs are planned for delivery to Belgium, Canada, Denmark, Germany, Italy, the Netherlands, Poland, and the United Kingdom.[116] Additionally, 60 Eurodrone MALE UAS aircraft are planned for delivery to Germany, Italy, France, and Spain beginning in 2030.[117] Together, these deliveries will increase the non-U.S. / non-Turkish long-endurance UAS forces available to NATO by 133 percent. This expansion will be a major boon to alliance airpower, but it will make it difficult to harmonize the activities of NISRF and national fleets.

Some observers might ask why NATO still needs NISRF if member states are expanding their MALE UAS fleets. Beyond the qualitative difference between HALE UAS and MALE UAS highlighted above, three additional reasons are paramount. First, member-state UAS might not always be available when NATO needs them, as chapter 1 demonstrated. Second, NISRF functions as a vanguard for NATO, ensuring the alliance always has a minimum viable surveillance capability that can be scaled up by national contributions as required. Third, the United States under the Donald Trump administration is demanding that NATO carry a larger burden. NISRF is an important symbol of the alliance's ability and willingness to do so.

116 AWIN, "Global Military GA-ASI MQ-9 Fleets"; General Atomics Aeronautical, "Denmark Buys Four MQ-9B SkyGuardians from GA-ASI," July 23, 2025, https://www.ga-asi.com/denmark-buys-four-mq-9b-skyguardians-from-ga-asi; and General Atomics Aeronautical, "Germany Buys Eight MQ-9B SeaGuardian RPA Through NSPA," January 12, 2026, https://www.ga-asi.com/germany-buys-eight-mq-9b-seaguardian-rpa-through-nspa.

117 Gareth Jennings, "Eurodrone Passes Critical Design Review," *Janes Defence Weekly*, October 17, 2025.

## Four Limitations on Effectiveness

### People: Manning Is Below Authorized Strength and Training Time Is Long

Currently, the biggest limitation on NISRF's effectiveness is lack of people. The force has an authorized strength of 600 personnel, but recently it has been manned at only about 60 percent of that level.[118] This shortfall is the primary reason why it flies only one sortie per week.[119] As a former NISRF commander remarked, "We can't do much more than that because I simply don't have the people."[120] If properly supported, its five RQ-4Ds could fly between four and six sorties per week, assuming two aircraft were always operationally available.[121] NISRF is therefore operating at less than 25 percent of its maximum sortie rate because of insufficient manning.

NISRF's personnel shortfall is compounded by the time required to train new arrivals. Because no NATO member other than the United States operates the Global Hawk, service members typically arrive unqualified and must train extensively.[122] The force has built a well-equipped training center that over 95 percent of personnel attend, but the timelines can be long.[123] For instance, an F/A-18 pilot assigned to NISRF may require seven months of instruction before being mission ready. Meanwhile, communication information system (CIS) technicians can take nine months to achieve certification.[124] Given typical three-year assignments, these prolonged training periods reduce the amount of time that service members contribute to the mission while fully qualified.

NISRF is still at initial operational capability. It will not achieve full operational capability until its manning reaches its authorized strength—or until it develops new approaches requiring less manning. Several roles are critically understaffed, including CIS technicians and geospatial intelligence analysts.[125] NISRF leaders anticipate reaching full operational capability as more personnel join the command in 2026, but that outcome depends on alliance member contributions.[126]

118 Federico Borsari and Gordon B. "Skip" Davis Jr., *An Urgent Matter of Drones* (Washington, DC: Center for European Policy Analysis [CEPA], 2023), 72, https://cepa.org/comprehensive-reports/an-urgent-matter-of-drones/.

119 Besides personnel, other factors affecting sortie rate include base infrastructure, mission duration, and weather conditions.

120 Attariwala, *Go Bold*, episode 77, 1:03:55.

121 A standard planning assumption is two to three sorties per Global Hawk per week. Interview with senior NATO military official, March 25, 2025; and DoD Director of Operational Test and Evaluation, "RQ-4B Global Hawk High-Altitude Long-Endurance Unmanned Aerial System (UAS)," 2016, 402, https://www.dote.osd.mil/Portals/97/pub/reports/FY2016/af/2016globalhawk.pdf?ver=2019-08-22-105430-687.

122 Attariwala, *Go Bold*, episode 78, 43:00.

123 Attariwala, *Go Bold*, episode 78, 42:15.

124 Interview with senior NATO military official, March 25, 2025.

125 Attariwala, *Go Bold*, episode 77, 1:06:40; and interview with senior NATO military official, March 25, 2025.

126 Attariwala, *Go Bold*, episode 77, 1:01:15.

## Places: Sigonella Is Far from Key Collection Areas

NISRF's surveillance time is limited by its basing location in Sigonella. Its RQ-4Ds spend a significant portion of each sortie transiting to and from their collection locations, reducing their on-target time conducting surveillance. Lengthy transit times are a normal part of airborne ISR operations. In NISRF's case, however, they pose a major hindrance because the force's sortie rate is already constrained. Based on publicly available flight-tracker data, CSBA estimates the following roundtrip transit times for five key areas:

- Black Sea: six hours transit round trip (21 percent of 28-hour sortie)[127]
- Eastern Europe border areas: eight hours transit round trip (29 percent of 28-hour sortie)[128]
- Baltic Sea (including Kaliningrad): 10 hours transit round trip (36 percent of 28-hour sortie)[129]
- High North: 12 hours transit round trip (43 percent of 28-hour sortie)[130]
- GIUK Gap: 12 hours transit round trip (43 percent of 28-hour sortie)[131]

The disadvantages imposed by limited basing can be represented in cost terms. On average, the round-trip transit time for the five areas above equals about 10 hours (35 percent) of a 28-hour sortie. If that proportion held over a year's worth of missions, then 35 percent of the annual flying cost—equal to over $90 million in 2025—would in effect go to transit rather than collection.[132] Adding basing locations would divert part of that spending to more productive purposes, increasing the force's cost-effectiveness.

## Sensors: Current Capabilities Provide Only a Partial Picture

The collection capabilities onboard the RQ-4D, though formidable, cannot gather data at the level of fidelity NATO leaders need to make high-stakes decisions during crisis and conflict. The aircraft's collection modes—SAR, inverse SAR, MTI, and AIS—provide valuable intelligence about stationary and moving targets on the ground and at sea.[133] However, the aircraft

127 FlightRadar24 data from November 28, 2023. Calculated from takeoff time to crossing into the Black Sea through Bulgaria.

128 FlightRadar24 data from August 29, 2024. Calculated from takeoff time to the border intersection of Ukraine, Poland, and Belarus.

129 FlightRadar24 data from October 31, 2023, and September 11, 2024. Baltic Sea calculated from takeoff time to crossing into the Baltic Sea via Poland. Kaliningrad calculated from takeoff time to crossing within 50 nautical miles of the Kaliningrad–Poland border.

130 FlightRadar24 data from August 29, 2024. Calculated from takeoff time to crossing the border into Finland.

131 FlightRadar24 data from September 10, 2024. Calculated from takeoff time to crossing the Shetland Islands.

132 Transit time could include noninterference basis collection en route. As reported above, 75 percent of NISRF annual expenditures go to flying the aircraft. It follows that 75 percent of $352.4 million (2025 total cost) is $264.3 million (2025 flying cost), of which 35 percent is $92.5 million.

133 Inverse SAR uses the movement of the target, not the movement of the radar platform (as with regular SAR), to produce the synthetic aperture. Clark, *Intelligence Collection*, chap. 12.

lacks capabilities often possessed by other long-endurance UAS, including other Global Hawk variants. These include electro-optical (EO) and infrared (IR) imaging, full motion video (FMV), and electronic intelligence (ELINT) and other forms of SIGINT.[134] As a former NISRF commander remarked, "There are limitations to the intelligence you can derive" from the current sensors.[135] The challenge to adding new capabilities remains political. As the commander stated, "It's a matter of NATO will and NATO money."[136]

### Standards: Interoperability Doctrine and Technology Are Lacking

NISRF's ability to interoperate with NATO member forces is constrained by both doctrine and technology. Although the FEDPED process has been a clear success, other areas remain deficient. NATO does not have publications or doctrine dedicated to UAS employment. Joint allied air doctrine mentions UAS, but it does not capture recent technological advancements that have expanded capabilities, roles, and missions.[137] NATO's Joint Capability Group UAS provides authoritative assessments, but it has not harmonized activities across the alliance.[138]

On the plus side, NATO has approved standardization agreements (STANAGs) 4586 and 4671, which address UAS control systems, communication protocols, and airworthiness requirements. NISRF adheres closely to these standards.[139] Yet compliance alone does not achieve interoperability. As STANAG 4586 itself notes, "This agreement does not address platform and/or sensor operators' proficiency levels, nor does it define the [concepts of operations] necessary to enact full interoperability."[140]

Technological obstacles amplify these doctrinal gaps.[141] The RQ-4D is Link 16 capable—enabling it to securely exchange mission data with allied assets—but NATO members lack the required encryption software. As of mid-2025, the RQ-4D could not exchange tactical data in flight with alliance member aircraft, whether manned or unmanned, nor could it transmit information in flight to ground-based intelligence centers other than NISRF headquarters. The alliance lacks a common operating picture to integrate RQ-4D data with other feeds in near real time.

134 Gordon B. "Skip" Davis Jr., *The Future of NATO C4ISR: Assessment and Recommendations after Madrid* (Washington, DC: Atlantic Council, March 2023), 8, https://www.atlanticcouncil.org/in-depth-research-reports/report/the-future-of-nato-c4isr-assessment-and-recommendations-after-madrid/.

135 Attariwala, *Go Bold*, episode 77, 41:20.

136 Attariwala, *Go Bold*, episode 77, 42:12.

137 Borsari and Davis, *Urgent Matter of Drones*, 29.

138 Borsari and Davis, *Urgent Matter of Drones,* 59.

139 Attariwala, *Go Bold*, episode 78, 45:30.

140 NATO, *AEP-84,* vol. I, April 2017, 1-1, https://nso.nato.int/nso/nsdd/main/standards?search=4586.

141 This paragraph draws on an interview with a former senior NATO military official, March 18, 2025.

Passing information between NISRF and NATO members is laborious.[142] Sensor data are first transmitted from the RQ-4D to Sigonella (or mobile ground stations) before being disseminated to NATO members. All 32 NATO members can receive RQ-4D data via a secure, chat-based communications system, but the system requires a human to manually pass updates—a process ill suited to time-sensitive decisions. Information flows to NISRF can be similarly inefficient. Some nations must download their collection data onto a hard disk, physically upload that disk to a separate NATO-compatible computer, and then send the information to NISRF.

Cumbersome workarounds like these often occur in multinational military operations, particularly when the operations are expeditionary.[143] That is not NISRF's situation today. It is a permanent and institutionalized part of NATO. As such, it should be functioning with a greater degree of interoperability.

## Current NATO Planning for Improvements

NATO recognizes NISRF's limitations and is weighing options to strengthen the force. The first order of business is keeping the RQ-4D in good working condition, especially as the aircraft's support enterprise shrinks as the United States retires its Global Hawks.[144] NATO expects the RQ-4D to fly until 2041, so the fleet has over 15 years of service life remaining.[145] In April 2024, NATO signed a contract with Northrop Grumman via foreign military sales to sustain the aircraft.[146] It also continued pressuring member states to supply additional personnel to fix NISRF's manning shortfall.

Besides sustainment and personnel, NATO has started pursuing options for capability upgrades and fleet expansion. In 2024, it approved a new NISRF requirements statement.[147] The statement called for the following capabilities:

- additional sensors, including EO, IR, FMV, and ELINT;
- expansion of the fleet with additional HALE and/or MALE UAS;
- enhanced command and control resiliency and expanded geographic reach; and

142 This paragraph draws on an interview with a senior NATO military official, March 25, 2025.

143 Myron Hura et al., *Interoperability: A Continuing Challenge in Coalition Air Operations* (Santa Monica, CA: RAND Corporation, 2000), https://www.rand.org/pubs/monograph_reports/MR1235.html.

144 The U.S. Air Force plans to retire its remaining Global Hawks when replacement capabilities become available. Andrew P. Hunter et al., "Air Force Force Structure and Modernization Programs," prepared statement to the Senate Armed Services Committee Airland Subcommittee, May 8, 2024, 28, https://www.armed-services.senate.gov/imo/media/doc/airland_joint_statement.pdf.

145 NATO, "NATO Alliance Ground Surveillance," 2.

146 DoD, "Contracts for April 26, 2024," https://www.war.gov/News/Contracts/Contract/article/3758114/.

147 NATO, "NATO Alliance Ground Surveillance," 2–4.

- increased missions dedicated to maritime situational awareness and protecting allied critical underwater infrastructure.

NATO has made several preliminary decisions about implementing these requirements.[148] First, it prefers to use foreign military sales, not joint development, to acquire additional UAS, working under the banner of its new high-visibility project for multinational procurement of remotely piloted aircraft.[149] Second, it wants any newly acquired UAS to achieve initial operational capability by 2027, though NATO delays will make that date hard to achieve. Third, it intends to establish new NISRF forward operating locations in northern Europe. Finally, it plans to pursue opportunities for HALE–MALE teaming in its UAS operations.

Together, these improvements would combine into a well-rounded package. Costs would normally be an obstacle, as was the case throughout AGS's history. Although costs certainly remain a key consideration, today the alliance is more committed to increasing defense spending than it has been in decades. That commitment was demonstrated by the June 2025 agreement to raise NATO's defense spending target to 5 percent of gross domestic product.[150]

If NATO members meet the 5 percent commitment, then they will spend hundreds of billions of dollars more on defense in the coming decade than they would under current plans. According to CSBA analysis, the additional funds would be enough to purchase and operate hundreds of long-endurance UAS alongside many other new ground, air, and naval forces.[151] Indeed, improving NISRF would consume only a tiny fraction of the newly generated resources. Upgrading NISRF is unquestionably affordable for NATO today.

## Conclusion

There is a window of opportunity to improve NISRF, but it will not remain open forever.[152] The history of AGS shows that progress in NATO often comes in fits and starts. If the alli-

148 NATO, "NATO Alliance Ground Surveillance," 2–4.

149 The current participants in the high visibility project are the Czech Republic, Estonia, Finland, Greece, Italy, Latvia, Lithuania, Norway, Portugal, Romania, Spain, Turkey, and the United Kingdom. NATO, "Multinational Capability Cooperation," updated July 30, 2025, https://www.nato.int/en/what-we-do/deterrence-and-defence/multinational-capability-cooperation; and NATO, "NATO Launches Five New Multinational Cooperation Initiatives That Enhance Deterrence and Defence," October 17, 2024, https://www.nato.int/en/news-and-events/articles/news/2024/10/17/nato-launches-five-new-multinational-cooperation-initiatives-that-enhance-deterrence-and-defence.

150 The agreement calls on NATO members to spend 3.5 percent of gross domestic product (GDP) on core defense plus another 1.5 percent of GDP on critical infrastructure, secure networks, civil preparedness, innovation, and the defense industrial base. NATO, "Defence Expenditures and NATO's 5% Commitment," updated December 18, 2025, https://www.nato.int/en/what-we-do/introduction-to-nato/defence-expenditures-and-natos-5-commitment.

151 Travis Sharp, *Putting It All Together: The 2025 Defense Budget Request, Alternative Budget Proposals, and NATO Spending* (Washington, DC: CSBA, December 2024), 26–30, https://csbaonline.org/research/publications/putting-it-all-together-the-2025-defense-budget-request-alternative-budget-proposals-and-nato-spending.

152 Interview with senior NATO military official, March 11, 2025.

ance does not seize the chance to strengthen NISRF now, it might lose the opportunity to bolster its organic surveillance capabilities.

The question left to be answered, however, is surveillance capabilities for what purpose? This chapter analyzed NISRF's present-day performance and summarized current thinking about improving it. It did not, however, assess whether that thinking is appropriate given the missions likely to be conducted. It is not enough to echo what NATO believes is needed. Analysts must also evaluate why those things are (or are not) necessary for the future security environment. The next chapter presents an independent assessment of future NISRF requirements.

CHAPTER 3

# From Peacetime Deterrence to Wartime Defense: NISRF Requirements and Recommendations

Although the Ukraine War has showcased new technologies and tactics, the fundamentals of warfare have not changed. Nations bent on aggression will still seek to obscure their predatory intentions to prevent or delay a response. Russia used that approach when invading Ukraine in 2014 and 2022. NATO faces the chronic threat that Russia will one day attempt to seize its territory before the alliance can mount an effective response. Faced with this threat, NISRF must contribute to peacetime deterrence and be prepared to transition to wartime defense if deterrence fails.

This chapter outlines NISRF requirements for deterrence and defense and then evaluates two options for improving the force: establishing additional operating sites and expanding the fleet by buying additional aircraft (Table 1). The chapter finds that both options meaningfully improve NISRF's ability to fulfill peacetime and wartime requirements.[153] Together, the two options satisfy all requirements for peacetime. In wartime, however, NISRF can only meet all the requirements by interoperating with the national forces of NATO members.

153 On valuing forces differently in deterrence and defense contexts, see Glenn H. Snyder, *Deterrence and Defense* (Princeton, NJ: Princeton University Press, 1961), 30–33. The chapter's findings—specifically, options that yield heterogenous improvements in peacetime versus wartime—reflect Snyder's analysis.

## TABLE 1: ASSESSMENT OF OPTIONS FOR STRENGTHENING NISRF

*Options should be evaluated from left to right. See "How to Interpret Table 1."*

| Peacetime deterrence requirements | Current capability (with full manning) | Establish additional operating sites | Expand fleet by buying new aircraft |
|---|---|---|---|
| **Where:** Five priority geographic areas | ✓ | ✓ | ✓ |
| **What:** Identify adversary forces for strategic indications and warning | ✗ | ✗ → Improvement | ✓ |
| **Why:** Deterrence by Detection through persistent presence | ✗ → Improvement | – → Improvement | ✓ |
| **Wartime defense requirements** | **Current capability (with full manning)** | **Establish additional operating sites** | **Expand fleet by buying new aircraft** |
| **Where:** Forward edge of battle area and peripheries | ✓ | ✓ | ✓ |
| **What:** Identify adversary forces for operational engagement | ✗ | ✗ → Improvement | ✓ |
| **Why:** Forward defense through dynamic targeting | ✗ → Improvement | – | Different result than peacetime<br>–<br>Only fulfillable via interoperability |

**Source**: CSBA analysis.

**Notes**: Green icon = fulfillment of requirement. Yellow icon = partial fulfillment of requirement. Red icon = minimal fulfillment of requirement.

### HOW TO INTERPRET TABLE 1

Table 1 should be read from left to right, moving from the current capability through two accumulating improvements. The assessment of buying new aircraft assumes that additional operating sites are also included. The blue and white "Improvement" marker indicates an option improving the fulfillment of a requirement. The red and white "Different result than peacetime" marker indicates an option improving the fulfillment of a peacetime requirement but not a wartime requirement.

The chapter recommends making two improvements to NISRF:

- establish additional operating sites in Finland, Poland, Greece, and Norway; and
- buy five MQ-4Cs and five MQ-9Bs to create a 15-aircraft fleet.

According to CSBA estimates, buying 10 new aircraft would incur a one-time procurement cost ranging from $1.2 billion to $1.8 billion. Operating a fleet tripled in size might triple NISRF's annual operating budget, pushing it from about $350 million today to over $1 billion per year. These investments are sizable, but NATO can readily manage them given the upswing in alliance defense spending. Although NATO can afford expenditures of this size, NISRF should pursue alternative approaches so operating costs do not grow proportionally with fleet size. Relying on contractor-operated UAS, for example, would be a way to obtain high-quality intelligence collection at less cost.

With these improvements, NISRF could play a larger role in numerous high-profile missions essential to European security. Those missions include monitoring Ukraine to enforce the terms of any future peace agreement, tracking Russia's shadow fleet of smuggling vessels, surveilling locations where Russian asymmetric operations might occur, and watching the disposition of Russian forces along NATO's borders.

## Peacetime Deterrence Requirements

### Where: Five Priority Geographic Areas

In peacetime, NISRF should focus its operations on five geographic areas that are most likely to become flashpoints during a Russian move against NATO.[154] In priority order, the areas are:

1. the Baltic Sea region (including Kaliningrad),
2. Eastern European border areas,
3. the Black Sea region (including Eastern Ukraine and the Crimean Peninsula),
4. the High North, and
5. the GIUK Gap.

NISRF aircraft surveilled each of these areas from 2023 to 2025. The force is therefore already capable of meeting the basic requirement for peacetime geographic coverage.

The physical characteristics of the five areas suggest three subrequirements for NISRF. First, it must conduct both ground and maritime surveillance. Second, it must operate in diverse climatic conditions. Third, given the immense size of the areas, it must perform wide-area surveillance.

NISRF could fulfill these requirements using two approaches. One approach would be to continue its current model of equipping each aircraft with the sensors and other equipment needed to operate under all possible conditions. Under this approach, which maximizes flexibility, a single sortie would cover ground and sea targets in multiple geographic areas through wide-area and localized collection.

154 Thomas G. Mahnken, Travis Sharp, and Grace B. Kim, *Deterrence by Detection: A Key Role for Unmanned Aircraft Systems in Great Power Competition* (Washington, DC: CSBA, 2020), 26–29, https://csbaonline.org/research/publications/deterrence-by-detection-a-key-role-for-unmanned-aircraft-systems-in-great-power-competition.

An alternative approach would be to field a larger fleet composed of UAS optimized for specific targets (ground or maritime), climatic conditions, or collection patterns (wide area or localized). Under this approach, which maximizes effectiveness, groups of aircraft would be permanently assigned to a subset of targets, areas, and collection patterns, meaning a single sortie would not perform all missions.

### What: Identify Adversary Forces for Strategic Indications and Warning

NISRF should be able to identify Russian military forces—including hard targets disguising their identities using camouflage, concealment, and deception—in order to provide NATO leadership with strategic indications and warning (I&W) in peacetime.[155] Positively identifying targets is essential to understanding the disposition of Russian forces and spotting moves that may presage aggression.

One of the toughest identification tasks is finding enemy forces in locations where military and civilian activities intermix.[156] Russia has used intermixing to achieve surprise and sow confusion about its activities, as exemplified by its 2014 asymmetric operations in Crimea and its ongoing shadow fleet smuggling. A similar but less-known Russian campaign is ongoing in Transnistria, a breakaway region of Moldova along its border with Ukraine that contains approximately 1,500 Russian "peacekeeping" forces. This non-NATO nation could very well be Putin's next target if it continues strengthening ties with the West without bolstering its military capabilities.[157]

To identify Russian forces conducting asymmetric operations, NISRF aircraft require higher-fidelity sensors than the RQ-4D's current radar imaging capability. FMV and SIGINT sensors, for example, could collect finer-grained details about the composition, activities, and communications of Russian operatives. These details could then be cross-referenced with other collected information, including national surveillance by NATO members, to produce the high-confidence assessments needed by NATO officials to inform diplomatic and military responses.

To find smuggling vessels, NISRF aircraft require a package of sensors to counter Russian deception tactics, which include ship-to-ship transfers, spoofing locational data, and AIS blackouts. A combination of ELINT sensors, AIS transceivers, and imagery capabilities

155 Positive identification is derived from observation and analysis of target characteristics including visual recognition, electronic support systems, noncooperative target recognition techniques, identification friend or foe systems, or other physics-based identification techniques. Indications bear on the intention of a potential enemy to adopt or reject a course of action. Warnings help anticipate hostile actions or intention against a nation's entities, partners, or interests. DoD, *Dictionary of Military and Associated Terms*, November 2021, 103, 170, 229, https://irp.fas.org/doddir/dod/dictionary.pdf.

156 Alan J. Vick et al., *Aerospace Operations Against Elusive Ground Targets* (Santa Monica, CA: RAND Corporation, 2001), 5–6, https://www.rand.org/pubs/monograph_reports/MR1398.html.

157 Ahsan Ali, "Transnistria: Russia's Sleeper Front," *European Relations*, August 6, 2025, https://europeanrelations.com/transnistria-russias-sleeper-front/.

(maritime MTI, EO, and FMV) offer the best chance to identify elusive vessels in congested maritime areas.

### Why: Deterrence by Detection Through Persistent Presence

In peacetime, NISRF should perform Deterrence by Detection (DbD), an operational concept developed by CSBA.[158] DbD assumes that Russia is less likely to commit opportunistic acts of aggression if it knows it is constantly being watched and that its actions can be widely publicized. By visibly signaling NATO's surveillance presence in the five priority geographic areas, NISRF will communicate to Russia that its wrongdoing will be promptly detected.

Detection underwrites deterrence by providing the basis for targeted retaliation.[159] Deterrence is not credible unless the defender can both spot the unwanted action and penalize it. Long-endurance UAS excel at this spotting task, particularly when integrated with other ISR sensors based in space, on land, and at sea.[160] Because UAS can perform both civil and military surveillance, everything from border patrolling to submarine tracking, they can discourage Russian aggression across the competition continuum.[161]

Successfully implementing DbD requires NISRF to maintain persistent presence, defined as the ability to surveil a target multiple times per day and reach any target in an assigned sector within a few hours.[162] The force does not currently meet that requirement due to its infrequent sorties and limited basing.

## Wartime Defense Requirements

### Where: Forward Edge of Battle Area and Peripheries

In wartime, NISRF should track Russian military forces operating along the forward edge of the battle area (FEBA) and in peripheral sectors. A Russian ground assault would have to focus on a few main battlefronts; attacking every area would violate the principle of force

158 Mahnken et al., *Deterrence by Detection*.

159 Jon R. Lindsay and Erik Gartzke, "Coercion Through Cyberspace: The Stability–Instability Paradox Revisited," in Kelly M. Greenhill and Peter Krause, eds., *Coercion: The Power to Hurt in International Politics* (New York: Oxford University Press, 2018), 179–203.

160 Thomas G. Mahnken, Travis Sharp, Chris Bassler, and Bryan W. Durkee, *Implementing Deterrence by Detection: Innovative Capabilities, Processes, and Organizations for Situational Awareness in the Indo-Pacific Region* (Washington, DC: CSBA, July 2021), https://csbaonline.org/research/publications/implementing-deterrence-by-detection-innovative-capabilities-processes-and-organizations-for-situational-awareness-in-the-indo-pacific-region.

161 Travis Sharp, Thomas G. Mahnken, and Tim Sadov, *Extending Deterrence by Detection: The Case for Integrating Unmanned Aircraft Systems Into the Indo-Pacific Partnership for Maritime Domain Awareness* (Washington, DC: CSBA, July 2023), https://csbaonline.org/research/publications/extending-deterrence-by-detection-the-case-for-integrating-unmanned-aircraft-systems-into-the-indo-pacific-partnership-for-maritime-domain-awareness.

162 Mahnken et al, *Deterrence by Detection*, 22.

concentration and prove logistically infeasible.[163] The operational theater would therefore consist of (a) main battlefronts packed with fighting forces and (b) peripheral sectors into which forces would flow as the sides maneuvered for advantage. Battlefronts and peripheries likely would be in the five priority areas identified above, at least initially. Those areas are priorities precisely because they are the most likely sites for Russian aggression. NISRF aircraft can already cover all five areas, so the current force meets the basic requirement for wartime geographic coverage.

Unlike in peacetime, NISRF in wartime would primarily have to perform standoff surveillance to avoid being downed by Russian air defenses. The RQ-4D's SAR and MTI sensors are estimated to have a range of over 200 nm.[164] If Russia placed along the FEBA its longest-range air defenses, such as the S-500 Prometheus (324 nm range) or the S-400 Triumf (216 nm range), then the RQ-4D could not get close enough to collect data without facing the continuous danger of being shot down.[165] However, Russia is unlikely to position these high-value systems along the FEBA where NATO could strike them, both because of cost and because these strategic systems generally protect critical infrastructure, military headquarters, and other high-value assets.[166]

Instead, Russian air defenses supporting ground troops (PVO-SV in their Russian acronym) would be most likely to threaten RQ-4D collection.[167] Short-range systems that protect front-line troops include the Buk-M1/M2/M3 (38 nm range), Tor-M1/M2 (10 nm range), and other air defense artillery.[168] Longer-range systems subordinate to the PVO-SV, such as the S-300V Antey-300 (54 nm range) and S-300VM Antey-2500 (108 nm range), generally do not deploy along the FEBA but instead protect brigade command posts and other critical nodes.[169] In a worst-case scenario, however, an S-300VM operated by the PVO-SV could divert from its normal mission of guarding command posts and deploy along the FEBA. Based on practices

163 Jan Kofroň and Jakub Stauber, "Don't Count on the U.S.: Can Russia Achieve a Rapid Breakthrough in Central Europe?" *European Security* 35, no. 1, July 2025, 23–48.

164 The range is an approximation based on L3Harris, "The New Option for Modern Threats—SOAR," April 2021, 3, https://www.l3harris.com/sites/default/files/2021-05/ims_rms_datasheet_mid_SOAR.pdf.

165 CSIS, "S-500 Prometheus," updated July 1, 2021, https://missilethreat.csis.org/defsys/s-500-prometheus/; and CSIS, "S-400 Triumf," updated July 6, 2021, https://missilethreat.csis.org/defsys/s-400-triumf/.

166 Thomas Withington, "Defending Mother Russia's Skies," RUSI, July 13, 2022, https://www.rusi.org/explore-our-research/publications/commentary/defending-mother-russias-skies.

167 GlobalSecurity.org, "Air Defense of Ground Troops (PVO Sukhoputnykh Voysk)," https://www.globalsecurity.org/military/world/russia/pvo-sv.htm.

168 CSIS, "Tor (SA-15 Gauntlet)," updated November 1, 2021, https://missilethreat.csis.org/defsys/tor/; and Global Defense News Army Recognition Group, "Buk-M3 Viking 9K317M SA-27 Gollum," updated January 1, 2026, https://www.armyrecognition.com/military-products/army/air-defense-systems/air-defense-vehicles/buk-m3-9k317m-medium-range-air-defense-missile-system-technical-data-sheet-specifications-11312154.

169 CSIS, "S-300," updated July 6, 2021, https://missilethreat.csis.org/defsys/s-300/; and "S-300VM (Antey-2500) Anti-Ballistic Missile Defence System," Army Technology, August 24, 2014, https://www.army-technology.com/projects/s-300vm-antey-2500-anti-ballistic-missile-defence-system/.

in Ukraine, it likely would stay at least 10 nm back from the front line.[170] In that scenario, NISRF aircraft would have enough sensor range to collect data on targets along the FEBA and peripheral sectors while staying outside the S-300VM's reach.

Russian aircraft probably represent the greater threat to NISRF aircraft. In the war against Ukraine, Russia's Su-35, MiG-31BM Foxhound, and Su-30SM2 Flanker have increasingly relied on the hypersonic R-37M air-to-air missile (162 nm range) rather than the R-77-1 missile (54 nm range).[171] The longer-range variant of the ubiquitous R-27 air-to-air missile (110 nm range) also poses a major threat to NATO aircraft.[172]

Facing these dangers, an NISRF aircraft would have several factors working in its favor. First, Russian aircraft in Ukraine generally have maintained combat air patrols only inside their controlled airspace, meaning they are unlikely to be eager to cross the FEBA and penetrate NATO-controlled airspace during a future conflict.[173] Second, layered NATO air defenses deployed along the FEBA would lead Russian aircraft to be even more cautious about crossing or nearing the FEBA to fire long-range missiles at NISRF aircraft. Third, the RQ-4D flight profile generally has its sensors looking sideways at the collection area, meaning it would not be flying straight at the enemy and the enemy would therefore have a reduced maximum effective missile range.[174] If these factors played out as stipulated here, then NISRF aircraft would have sufficient sensor range to collect data on targets along the FEBA and peripheral sectors while remaining beyond the reach of Russian air-to-air missile threats, including the hypersonic R-37M.

### What: Identify Adversary Forces for Operational Engagement

In wartime, NISRF should be able to find, fix, and track Russian military forces, including hard targets, to support operational engagement with kinetic and nonkinetic fires. Unlike in peacetime, when the aim is to anticipate aggression via I&W, the aim during conflict is to facilitate destruction and disruption via target-quality tracking.

170 Jack Watling and Nick Reynolds, *Meatgrinder: Russian Tactics in the Second Year of Its Invasion of Ukraine* (London: RUSI, May 2023), https://static.rusi.org/403-SR-Russian-Tactics-web-final.pdf.

171 Justin Bronk, "The Evolution of Russian and Chinese Air Power Threats," RUSI, January 8, 2026, https://www.rusi.org/explore-our-research/publications/insights-papers/evolution-russian-and-chinese-air-power-threats; and Miko Vranic, "Ukraine Conflict—Combat Experience: Russia's R-37M Hypersonic Missile and MiG-31BM Debut in Ukraine," *Janes International Defence Review*, November 8, 2022.

172 Operational Environment Data Integration Network, "R-37M (AA-X-13/AA-13 Arrow) Russian Air-to-Air Missile," U.S. Army Training and Doctrine Command, updated June 14, 2024, https://odin.tradoc.army.mil/WEG/Asset/59940359ebacd5953098f01ece89c21e.

173 Justin Bronk, Nick Reynolds, and Jack Watling, *The Russian Air War and Ukrainian Requirements for Air Defence* (London: RUSI, November 2022), https://static.rusi.org/SR-Russian-Air-War-Ukraine-web-final.pdf.

174 Air-to-air missile engagement ranges depend on many factors, including the flight profiles of the shooter and target, missile kinematics, weather, detection range, radar cross section, and target maneuvering capabilities. The missile ranges described in this section assume a hot contact in which the aircraft are flying toward each other.

The military–civilian intermixing challenge should prove less severe in wartime because civilian activity should be more limited near the battlefront. However, other challenges will surely emerge. For example, Russian forces will employ electronic warfare, emission control, concealment, and rapid maneuver to thwart NATO surveillance. Whereas Russia has strengthened its proficiency in these areas (especially electronic warfare) during the Ukraine War, NATO has improved more unevenly.[175]

NISRF currently lacks the onboard sensors and number of aircraft required to support operational engagements under wartime conditions. The future fleet could meet this requirement using either a direct or an indirect approach.

With the direct approach, NISRF aircraft would perform frontline sensing themselves, most likely at standoff range while using hardened communications and perhaps carrying self-protection pods to evade missile attacks.[176] To execute this approach, the fleet would need ELINT and imaging sensors to track elusive targets. It would also likely need to assign multiple aircraft to the same target set in order to perform triangulation and overcome Russian countermeasures (implying the need for a larger fleet). Finally, it would need to interoperate with NATO national forces to pass information rapidly to ground, sea, and air forces so they could launch attacks.

With the indirect approach, NISRF aircraft would function as a relay or hub for other ISR assets that would perform frontline sensing. In the relay role, NISRF aircraft would use a communications payload like the Battlefield Airborne Communications Node (BACN) previously integrated on U.S. Global Hawks. This type of payload provides connectivity for geographically separated operational units, a useful capability in areas with limited satellite coverage such as the High North.[177] In the hub role, NISRF aircraft would collaborate with smaller or penetrating UAS to reconnoiter the battlespace. For example, NISRF aircraft could carry and launch smaller UAS such as the Eaglet or Sparrowhawk produced by General Atomics.[178] Employing air-launched effects such as these would allow NISRF aircraft to remain behind the FEBA and thus reduce the risk of being shot down.

Regardless of whether the approach is direct or indirect, NISRF aircraft would need to support operational targeting through some form of cooperative engagement concept.[179]

175 Justin Bronk, *Airborne Electromagnetic Warfare in NATO: A Critical European Capability Gap* (London: RUSI, March 2025), 3–4, https://www.rusi.org/explore-our-research/publications/occasional-papers/airborne-electromagnetic-warfare-nato-critical-european-capability-gap.

176 General Atomics Aeronautical, "Self-Protection Pod," 2022, https://www.ga-asi.com/images/products/aircraft_systems/pdf/Self-Protect-Pod-Datasheet-P06998.pdf.

177 General Atomics Aeronautical, "GA-ASI Flight Tests LEO SATCOM on MQ-9A," February 2, 2023, https://www.ga.com/ga-asi-flight-tests-leo-satcom-on-mq-9a.

178 General Atomics Aeronautical, "Small Unmanned Aerial Systems and Launched Effects," n.d., https://www.ga-asi.com/remotely-piloted-aircraft/small-uas-and-launched-effects.

179 Cooperative engagement is used here in a generic sense rather than to refer specifically to the U.S. Navy's program by that name.

This concept refers to an external (or third-party) sensor directing a weapon where to go, including through specific processes such as forward pass or engage on remote.[180] The concept enables aircraft, surface ships, and land-based units to share target-track information and guide each other's weapons in flight, thereby overcoming the limitations imposed by relying on a single platform's onboard sensors. To execute cooperative engagement, a NISRF aircraft could function as a combined relay-hub providing target-quality tracks directly to other manned and unmanned platforms that would launch attacks. To deliver these integrated effects, NISRF aircraft and other forces would require sophisticated tactical data links, including Link 16, with high reliability and low latency.[181]

### Why: Forward Defense Through Dynamic Targeting

In wartime, NISRF should support forward defense, which would involve attriting Russian frontline forces and interdicting deeper targets such as transportation nodes, aggregation points, communication lines, and depots.[182] By supporting attrition and interdiction, NISRF would help halt Russia's invasion forces at the point of attack while degrading its combat potential for reinforcement and maneuver. Both lines of operation would be necessary to maintain political cohesion within NATO and compel Russia to stop its aggression.

Successfully executing forward defense would require NISRF to support dynamic targeting, rapid responses to Russian forces that appear temporarily vulnerable.[183] Dynamic targeting in wartime is far more demanding than persistent presence in peacetime because more targets need surveillance and there is less time to reach them before their windows of vulnerability close.[184] NISRF currently lacks the operating sites, capabilities, number of aircraft, and interoperability with national forces required to execute dynamic targeting in wartime.

To be clear, there is no expectation (or possibility) that NISRF will fulfill all dynamic targeting requirements by itself. National ISR forces will supply most of the required collection. Still, NISRF must make a meaningful contribution consistent with the time, attention, and money that NATO has invested in it over the past 30 years—but it is not currently able to do so.

180 "The Cooperative Engagement Capability," *Johns Hopkins APL Technical Digest* 16, no. 4, 1995, 377–396, https://secwww.jhuapl.edu/techdigest/content/techdigest/pdf/V16-N04/16-04-APLteam.pdf.

181 William H. Zinger and Jerry A. Krill, "Mountain Top: Beyond-the-Horizon Cruise Missile Defense," *Johns Hopkins APL Technical Digest* 18, no. 4, 1997, 504, https://secwww.jhuapl.edu/techdigest/content/techdigest/pdf/V18-N04/18-04-Zinger.pdf.

182 On why and how deeper Russian targets should be held at risk, see Eric Edelman, Chris Bassler, Toshi Yoshihara, and Tyler Hacker, *Rings of Fire: A Conventional Missile Strategy for a Post–INF Treaty World* (Washington, DC: CSBA, August 2022), 19–21, https://csbaonline.org/research/publications/rings-of-fire-a-conventional-missile-strategy-for-a-post-inf-treaty-world.

183 Dynamic targeting prosecutes targets identified too late or not selected for action in time to be included in deliberate targeting. The assessment assumes that the ability to perform dynamic targeting implies also being able to perform deliberate targeting. DoD, *Dictionary of Military and Associated Terms*, 67, https://irp.fas.org/doddir/dod/dictionary.pdf.

184 DoD, *Joint Publication 3-60: Joint Targeting*, September 28, 2018, II-2 to II-3, https://www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/Joint_Staff/21-F-0520_JP_3-60_9-28-2018.pdf.

## Recommendation 1: Establish Additional Operating Sites

**Assessed marginal gain**: Increased proximity to targets in key geographic areas will partially fulfill requirements for persistent presence in peacetime and dynamic targeting in wartime (Table 2).

### TABLE 2: ASSESSED MARGINAL GAIN FROM ESTABLISHING ADDITIONAL OPERATING SITES

| Peacetime deterrence requirements | Current capability (with full manning) | Establish additional operating sites |
|---|---|---|
| **Where:** Five priority geographic areas | ✓ | ✓ |
| **What:** Identify adversary forces for strategic indications and warning | ✗ | ✗ |
| **Why:** Deterrence by Detection through persistent presence | ✗ → Improvement | → – |
| **Wartime defense requirements** | **Current capability (with full manning)** | **Establish additional operating sites** |
| **Where:** Forward edge of battle area and peripheries | ✓ | ✓ |
| **What:** Identify adversary forces for operational engagement | ✗ | ✗ |
| **Why:** Forward defense through dynamic targeting | ✗ → Improvement | → – |

**Source**: CSBA analysis.

**Notes**: See Table 1 for details about interpretation.

Basing ISR aircraft closer to targets is a proven way to increase collection time.[185] Additional operating sites would allow NISRF to cover more targets per sortie, reach them more quickly, and surveil them more often. With these benefits of proximity, the force would

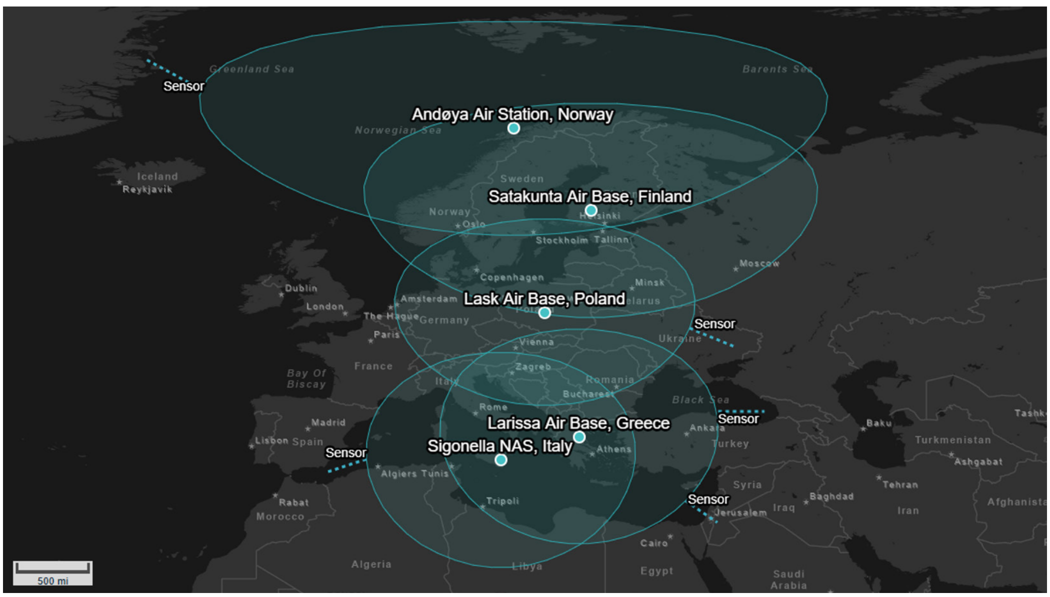
185 Tim Sadov and Travis Sharp, "A Prize-Dependent Loitering Time Approach to UAS Routing: Application to South China Sea Maritime Domain Awareness," *Journal of Defense Modeling and Simulation*, February 2025, 8–11, https://doi.org/10.1177/15485129241312711.

be better prepared to maintain persistent presence in peacetime and conduct dynamic targeting in wartime.

Based on proximity to key collection areas, four additional operating sites appear most promising for NISRF: Satakunta Air Base (Finland), Lask Air Base (Poland), Larissa Air Base (Greece), and Andøya Air Station (Norway). The force should think of these sites as a network of flexible options meant to complement its Sigonella home base. Depending on mission needs, some or all NISRF aircraft could operate from some or all of these locations for as long as operational requirements dictated. The vision is agile employment rather than permanent basing.[186] Each site has the core infrastructure required for long-endurance UAS operations, though some additional investment would be needed to upgrade certain sites.[187] That investment would be far smaller than creating entirely new bases.

From Sigonella and the four additional sites, NISRF aircraft could reach most targets within the five priority areas in two hours or less (Figure 9). That level of responsiveness would help satisfy the requirements articulated in this chapter.

## FIGURE 9: TWO-HOUR FLIGHT RADIUS (620 NM) WITH SENSOR RANGE (200 NM) FOR ADDITIONAL SITES




**Source**: CSBA analysis using unclassified geospatial research tools.

**Notes**: Radius plots assume an aircraft cruising speed of 310 knots. Plots overlaying Russian territory are not meant to suggest that NISRF aircraft would overfly those areas; rather, the plots merely illustrate aircraft reach.

186 On agile combat employment in NATO, see Isaiah Oppelaar, "Agile Combat Employment: The Next Big Thing for NATO Air Power," *Journal of the JAPCC* 36, Summer 2023, 54–59, https://www.japcc.org/wp-content/uploads/JAPCC_J36_screen.pdf.

187 Interview with former senior NATO military official, March 18, 2025.

In order of importance, NATO should prioritize Satakunta, Lask, Larissa, and then Andøya. Satakunta is the only option providing timely coverage of the Baltic Sea (priority 1), the Eastern European border (priority 2), and part of the High North (priority 4). Lask is best positioned to cover Eastern Europe, including Ukraine. Larissa can quickly reach Black Sea targets (priority 3). Finally, Andøya offers ideal access to the maritime High North and the GIUK Gap (priority 5). The Mediterranean is not one of the priority areas, but it would be readily reachable from Sigonella and Larissa.

Operating from additional sites would require having personnel and equipment in those locations to launch and recover aircraft. There are three options for delivering that support. First, NISRF could use its own personnel and equipment. This would require it to have more trained personnel, larger equipment stocks, and a bigger budget. Second, a NATO member (such as the site host nation) could dedicate its national forces to supporting NISRF operations. Such support would be an in-kind contribution from the member to the alliance. The member would have to train its national forces to meet NISRF standards, a goal it could readily accomplish by sending people to the existing NISRF training program in Sigonella.[188] Third, a contractor could operate the aircraft on NISRF's behalf. This would limit the need for additional military personnel, a major constraint for NISRF and NATO militaries in general.[189] Several NATO members have used the contractor-operated model to field long-endurance UAS.[190]

Although adding sites would require more personnel and equipment to handle flight operations, this should not require much extra resourcing for analysis and PED. As chapter 2 noted, the NISRF intelligence staff currently devotes significant time to analyzing information its aircraft did not collect. It therefore has sufficient capacity, especially when fully manned, to handle a larger workload of organic collection generated from additional operating sites, albeit with potentially decreased throughput on nonorganic data exploitation.

## Recommendation 2: Expand NISRF by Buying MQ-4Cs and MQ-9Bs

**Assessed marginal gain**: A larger fleet capable of higher-fidelity collection would fulfill strategic I&W and persistent presence requirements in peacetime and operational engagement requirement in wartime (Table 3).

188 NATO, "NISRF Training Center," accessed December 10, 2025, https://nisrf.nato.int/home/about-us/nisrf-training-center.

189 Jack Detsch, "NATO Doesn't Have Enough Troops," *Foreign Policy*, April 10, 2024, https://foreignpolicy.com/2024/04/10/nato-troop-numbers-russia-ukraine-war/.

190 Jaroslaw Adamowski, "Poland Leases MQ-9A Reapers Ahead of Drone Buy," *Defense News*, October 21, 2022, https://www.defensenews.com/global/europe/2022/10/21/poland-leases-mq-9a-reapers-ahead-of-drone-buy/.

### TABLE 3: ASSESSED MARGINAL GAIN FROM EXPANDING FLEET BY BUYING NEW AIRCRAFT

| Peacetime deterrence requirements | Establish additional operating sites | Expand fleet by buying new aircraft |
|---|---|---|
| **Where:** Five priority geographic areas | ✓ | ✓ |
| **What:** Identify adversary forces for strategic indications and warning | ✗ → Improvement → | ✓ |
| **Why:** Deterrence by Detection through persistent presence | – → Improvement → | ✓ |
| **Wartime defense requirements** | **Establish additional operating sites** | **Expand fleet by buying new aircraft** |
| **Where:** Forward edge of battle area and peripheries | ✓ | ✓ |
| **What:** Identify adversary forces for operational engagement | ✗ → Improvement → | ✓ |
| **Why:** Forward defense through dynamic targeting | – | Different result than peacetime<br>–<br>Only fulfillable via interoperability |

Source: CSBA analysis.

Notes: See Table 1 for details about interpretation.

NISRF is too small to meet the demands of peacetime, let alone wartime. Even with full manning and more operating sites, five aircraft cannot maintain persistent presence in five geographic areas simultaneously. That force-to-space ratio, one UAS per area (or orbit), violates the rule of thumb of needing three UAS per area for consistent coverage.[191] The shortfall would be worse in wartime, when Russian electronic warfare and air defenses would further constrain NISRF's performance.

On both operational and political grounds, there is a strong case for NISRF to acquire 10 new UAS, increasing its inventory to 15 aircraft. The 2024 NISRF requirements statement

191 Jeremiah Gertler, *U.S. Unmanned Aerial Systems* (Washington, DC: CRS, January 3, 2012), 1, https://www.congress.gov/crs-product/R42136.

called for a larger fleet.[192] According to NATO officials, buying five to 10 UAS seems politically feasible, but anything more than that seems unlikely.[193] With 10 new aircraft, NISRF's inventory (15) would nearly equal the quantity (16) CSBA has identified as providing the foundation for DbD in Europe.[194] A 15-aircraft NISRF could therefore anchor DbD, with NATO members contributing additional aircraft to fully implement the concept.

With 15 UAS, NISRF could dedicate three aircraft to each of the five priority geographic areas, a force-to-space ratio sufficient for persistent presence and operational engagement. NISRF could also concentrate aircraft in one or two areas to generate denser coverage if the threat environment dictated such a shift. Although 15 aircraft would not fulfill the requirement for dynamic targeting—which is only achievable by interoperating with national forces—it would make NISRF a more formidable and flexible military instrument.

The 10 new UAS acquired for NISRF should feature different sensors than the RQ-4D fleet. NISRF leaders have identified EO and IR imaging as the most pressing needs: NATO is entirely reliant on national contributions for that collection, and those contributions might not always come when the alliance needs them.[195] The 2024 NISRF requirements statement emphasized adding EO, IR, FMV, and ELINT.[196]

Additional sensors would enable NISRF to fulfill the requirement to provide strategic I&W in peacetime. The fleet would be better able to overcome the military–civil intermixing challenge, a favored Russian tactic, to give NATO leaders prompter and more accurate I&W. Such intermixing is hard to unravel with SAR and MTI, the RQ-4D's current sensors, as demonstrated by JSTARS in Bosnia during the 1990s (see chapter 1). Airborne surveillance using EO, IR, and FMV stands a better chance of positively identifying hostile actions because those sensors return more detailed data.

Additional sensors would also fulfill the requirement for operational engagement in wartime. ELINT plays an especially critical role in wartime targeting because radar emissions often provide the most readily collectible and interpretable evidence about the location and identity of enemy units.[197] ELINT-equipped NISRF aircraft could conduct standoff

192 NATO, "NATO AGS."

193 Interviews with senior NATO military officials, March 11, 2025, and March 25, 2025.

194 CSBA recommended assigning 16 MQ-9s, RQ-4s, and MQ-4Cs to the priority geographic areas emphasized by this report. In addition to that foundational force, the report also recommended assigning another 30 UAS to the theater, adding up to a total requirement for 46 UAS. Mahnken et al., *Deterrence by Detection*, 32.

195 Attariwala, *Go Bold*, episode 78, 21:18; and Attariwala, *Go Bold*, episode 77, 41:40.

196 The force would have to follow agreed-upon rules for operating these sensors when overflying the territories of NATO members, but the alliance has successfully managed that issue before. NATO, "NATO AGS," 2–4; and interview with former senior NATO military official, March 18, 2025.

197 Jeffrey T. Richelson, *The U.S. Intelligence Community*, 7th ed. (New York: Routledge, 2016), 223.

collection to localize key Russian targets, including SAMs, jammers, smuggling vessels, warships, and command-and-control nodes for ground forces.[198]

Beyond ELINT, adding EO, IR, and FMV to NISRF aircraft would aid wartime targeting. Better imaging would help positively identify Russia forces, especially if NISRF received tipping and cueing on targets of interest from national collection by NATO members. NISRF aircraft could function as backup imagery collectors if Russia temporarily disabled NATO nations' space-based reconnaissance.[199] NISRF imaging could also support battle damage assessment to inform decisions about reattacking targets.

Because the RQ-4D fleet still has 15 years of service life, some might suggest adding sensors to the current aircraft.[200] That option faces several feasibility challenges. Adding a sensor often requires costly and time-consuming aircraft modifications, which then require follow-on integration, testing, and airworthiness certification.[201] Integrating ELINT onto the RQ-4D, for example, would require extensive shielding work to prevent the existing SAR sensor's energy from interfering with the new ELINT sensor.[202] Expenses for those modifications would come on top of the sensor's base price, which itself can be significant. Altogether, a new sensor, installation, and initial spares might exceed $50 million per RQ-4D—or over $250 million for all five aircraft—according to open-source data.[203] At that high price point, the more economically sensible decision would be to acquire new UAS with the desired sensors (plus full aircraft service lives) rather than retrofitting them onto the RQ-4D.

The 2024 NISRF requirements statement called for emphasizing maritime surveillance, pursuing HALE–MALE teaming, and fielding any new UAS by 2027. Those criteria, plus the need for the sensors discussed above, point to the MQ-4C (HALE) and MQ-9B (MALE) as the most plausible additions to NISRF. Both aircraft carry the desired sensors and can operate in maritime climatic conditions. Crucially, both are also ready for purchase today. The leading alternative option, the Eurodrone MALE UAS, has suffered design delays due to immature technologies. It will not deliver aircraft until 2030, years after the 2027

198 Interview with industry expert, July 26, 2024.

199 Interview with senior NATO military official, March 25, 2025.

200 A former NISRF commander said adequate space exists on the RQ-4D to add new equipment. Attariwala, *Go Bold*, episode 77, 2:12.

201 Jeffrey N. Fox et al., *Global Hawk: Root Cause Analysis of Projected Unit Cost Growth* (Alexandria, VA: Institute for Defense Analyses, May 2011), 23, https://www.acq.osd.mil/asda/ae/ada/docs/arc/2011-ida-rca-global-hawk-p-4668.pdf; and Frank Wolfe, "U.S. Navy Requests Increase for Development of MQ-4C Triton SIGINT Package," *Aviation Today*, April 30, 2020, https://www.aviationtoday.com/2020/04/30/u-s-navy-requests-increase-development-mq-4c-triton-sigint-package/.

202 Brooks McKinney, "MQ-4C Triton Takes Flight with Multi-Intelligence Upgrade," Northrop Grumman, n.d., https://www.northropgrumman.com/what-we-do/aircraft/triton/mq-4c-triton-takes-flight.

203 Teal Group, "Global Hawk & Triton & Future Next-Gen HALE EO/IR & Radars," Military Electronics Briefing, September 2019, 4, http://procurement-intelligence.co.uk/wp-content/uploads/Global-Hawk-Triton-Future-Next-Gen-HALE-EOIR-Radars-1.pdf.

fielding target.[204] Although NATO delays will make it difficult to field new MQ-4Cs and MQ-9Bs by 2027, those aircraft could be ready shortly thereafter. The same cannot be said of Eurodrone.

NATO officials have expressed confidence that they can integrate the MQ-4C and MQ-9B with the existing RQ-4D fleet, though some growing pains may occur.[205] The lead contractors for each aircraft, Northrop Grumman (MQ-4C) and General Atomics (MQ-9B), can partner with non-American firms to divide the workshare. Northrop did that with the RQ-4D (see chapter 1), and recent General Atomics sales of MQ-9B to NATO nations have included workshare for the recipient's industry.[206] Spreading the work will preempt concerns about the United States reaping all the industrial benefits.

Some observers might argue that NISRF should acquire only the MQ-4C or MQ-9B, not both. Though the case for each aircraft is strong, the case for both is stronger. A mixed fleet combining HALE (RQ-4D, MQ-4C) and MALE (MQ-9B) UAS would maximize flexibility to cover the varied geographies, conditions, and missions across the European continent. With both HALE and MALE UAS, NISRF would be better prepared to fulfill the peacetime and wartime requirements described in this chapter. For example, the MQ-4C's proficiency at wide-area surveillance would prove very valuable for maintaining peacetime persistent presence throughout the vast maritime High North and GIUK Gap. Meanwhile, the MQ-9B's proficiency with strike, air-launched effects, and short takeoff and landing would prove very valuable for supporting wartime operational engagement. The two aircraft bring different advantages to the different missions NISRF must perform. Neither is superior to the other in all contexts.

To maintain balance across mission requirements, NATO should acquire five MQ-4Cs and five MQ-9Bs to mirror the five RQ-4Ds already on hand. According to CSBA estimates, the procurement cost for the 10 new aircraft should fall between $1.2 billion and $1.8 billion (Table 4). That cost is substantially smaller than the RQ-4D fleet's original acquisition cost in 2012 (after adjusting to today's dollars).[207] If NATO could rouse itself to spend more then, before Russia invaded Ukraine (twice), then it can muster the political will to spend a smaller amount now, especially with its increased defense spending target.

204 Jennings, "Eurodrone Passes Critical Design Review."

205 Interview with senior NATO military official, March 25, 2025; and Federico Borsari and Gordon B. "Skip" Davis Jr., *High Stakes in the High North: Harnessing Uncrewed Capabilities for Arctic Defense and Security* (Washington, DC: CEPA, December 2025), 18, https://cepa.org/commentary/high-stakes-in-the-high-north-harnessing-uncrewed-capabilities-for-arctic-defense-and-security/.

206 General Atomics Aeronautical, "Government of Canada Orders the MQ-9B SkyGuardian RPAS from GA-ASI," December 19, 2023, https://www.ga-asi.com/government-of-canada-orders-the-mq-9b-skyguardian-rpas-from-ga-asi.

207 The RQ-4D fleet acquisition cost of $1.7 billion in 2012 equals $2.3 billion in 2025.

## TABLE 4: ESTIMATED PROCUREMENT COST OF MQ-4C AND MQ-9B (2025 DOLLARS)

| | Procurement unit cost | Procurement total cost |
|---|---|---|
| **MQ-4C** | $150 million to $240 million (1 aircraft) | $750 million to $1.2 billion (5 aircraft) |
| **MQ-9B** | $80 million to $125 million (1 aircraft) | $400 million to $625 million (5 aircraft) |
| **Total** | N/A | $1.2 billion to $1.8 billion (10 aircraft) |

**Sources**: CSBA analysis based on data from DoD and media reports.[208]

**Notes**: Cost excludes research and development.

The operations and support (O&S) cost of new aircraft is more difficult to estimate because of uncertainty about mission tempo, staff utilization, and maintenance commonality. As an initial proposition, however, NISRF's flying costs might very well triple as its fleet size triples, growing from $265 million to nearly $800 million per year.[209] If flying costs remained 75 percent of NISRF's annual cost, as they are today, then flying costs of $800 million imply a total O&S cost of just over $1 billion annually for NISRF.[210] As was the case

208 MQ-4C estimate reflects the minimum and maximum flyaway unit cost from FY 2016 to FY 2024 as reported in the FY 2018 to FY 2026 budget requests (i.e., data are two-year lagged actuals). Flyaway costs adjusted to 2025 dollars using DoD, *National Defense Budget Estimates*, Table 5-3. For the minimum (FY 2016) and maximum (FY 2017) values, see DoD, *FY 2018 Budget Estimates, Aircraft Procurement Navy (01-04)*, May 2017, 151, https://www.secnav.navy.mil/fmc/fmb/Documents/18pres/APN_BA1-4_BOOK.pdf; and DoD, *FY 2019 Budget Estimates, Aircraft Procurement Navy (01-04)*, February 2018, 167, https://www.secnav.navy.mil/fmc/fmb/Documents/19pres/APN_BA1-4_BOOK.pdf. MQ-9B estimate reflects unit cost implied in recent sales to India, Poland, and Japan. See Gordon Arthur, "India's MQ-9B Buy from the U.S. Caps Fruitless Push for Homemade Drone," *Defense News*, October 31, 2024, https://www.defensenews.com/global/asia-pacific/2024/10/31/indias-mq-9b-buy-from-the-us-caps-fruitless-push-for-homemade-drone/; Bartosz Głowacki, "Poland Acquires General Atomics MQ-9B SkyGuardian in $310M Deal," *Breaking Defense*, December 16, 2024, https://breakingdefense.com/2024/12/poland-acquires-general-atomics-mq-9b-skyguardian-in-310m-deal/; and Kosuke Takahashi, "New Details on Japan's MQ-9B SeaGuardian Procurement for JMSDF," *Naval News*, December 5, 2024, https://www.navalnews.com/naval-news/2024/12/new-details-on-japans-mq-9b-seaguardian-procurement-for-jmsdf/.

209 See chap. 2.

210 The cost estimate in this paragraph assumes no additional facilities cost beyond those discussed in the section on additional operating sites. That assumption is premised on many of the 10 new UAS operating from the additional sites rather than Sigonella. If additional sites are not used, then investment would likely be required at Sigonella to accommodate the expanded fleet.

with procurement, this O&S cost is sizable but manageable given the upward trajectory of NATO defense budgets.

Although NATO can afford O&S expenditures of this size, NISRF could reduce costs by pursuing alternative approaches. One option mentioned above is contractor-operated UAS. A detachment of three contractor-operated long-endurance UAS would cost only $50 million per year, according to previous CSBA analysis of industry data.[211] That expense would be far smaller than the costs estimated here. Contractor-operated aircraft would offer less flexibility than aircraft owned outright by NATO, so the approaches are not qualitatively equivalent. Still, the contractor-operated approach is a viable option for expanding NISRF's fleet at a lower cost.

## Conclusion

Strengthening NISRF would help NATO reduce its reliance on U.S. military surveillance capabilities. Although American and alliance leaders have long desired that outcome, progress has always proved underwhelming. The reelection of Trump changed the equation. Unprecedented urgency now exists for burden shifting within NATO. Improving NISRF would permit NATO to show the United States that it is making progress. NISRF is an important symbol of the alliance's ability to defend itself. The alliance should not rely entirely on member-state contributions, whether from the United States or other nations, for all the UAS needed to deter and defeat Russia aggression. A better and bigger NISRF will provide NATO with essential flexibility and autonomy.

211 Sharp et al., *Extending Deterrence by Detection*, 38.

CHAPTER 4

# Conclusion: Interoperability Brings It All Together

In a now-declassified article originally published in 1984, U.S. Army General Edward B. Atkeson described Cold War NATO intelligence as a contradiction in terms.[212] NATO forces held fast along the German border, but access to quality intelligence varied widely across the different geographic sectors defended by alliance troops. NATO delegated responsibility for intelligence to member states rather than pushing alliance-wide standardization, resulting in the absence of what would today be called a common intelligence picture. Fortunately, NATO has worked hard to fix these shortcomings.

Over the past 20 years, NATO has taken significant strides to ensure that the inevitable disparities among member-state intelligence capabilities do not hamstring its military effectiveness. In 2006, it established the NATO Intelligence Fusion Centre in Molesworth, United Kingdom, to share information and support planning.[213] In 2016, it appointed its first assistant secretary general for intelligence and security to help integrate alliance-wide efforts.[214] Finally, as detailed in this report, in 2021 it declared that NISRF had reached initial operational status, providing all alliance members with a sophisticated high-altitude surveillance capability.

Despite these achievements, the interoperability of NATO's military surveillance forces, particularly UAS, remains an area of inadequate progress. NATO has not presented a comprehensive vision for its UAS capabilities, which include NISRF and member-state aircraft. It should do so with utmost haste. NISRF is indisputably valuable, as this report

212 Edward B. Atkeson, "NATO Intelligence: A Contradiction in Terms," *Studies in Intelligence* 28, no. 1, 1984, 1–13, https://www.cia.gov/resources/csi/static/nato-intel-contradiction.pdf.

213 NATO, "NIFC: Who We Are," n.d., https://web.ifc.bices.org/about-us/who-we-are.

214 Julian Barnes, "NATO Appoints Its First Intelligence Chief," *Wall Street Journal*, October 21, 2016, https://www.wsj.com/articles/nato-appoints-its-first-intelligence-chief-1477070563.

has argued, but it is a mere fraction of the UAS possessed by NATO members. If NISRF is not tightly integrated with national forces, then it may struggle to perform Deterrence by Detection in peacetime and will likely fail to meet wartime requirements.

Doctrinally, NATO lacks standardized concepts for UAS employment, communication formats, and data-exchange protocols, though it has made improvements.[215] Existing STANAGs and associated policies provide a foundation for alliance interoperability, but member-state implementation too often proves inadequate. Unsurprisingly, countries continue to design doctrine and operations based on their own risk tolerance and political interests rather than on any sense of the alliance-wide ideal. Supranational interest cannot be expected to trump national interest, of course, but NISRF is living proof that alliance and national interests can be advanced simultaneously. NATO and its members are safer with NISRF flying than they would be without it.

Technologically, NATO members operate an array of long-endurance UAS produced by different companies from different countries. Data links, communication formats, and data-exchange protocols vary across these aircraft and the ground control stations supporting them. As a result, different UAS often cannot communicate with the speed and reliability needed in higher-intensity missions. Without improved tactical data links and other tools to share information rapidly, NATO UAS forces will continue to operate in compartmented silos and produce intelligence that is uneven in quality and timeliness—a new version of the problem that plagued Cold War-era NATO troops in Germany.

Interoperability hangs over every aspect of this report's analysis. It has focused on discrete improvements for NISRF, but everything the force does depends on interoperability, in one form or another, with the national militaries of NATO members. That is the blessing and the curse of an alliance-owned capability. It either thrives from collective action or suffers from disjointed inaction. As NATO leaders implement this report's recommendations, they must continue working to improve the doctrinal and technological challenges of interoperability. The alliance's security depends on it.

215 Borsari and Davis, *Urgent Matter of Drones*, 59.

## LIST OF ACRONYMS

| | |
|---|---|
| AGS | Alliance Ground Surveillance |
| AIS | automated identification system |
| AWACS | airborne warning and control system |
| AWIN | Aviation Week Intelligence Network |
| CEPA | Center for European Policy Analysis |
| CIS | communication information system |
| CRS | Congressional Research Service |
| CSBA | Center for Strategic and Budgetary Assessments |
| CSIS | Center for Strategic and International Studies |
| DbD | Deterrence by Detection |
| DoD | Department of Defense |
| ELINT | electronic intelligence |
| EO | electro-optical |
| FEBA | forward edge of the battle area |
| FEDPED | federated processing, exploitation, and dissemination |
| FMV | full motion video |
| FY | fiscal year |
| GDP | gross domestic product |
| GIUK | Greenland–Iceland–United Kingdom |
| HALE | high-altitude long-endurance |
| I&W | indications and warning |
| IISS | International Institute of Strategic Studies |
| IR | infrared |
| ISR | intelligence, surveillance, and reconnaissance |
| JSTARS | Joint Surveillance Target Attack Radar System |
| MALE | medium-altitude long-endurance |
| MP-RTIP | multi-platform radar technology insertion program |
| MTI | moving target indicator |
| NISRF | NATO ISR Force |
| O&S | operations and support |
| PED | processing, exploitation, and dissemination |
| RUSI | Royal United Services Institute |
| SAM | surface-to-air missile |
| SAR | synthetic aperture radar |
| SIGINT | signals intelligence |
| STANAG | standardization agreement |
| UAS | unmanned aircraft system |

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Center for Strategic and Budgetary Assessments

1667 K Street, NW, Suite 900
Washington, DC 20006
Tel. 202.331.7990 • Fax 202.331.8019
www.csbaonline.org