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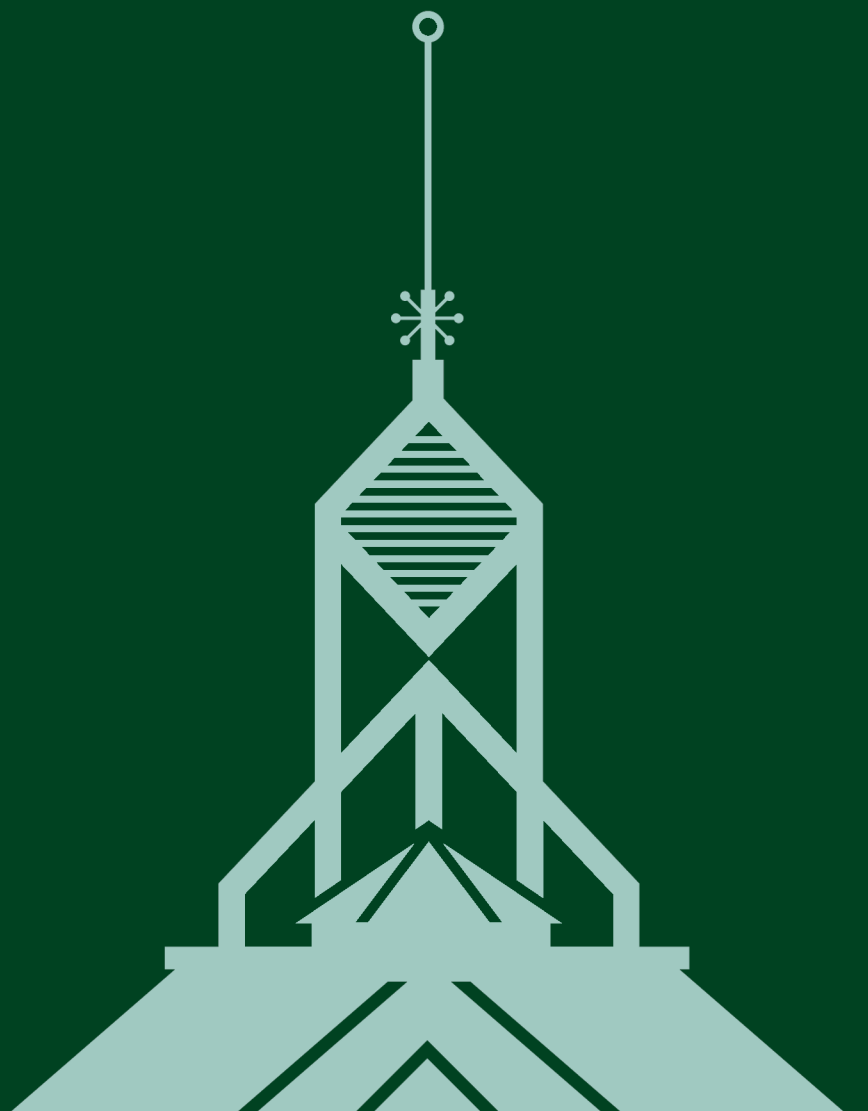
A "Build Allied" Approach to Increase Industrial Base Capacity



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School of Business
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A "Build Allied" Approach to Increase Industrial Base Capacity

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Developing an effective "Build Allied" approach will help the Department of Defense create surge capacity, with both speed and scale, and industrial resilience in support of the National Defense Strategy (NDS) objectives

THE WAR IN UKRAINE has clearly demonstrated the need for greater capacity in our defense industrial base. Increasing U.S. production of defense systems is part of the solution to this capacity deficit, but engaging the industrial capacity of American partners and allies is a critical, mutually beneficial, and cost-effective approach as well. The NDS underscores the imperative of increasing this cooperation to build "enduring advantages" in the joint force and specifically references the need for the Department of Defense (DoD) to work or collaborate with allies and partners *thirty-two* times.

How can the United States implement this clear priority? This report argues for the development and execution of a "Build Allied" approach—the creation of a larger industrial base to increase speed and scale capabilities through robust international industrial partnerships to build the systems needed for current and future contingencies.

The case studies and analysis in this report illustrate that we clearly have many of the building blocks in place for a "Build Allied" approach. There have been and are in development a number of co-development, co-production, second sourcing, licensed production, and sustainment efforts involving our allies and partners.

Our examinations of two very large programs, four focused collaborative efforts, and three NATO programs show very clearly what can be done. The case study findings further show that these success-

ful efforts have largely been driven by strong leadership, focused cooperative efforts, and effective enablers.

The environment today for international industrial collaboration is incredibly strong, with robust Administration leadership, bipartisan Congressional support, and increased allied defense investment to address defense industrial capacity shortfalls. There are a significant number of enablers such as the Australia, United Kingdom, and United States (AUKUS) Partnership, the National Technology Industrial Base (NTIB), the Defense Exportability Features (DEF) program, and others that are promising vehicles for this industrial collaboration.

At the same time, however, there are significant obstacles that need to be overcome. Export controls, technology security and foreign disclosure processes, aspects of the defense acquisition system, and Buy America sentiments can present significant challenges to the collaboration needed for today's challenges.

The report concludes with a series of practical and actionable recommendations to help enhance the enablers of and remove the obstacles to achieve a true "Build Allied" approach. This goes well beyond reforming foreign military sales or expanding the scope of international acquisition programs. To realize NDS objectives, we must accelerate international industrial collaboration to build the industrial base capacity and resilience we need to face the national security challenges of tomorrow. This requires system level efforts—encouraged and supported by senior acquisition organizations and prime contractors—that promote and foster a broad mosaic of programs across the entire spectrum of U.S. and allied defense acquisition needs. While many of the building blocks are in place, acting on these recommendations is essential to gain the speed and scale necessary for a successful "Build Allied" approach, which will ultimately be a win-win proposition for the United States as well as its allies and partners.

Acknowledgements

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Introduction

RESEARCH QUESTION

The war in Ukraine has clearly demonstrated the need for surge capacity in our defense industrial base. From the skyrocketing demand for and lack of ability to rapidly increase production of Javelins and High-Mobility Artillery Rocket System (HIMARS) or the largely shuttered production of Stingers, our defense acquisition system has shown itself to be more brittle than resilient in some critical ways. In response, Under Secretary for Acquisition and Sustainment Dr. Bill LaPlante has strongly emphasized the importance of production, going as far to say that "we as a country did our best to not do production in defense" in our efforts to keep costs down and maintain program schedules.[1] Beyond the current fight in Ukraine, looming security threats in East Asia underscore the importance of producing systems at scale *and* replacing or sustaining them as systems attrit or are destroyed in combat.

Increasing U.S. production of defense systems is part of the solution to this capacity deficit, but focusing solely on domestic production does not fit how we currently produce defense systems nor how we fight. NATO and other allies have provided equipment to Ukraine, most buy U.S. defense systems, and many also produce major parts or sub-systems that are incorporated into platforms principally delivered by U.S. prime contractors. Engaging the industrial capacity of American partners and allies could be a mutually beneficial and more affordable approach to address our collective capacity shortfalls.

This paper will examine a select number of international industrial collaboration efforts to address this principal research question: how can DoD develop an effective Build Allied approach that creates surge production capacity, with both speed and scale, and industrial resilience in support of the NDS objectives?

THE NATIONAL DEFENSE STRATEGY

The emphasis on the importance of allies starts at the top. The President's National Security Strategy

1. Bridging the Valley of Death Fireside Chat, 2022 GMU-DAU Government Contracting Conference, November 9, 2022, https://coursemedia.gmu.edu/media/Fireside%20Chat%20Bridging%20the%20Valley%20of%20Death/1_md-vurwh0 (accessed April 8, 2023).

calls for robust collaboration "to remove barriers to deeper collaboration with allies and partners, to include issues related to joint capability development and production to safeguard our shared military-technological edge."[2] The NDS further underscores the imperative of increasing this cooperation to build "enduring advantages" in the joint force.[3] The NDS specifically references the need for the Department to work or collaborate with allies and partners *thirty-two* times so this is clearly a DoD strategic priority. This major allied emphasis is also coupled with a sense of urgency given what the NDS calls the "pacing challenge" of China.

There are numerous ways that U.S. forces currently collaborate with partners and allies. Two decades of combat in Afghanistan and Iraq clearly demonstrated that we fight with our allies and partners. These operational activities are central to U.S. strategy, and we conduct regular operations, exercises, and other engagements with countries across the globe under the broad rubric of security cooperation.

Industrial collaboration to "support modernization and future capability development" and "collaborative development and production" is also part of security cooperation, as the NDS notes.[4] Co-production, licensed production, cooperative programs, foreign military sales, direct commercial sales, and other efforts are examples of this international industrial collaboration. DoD leaders such as Dr. LaPlante have called for an increase in these efforts.[5]

DEVELOPING A BUILD ALLIED APPROACH

Objective

The objective of a "Build Allied" approach is to create a larger industrial base through international industrial partnerships to build the systems needed for current and future contingencies. This would create more industrial capacity to develop, produce, and sustain American and allied operational capabilities. This would also help to increase the rate of production and reduce supply chain bottlenecks that have created challenges in replenishing stockpiles during periods of high operational demand.

Components

The principal components of a "Build Allied" approach include:[6]

- **U.S. subsidiaries.** The creation or expansion of the U.S. footprint by foreign-headquartered companies as a result of investment, program wins, or corporate merger.
- **Co-development.** Systems or subsystems cooperatively designed and developed in two or more countries. Shared responsibilities include applied research, design, engineering, manufacturing, and test and evaluation.
- **Co-production.** Production of a defense system in two or more countries. This involves the transfer of production technology and complex or sensitive subsystem components from the country of origin to countries producing the system. The recipient may expand production to include subsystems and components.

2. 2022 National Security Strategy, October 12, 2022, https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf (accessed April 1, 2023).

3. 2022 National Defense Strategy, October 27, 2022, https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF (accessed March 31, 2023).

4. Ibid., 10.

5. Valley of Death Fireside Chat.

6. Definitions for co-development, co-production, and second sourcing from Defense Acquisition University (DAU) Glossary, https://www.dau.edu/glossary/Pages/Glossary.aspx (accessed April 2, 2023).

- **Second-sourcing or licensed production.** Execution of established acquisition strategy to qualify two producers for the part or system, sometimes called dual sourcing.
- **Sustainment of existing systems.** Maintenance, repair, or overhaul of defense systems.

The good news is that these principal components of a "Build Allied" approach already exist. International cooperative programs such as the F-35 Lightning II and the NATO Sea Sparrow Consortium, for example, include many of these components. Foreign Military Sales (FMS) programs often include co-production and sustainment elements as part of government-to-government agreements. Direct commercial sales (DCS), on the other hand, are generally not as effective in building allied industrial capabilities, but do strengthen the U.S. industrial base by extending production lines for aging systems being phased out of the U.S. inventory.

A "Build Allied" approach, however, goes well beyond reforming FMS or expanding the scope of international acquisition programs. To realize NDS objectives, we must accelerate international industrial collaboration to build the industrial base capacity and resilience we need to face the national security challenges of tomorrow.

The challenge is that pursuing a "Build Allied" approach is often perceived as exceedingly difficult and sometimes not worth the effort by government officials or industry executives. Moreover, many aspects of a "Build Allied" approach are by their nature not transparent because they are government-to-government agreements and proprietary contractual relationships. As a result, the breadth and depth of international industrial arrangements to produce and sustain a system do not have a great deal of visibility outside of a specific DoD program or a contractual contractor relationship. Developing a more explicit "Build Allied" approach would therefore require system level efforts—encouraged and supported by senior acquisition organizations and prime contractors—that promote and foster a broad mosaic of programs across the entire spectrum of U.S. and allied defense acquisition needs.

Methodology

To develop this "Build Allied" approach, we start by examining the bilateral and multilateral enablers that can spur increased production. Then we examine the obstacles to a robust "Build Allied" industrial campaign. Next, we look at case studies of where allied industrial capabilities contribute to the development, fielding, and sustainment of weapons systems. Finally, we make a series of recommendations to implement this "Build Allied" approach.

Enablers

THERE ARE NUMEROUS enablers for a robust "Build Allied" approach. Some of these are long-standing (U.S. subsidiaries, Reciprocal Defense Procurement MOUs, Security of Supply Arrangements), some have existed for a few years (DEF and NTIB), and some are just getting started (AUKUS and NATO Defence Innovation Accelerator for the North Atlantic (DIANA)).

U.S. SUBSIDIARIES

The most obvious enabler is the fact that many foreign companies have U.S.-based subsidiaries manufacturing products or conducting services for unclassified and classified DoD programs. For those conducting classified work, these subsidiaries operate under Foreign Ownership, Control or Influence (FOCI) regulations governed by the Defense Counterintelligence and Security Agency, which limits communications and sharing of information between the parent company and the U.S. subsidiary.[7] Companies such as BAE Systems, Leonardo DRS, Thales, Elbit, and many others have long-standing major U.S. subsidiaries that regularly compete and win DoD programs.

In addition, companies such as Saab and Fincantieri Maritime Marine have recently won the Air Force Trainer and Navy Frigate programs, respectively, through foreign designs coupled with significant investments in U.S.-based production.[8] Similarly, three of the five industry teams in the Army's Optionally Manned Fighting Vehicle (OMFV) competition include major contributions by non-U.S. headquartered firms.[9]

7. Defense Counterintelligence and Security Agency, Foreign Ownership, Control or Influence, https://www.dcsa.mil/mc/ctp/foci/ (accessed April 20, 2023).

8. McGinn, *Building Industrial Resilience with a Little Help from Our Friends: Adapting DoD Acquisition Processes to Facilitate Allied and Partner Engagement*, George Mason Center for Government Contracting White Paper Series, No. 8, June 5, 2021, 4, https://business.gmu.edu/news/2021-10/no-8-building-industrial-resilience-little-help-our-friends-adapting-dod-acquisition (accessed April 2, 2023).

9. Sidney E. Dean, "SITREP—The Army's Optionally Manned Fighting Vehicle (OMFV)," *European Security and Defence*, January 23, 2023, https://euro-sd.com/2023/01/articles/29128/sitrep-the-us-armys-optionally-manned-fighting-vehicle-omfv/ (accessed April 2, 2023).

RECIPROCAL DEFENSE PROCUREMENT AND ACQUISITION POLICY MEMORANDA OF UNDERSTANDING (RDP MOUS)

There are currently 28 countries that have RDP MOUs with DoD.[10] These MOUs establish agreed upon procurement principles that foster transparency and openness to competition in each country's respective defense marketplace.

The largest tangible benefit for the non-U.S. signatory countries is that companies headquartered in these countries are waived from Buy America provisions when competing for DoD programs.[11] The existence of this exemption, however, is often not well recognized in some program offices or on Capitol Hill and others are opposed to these exemptions in the first place.

Nonetheless, RDP MOUs are key enablers of international cooperative efforts and are central in many of the case studies below. Having greater recognition of the power of these agreements would enable more "Build Allied" efforts.

SECURITY OF SUPPLY ARRANGEMENTS (SOSAS)

There are currently 13 bilateral Security of Supply Arrangements between DoD and partner nation defense organizations.[12] Not surprisingly, all SoSAs are with RDP MOU countries. These arrangements implement part of the Declaration of Principles in the RDP MOUs and recognize the "mutual interdependence of supplies needed for national security" as well as calling for the signatories to "explore solutions for achieving assurance of supply."[13] Some of the signatory nations have established industry codes of conduct as a measure of reliance of their respective industry partners to support defense priorities.

The most telling part of these efforts, however, is the fact that they are "best efforts" international *arrangements*—rather than binding international *agreements*. That underscores the relatively informal and voluntary nature of these bilateral initiatives. These arrangements are confidence building measures and there is value in that, but they are not formal commitments by the respective government signatories. Thus, it is not surprising that these arrangements have not been invoked directly in any specific case to date.

DEFENSE EXPORTABILITY FEATURES (DEF)

The DEF program attempts to address one of the biggest challenges in technology sharing, the level of technology that is incorporated in each specific weapons system. One of the major considerations in technology security and foreign disclosure processes is determining what level of capability in each weapons system can be shared with which specific partner. For

10. Defense Pricing and Contracting, Reciprocal Defense Procurement and Acquisition Policy Memoranda of Understanding, https://www.acq.osd.mil/asda/dpc/cp/ic/reciprocal-procurement-mou.html (accessed April 6, 2023). The countries are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, Turkey, and the United Kingdom of Great Britain and Northern Ireland.

11. DFARS 225.872-1, https://www.acq.osd.mil/dpap/dars/dfars/html/current/225_8.htm#225.872-1 (accessed April 13, 2021).

12. Security of Supply, https://www.businessdefense.gov/security-of-supply.html (accessed April 7, 2023). The following countries have SoSAs with the United States: Australia, Canada, Denmark, Finland, Israel, Italy, Japan, Latvia, the Netherlands, Norway, Spain, Sweden, The United Kingdom.

13. Ibid.

example, if a DoD program producing an advanced radar for U.S. forces is directed to develop an export version suitable for sales to an ally or partner, additional engineering efforts will be required. Creating these "after the fact" export versions are much more expensive than designing for future export during a program's initial development phases.

To address this issue, DEF was first authorized by the National Defense Authorization Act (NDAA) of Fiscal Year 2011 to pilot developing and incorporating technology protection features in designated defense systems during research and development.[14] The program was promoted through the department's Better Buying Power initiative which recognized that incorporating exportability features in initial designs provided benefits such as reduced costs, improved U.S. competitiveness, stronger ties to friends and allies, and improved interoperability.[15] DEF's primary objectives are to reduce costs, demonstrate quicker availability of domestic platforms for the international market by incorporating exportable features in design work, and identity lessons learned.[16]

In 2018, the Trump Administration's Conventional Arms Transfer Policy made building exportability into new DoD systems a requirement, which was incorporated into both the DoD Joint Capabilities Integration and Development System (JCIDS) Manual and DoD 5000 series acquisition policy.[17] The DEF program has been used by DoD Component programs as noted in the Three-Dimensional Expeditionary Long Range Radar (3DELRR) case below. The Air Force's 3DELRR's program management office used DEF to fund their initial development phase efforts to define and design exportable versions for future sales to allied and partner nations.

While the DEF program has had a modest impact thus far, it needs significant scaling to become a core "Build Allied" component. It was funded initially as a pilot program and has continued to limp along at low funding levels in the last several years.[18] The Ukraine conflict, however, may help revive DEF's prospects. A $50 million reprogramming action in April 2022 transferred money into DEF to "design and incorporate exportability features . . . that enhance interoperability of . . . systems with those of friendly foreign countries."[19]

NATIONAL TECHNOLOGY INDUSTRIAL BASE (NTIB)

The NTIB has deep roots and was first codified in U.S. law in 1992 when the United States and Canada were designated as one national technology industrial base. It garnered greater attention when the 2017 National Defense Authorization Act (NDAA) added the United Kingdom and Australia to NTIB and, recently, New Zealand was added to the NTIB

14. National Defense Authorization Act for Fiscal Year 2011, https://www.congress.gov/bill/111th-congress/house-bill/6523 (accessed March 1, 2023).

15. DoD AT&L Memo, Subject: Better Buying Power 2.0: Continuing the Pursuit for Greater Efficiency and Productivity in Defense Spending, November 13, 2012, https://www.acq.osd.mil/fo/docs/USD(ATL)%20Signed%20Memo%20to%20Workforce%20BBP%202%200%20(13%20Nov%2012)%20with%20attachments.pdf (accessed March 1, 2023).

16. "Defense Exportability Features., https://www.acq.osd.mil/ic/def.html (accessed March 1, 2023).

17. DAU.edu Blog, https://www.dau.edu/training/career-development/intl-acq-mgmt/blog/DoD-Acquisition-Policy-and-Defense-Exportability (accessed June 14, 2023).

18. DEF, for example, received $12.6 million in base funding in the FY2023 President's Budget submission, https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2023/budget_justification/pdfs/03_RDT_and_E/OSD_PB2023.pdf (accessed April 4, 2023).

19. Reprogramming Action—Exportability Funding from Ukraine Supplemental #2, July 21, 2022, https://comptroller.defense.gov/Portals/45/Documents/execution/reprogramming/fy2022/ir1415s/22-36_IR_Exportability_Funding_Ukraine_Sup_2.pdf (accessed April 4, 2023).

through the 2023 NDAA.[20] The NTIB has become a strong vehicle for government-to-government initiatives such as the sharing of best practices for countering the potential national security impacts of foreign direct investment.

With its industrial base focus, NTIB would seem to be a natural vehicle for a "Build Allied" approach. NTIB, however, has not had any success in fostering industrial collaboration with one minor exception. The 2019 NDAA did create an exemption for NTIB U.S. subsidiaries operating under a Special Security Agreement to obviate the need for a national interest determination for proscribed information.[21] Overall, however, NTIB has not been utilized to foster industrial collaboration in any meaningful way and many have begun to question NTIB's utility as a vehicle for such efforts.[22] This is a major missed opportunity, but it can be turned around. The NTIB governments and industries can work together to create better incentives for utilizing the NTIB to truly spur industrial base collaboration through rule changes, contract clauses, and other mechanisms.

AUSTRALIA, UNITED KINGDOM, AND UNITED STATES (AUKUS) PARTNERSHIP

Announced in September 2021 at the heads of state level, AUKUS is an enhanced trilateral security partnership between Australia, the UK, and the U.S. for the governments to strengthen the ability of each to support security and defense interests and build on longstanding and ongoing bilateral ties.[23] The UK and U.S. sharing of nuclear propulsion technology for nuclear attack submarines with Australia is the first and most publicized initiative of the agreement, Pillar I. Under that agreement, Australia will develop, build, and deploy a conventionally-armed, nuclear-powered submarine of the existing Virginia class boats.[24]

Under Pillar II, there are multiple other advanced capabilities initiatives: undersea capabilities, quantum technologies, artificial intelligence and autonomy, advanced cyber, hypersonic and counter-hypersonic capabilities, electronic warfare, innovation, and information sharing. The potential to collaborate, for example, on operating manned and unmanned aircraft operating in tandem is already being considered as U.S. Air Force begins its collaborative combat aircraft program and the Royal Australian Air Force deploys its own robotic wingman, the MQ-28 Ghost Bat.[25]

The very nature of AUKUS makes it incredibly

20. For a more detailed treatment of NTIB, see John (Jerry) McGinn, *Building Industrial Resilience with A Little Help from Our Friends*, Baroni Center for Government Contracting, White Paper No. 8, June 5, 2021, 6–7, https://mymasonportal.gmu.edu/bbcswebdav/orgs/AU_SOB_SOBW/Centers%20and%20Initiatives/Center%20for%20Government%20Contracting/White%20Papers/john-mcginn-building-resilience-with-a-little-help-from-our-friends.pdf.

21. Ibid., 4.

22. Bill Greenwalt, "The NTIB is dying: Is AUKUS next? Congress must apply life support soon," *Breaking Defense,* June 1, 2022, https://breakingdefense.com/2022/06/the-ntib-is-dying-is-aukus-next-congress-must-apply-life-support-soon/ (accessed April 3, 2023).

23. Joint Leaders Statement on AUKUS, September 15, 2021, https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/15/joint-leaders-statement-on-aukus/ (accessed April 3, 2023).

24. Fact Sheet: Implementation of the Australia—United Kingdom—United States Partnership (AUKUS), April 5, 2022, https://www.whitehouse.gov/briefing-room/statements-releases/2022/04/05/fact-sheet-implementation-of-the-australia-united-kingdom-united-states-partnership-aukus/ (accessed April 3, 2023).

25. Mikayla Easley, "US Air Force hopes to learn from Australia's robotic wingmen efforts as it pursues collaborative combat aircraft," *DEFENSE SCOOP,* March 20, 2023, https://defensescoop.com/2023/03/20/us-air-force-hopes-to-learn-from-australias-robotic-wingmen-efforts-as-it-pursues-collaborative-combat-aircraft/ (accessed April 3, 2023).

conducive to a "Build Allied" approach because it is explicitly focused on capability development and industrial capacity. There are significant concerns, however, about implementing the AUKUS agreement in the face of headwinds over export controls and technology sharing and foreign disclosure issues.[26] These concerns highlight how the research on "Build Allied" enablers and obstacles are intertwined. For AUKUS to succeed, export controls require significant regulatory reform and an implementation plan to operationalize across multiple governmental communities and defense industrial bases of at least three countries.[27]

AUKUS also represents an increased U.S. willingness to collaborate, which was cited in multiple interviews. Some see this willingness as a result of first COVID highlighting the vulnerabilities of the supply chain and then the Ukraine conflict spotlighting the weaknesses of a stockpiling approach.

NATO DEFENCE INNOVATION ACCELERATOR FOR THE NORTH ATLANTIC (DIANA)

The North Atlantic Treaty Organization (NATO) has conducted numerous acquisition programs in the past several decades as evidenced by the three NATO case studies in this paper. With thirty members today, gaining consensus in NATO is challenging, but the three cases illustrated the benefits and challenges of conducting procurement in the Alliance. Multilateral development programs like NATO Air Ground Surveillance are exceedingly hard to pull off given all the negotiations required to achieve consensus on each step of the program. Collaborative NATO procurement efforts like Tanker and the Sea Sparrow Consortium, on the other hand, have been more successful.

With these experiences, it will be interesting to see how NATO's DIANA develops. Established in 2021, attention on DIANA increased in the wake of the war in Ukraine and the need to "build greater resilience into how allies get tech to troops at speed."[28] DIANA is launching three pilot programs on energy resilience, secure information sharing, and sensing and surveillance in the summer of 2023 so the progress of those efforts will be telling for the future of DIANA.[29]

26. The Future of AUKUS with Admiral Harry Harris Jr., USN (Ret.), Center for Strategic and International Studies, March 30, 2023, https://www.csis.org/events/future-aukus-admiral-harry-harris-jr-usn-ret (accessed April 3, 2023). See also, Katrina Mason, "Australia Laments Bureaucratic 'Permafrost' that slowing AUKUS Security Alliance," *Bloomberg,* May 23, 2023, https://www.bloomberg.com/news/articles/2023-05-23/australia-laments-bureaucratic-permafrost-that-s-slowing-aukus-alliance#xj4y7vzkg (accessed June 14, 2023).

27. William Greenwalt and Tom Corben, "Breaking the barriers: Reforming US export controls to realise the potential of AUKUS," United States Studies Centre at the University of Sydney, May 2023, https://www.aei.org/wp-content/uploads/2023/05/Breaking-the-barriers-Reforming-US-export-controls-to-realise-the-potential-of-AUKUS.pdf?x91208 (accessed May 26, 2023).

28. Rob Murray, "NATO can learn from Ukraine's military innovation," *Chatham House,* February 3, 2023, https://www.chathamhouse.org/publications/the-world-today/2023-02/nato-can-learn-ukraines-military-innovation (accessed April 3, 2023).

29. Ms. Barbara McQuiston, Chair, DIANA Board of Directors, remarks at ComDef 2023, "Marshalling Technology towards Common Goals," February 10, 2023.

Obstacles

The United States and allies have operated together for decades in Afghanistan, Iraq, and elsewhere. They have established close relationships for sharing intelligence, operational data, and UK and Australian personnel can even operate on U.S. classified networks at combatant commands. Despite these intimate connections, industrial collaboration has always been much more difficult. This section looks at four principal obstacles—export controls, technology security and foreign disclosure, the defense acquisition system, and Buy America—to better understand the challenges that need to be addressed to create a "Build Allied" culture that drives government and industry behavior in the coming years.

EXPORT CONTROLS

Export controls are a perennial issue in defense trade and security cooperation. Governed by the International Trafficking in Arms Regulations (ITAR) for defense items and services and the Export Administration Regulation for commercial dual use items, export controls are designed to prevent the transfer of military technology to unfriendly nations or hostile organizations. Numerous efforts have been undertaken to reform the export controls system since the 1990s and some progress has been made.

The failure to make significant progress in export controls with our closest allies has been puzzling, however. There is a long-standing exemption to the ITAR for Canada that permits the transfer of some unclassified defense items and services without an export license.[30] This exemption is limited and companies sometimes avoid using the exemption for fear of costly ITAR violations.[31] Efforts to obtain Congressional approval for similar ITAR exemptions for the UK and Australia failed in the early 2000's and the governments then took a different approach, signing bilateral defense trade cooperation treaties

30. "The ITAR Canadian Exemption." U.S. Department of State, Directorate of Defense Trade Controls (DDTC), https://www.pmddtc.state.gov/ddtc-public?id=ddtc_kb_article_page&sys_id=31002473dbb8d300d0a370131f9619b0 (accessed April 4, 2023).

31. "Working successfully with ITAR in U.S. Canadian Defence Industry Technology Transfers," Guide prepared by Larry Christensen and Matthew Goldstein of Miller Chevalier LLP for Quebec Government Office, Los Angeles, CA, undated, https://www.millerchevalier.com/sites/default/files/news_updates/attached_files/christensen20and20goldstein20-20quebec20itar-20canadian20exemptions20guide.pdf (accessed April 4, 2023).

in 2007. These treaties, ratified by the Senate in 2010, created a "trusted community" of companies that could share technology and compete for opportunities within this trusted community.[32]

Unfortunately, these treaties have never come close to reaching their potential. They are used for government-to-government transactions to a limited degree, and they have almost never been used by industry. The lack of robust dialogue between government and industry as well as restrictive Senate Treaty implementation language were major factors in this failure and must be avoided in any future reform effort.

Officials involved with AUKUS and informed observers have noted the importance of export control reform to facilitate program success.[33] Industry groups in AUKUS countries have outlined strategies for operationalizing AUKUS, including the creation of an AUKUS industry forum, the establishment of a trusted body of government and industry officials to develop certification standards, and recommended U.S. statutory support for the UK and Australia.[34] At the same time, Congress is preparing for the consideration of export control reform legislation. The House passed a lopsidedly bipartisan bill directing State and DoD to report on the licensing requirements for AUKUS collaboration under Pillar II on hypersonic weapons, artificial intelligence, and quantum technologies.[35] The Biden Administration is also focused on modernizing U.S. arms exports as a central part of strengthening AUKUS, as Assistant Secretary of State for Political Military Affairs testified recently before the House Committee on Foreign Affairs.[36]

TECHNOLOGY SECURITY AND FOREIGN DISCLOSURE

A less well-known but equally important area that can impede international collaboration is the technology security and foreign disclosure (TSFD) policies and processes established by various U.S. Government and DoD organizations. TSFD policies cover sensitive technology areas such as anti-tamper, low observable and counter low observable, electronic warfare, and others. These are generally highly classified technologies that are individually reviewed by various DoD offices to determine their suitability for release to foreign partners. As outlined in Figure 1,[37] there are 13 separate TSFD processes or "pipes":

DoD program management offices (PMOs) must successfully navigate through relevant TSFD pipes to achieve their programs' international involvement objectives.[38] An analysis of DoD Major Weapons sys-

32. "United Kingdom and Australia Defense Trade Cooperation Treaties," DDTC, https://www.pmddtc.state.gov/ddtc_public?id=ddtc_kb_article_page&sys_id=2d21e8b3dbb8d300d0a370131f96190b (accessed April 4, 2023).

33. Colin Clark, "Eye on AUKUS, Aussie defense minister pushes US on ITAR—gently," *Breaking Defense,* March 3, 2023, https://breakingdefense.com/2023/03/eye-on-aukus-aussie-defense-minister-pushes-us-on-itar-gently/ (accessed April 4, 2023).

34. Aerospace Industries Association, "Operationalizing AUKUS: Recommendations for the U.S. System," March 8, 2023, https://www.aia-aerospace.org/wp-content/uploads/Operationalizing-AUKUS-AIA-Release.pdf (accessed April 4, 2023).

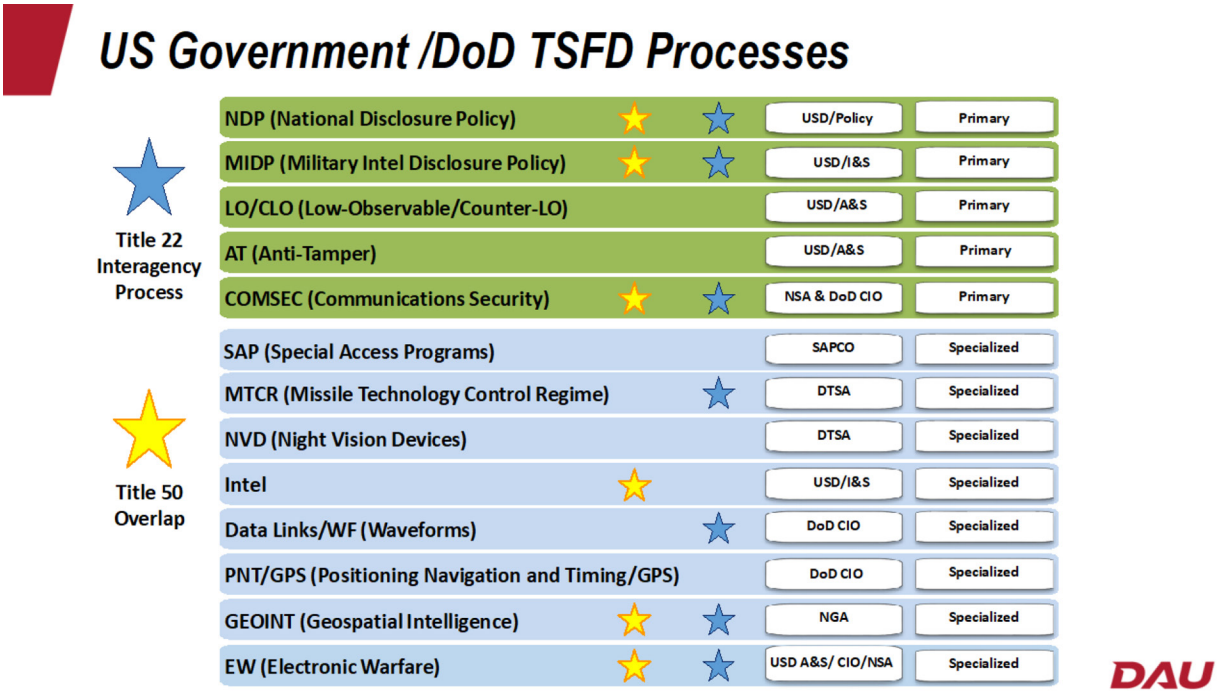
35. Bryant Harris, "Congress lays groundwork for AUKUS export control reform," *Defense News,* March 22, 2023, https://www.defensenews.com/congress/2023/03/22/congress-lays-groundwork-for-aukus-export-control-reform/ (accessed April 4, 2023).

36. "House Committee on Foreign Affairs Hearing: Modernizing U.S. Arms Exports and a Stronger AUKUS A/S Jessica Lewis," prepared remarks, May 24, 2023, https://www.state.gov/house-committee-on-foreign-affairs-hearing-modernizing-u-s-arms-exports-and-a-stronger-aukus-a-s-jessica-lewis/ (accessed May 26, 2023).

37. DAU Defense Exportability Integration Lesson, https://media.dau.edu/media/t/1_sbqr6dhk/62957371 (accessed June 13, 2023).

38. DoD IA&E Policies and Practices Framework Overview, https://www.dau.edu/cop/iam/DAU%20Sponsored%20Docu-

Figure 1. Technology Security and Foreign Disclosure Processes



tem in the FY 2023 DoD budget shows that 60 out of 78 of these programs have international involvement of some type (International Cooperative Programs (ICPs), Foreign Military Sales, Direct Commercial Sales, International Contracting).[39] This means that over 75% of DoD's Major Weapon system PMOs—and their prime contractors—are involved in TSFD pipe navigation and follow-on USG export control engagement with the Department of State and Department of Commerce.

All PMOs find navigating the USG/TSFD pipes challenging. PMOs responsible for systems that are based on sensitive U.S. technology with leading edge warfighting capabilities must navigate through 10 or more "pipes" to obtain approvals. These "pipes" must be successfully navigated prior to engaging with allied and friendly nations in proposed international acquisition transactions. For DoD systems with these characteristics, TSFD approvals are typically required prior to U.S. industry submission of export approval requests to the Department of State to avoid having them "Returned without Action" until the pertinent TSFD processes have been successfully navigated. This imposes a major burden on DoD PMOs and industry counterparts attempting to pursue ICP, FMS, DCS, and International Contracting efforts in furtherance of USG and DoD strategic guidance to develop and build exportable systems.

DoD established the Arms Transfer and Technology Release Senior Steering Group in 2013 to coordinate guidance and timely address technolo-

ments/IA_E%20FW%20Policies%20Practices%20Overview%2005-15-23.pdf?Web=1 (accessed June 14, 2023).

39. DoD Program Acquisition Cost by Weapons System, p xvi–xvi, https://comptroller.defense.gov/Portals/45/Documents/defbudget/FY2023/FY2023_Weapons.pdf (accessed June 14, 2023).

gies under review in these "pipes," but reviews on the effectiveness of this Group have been mixed.[40] AUKUS Pillar I and Pillar II efforts will require extensive TSFD reviews. It is therefore promising to hear that DoD has initiated a review of these TSFD processes in light of AUKUS; hopefully progress will be made in this key area.[41]

DEFENSE ACQUISITION SYSTEM

Elements of a "Build Allied" approach are part of the defense acquisition system in numerous ways. DoD Directive 5000.01, *The Defense Acquisition System*, directs acquisition professionals to "enable allies and partners to enhance U.S. military capability, collaboration opportunities, potential partnerships, and international acquisition and exportability features and limitations will be considered in the early design and development phase of acquisition programs."[42] Under DoD Adaptive Acquisition Framework (AAF), program managers (PMs) "are required to consider acquisition strategies that leverage international acquisition and supportability planning to improve economies of scale, strengthen the defense industrial base, and enhance coalition partner capabilities to prepare for joint operations."[43]

The recently revised *Guide to DoD International Acquisition and Exportability Practices* goes into greater depth on international acquisition issues. The Guide outlines practices such as international cooperative programs, the involvement of international in acquisition strategy, the integration of exportability features, and foreign military sales.[44] There have been many large and small cooperative efforts over the past decades, as will be highlighted in the below case studies.

Despite this broadly supportive framework, however, international acquisition efforts often struggle. Defense acquisition professionals and their industry partners work diligently from source selection and throughout the program life to get things right and build the most capable systems for the warfighter. Incorporating allies and partners into the development, execution, and sustainment of programs is not always a top-level priority, however. In the development of acquisition programs, for example, requirements documents are regularly marked SECRET NOFORN, which makes it difficult to share with non-U.S. firms.[45] The constant pressure to maintain cost and schedule during the conduct of a program also inhibits international collaborative efforts. This is changing to a degree, as noted in some of the case studies below, but one specific area that calls out for attention is the rating of Program Executive Officers (PEOs) and PMs. While many PEOs and PMs conduct a significant amount of ICPs, FMS, and DCS business in their portfolios, not all of them are evaluated on how well they conduct these cooperative efforts in their performance reviews.[46] This may have

40. DoD Directive 5111.21, *Arms Transfer and Technology Release Senior Steering Group and Technology Security and Foreign Disclosure Office*, incorporating Change 1, effective July 14, 2020, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodd/511121p.pdf (accessed April 4, 2023).

41. Harris, "Groundwork."

42. DoD Directive 5000.01, *The Defense Acquisition System*, change 1 effective July 28, 2022, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodd/500001p.pdf (accessed April 1, 2023).

43. DoD Instruction 5000.02, *Operation of the Adaptive Acquisition Framework,* change 1 effective June 8, 2022, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/500002p.pdf?ver=2019-05-01-151755-110 (accessed April 1, 2023).

44. *Guide to DoD International Acquisition and Exportability Practices*, March 29, 2022, https://www.acq.osd.mil/ic/docs/def/Guide-to-International-Acquisition-and-Exportability_mjv.pdf (accessed April 1, 2023).

45. McGinn, *Building Industrial Resilience*, 4.

46. Interview with Mr. Keith Webster, former Director of

a negative impact on the speed of a program's implementation as evidenced by the 18-month average for the establishment of a DoD contract to implement an FMS program.[47]

TENSION BETWEEN DOMESTIC MANUFACTURING AND BUY AMERICA

Multiple whole-of-government reviews of the defense industrial base during the Trump[48] and Biden[49] Administrations underscored significant shortcomings in U.S. manufacturing capabilities. These shortfalls had been recognized for some time, but these and other efforts increased the focus on strengthening domestic American manufacturing. Numerous investments in areas such as rare earths processing, batteries, castings, and, in particular, microelectronics have been targeted to help on-shore or re-shore these important capabilities.

At the same time, however, this focus on domestic manufacturing has led to calls in some quarters for increased Buy America legislation or regulations. Representative Donald Norcross, for example, has attempted to add an amendment to the National Defense Authorization Act the past several years to increase the Buy America requirement on major defense acquisition programs.[50] The addition of a dedicated Buy America office in the Executive Office of the President has similarly worked to strengthen these requirements through regulation.[51]

These efforts are counterproductive. Aerospace and defense manufacturing is already one of the strongest domestic sectors because of existing Buy America requirements and the need for these national security capabilities to be delivered from the United States. Focusing on Buy America also ignores the principal industrial base challenge—too many single and sole source suppliers, largely from China and other unreliable markets. Moreover, there are some areas where close allies and partners have competitive advantages, such as mining or magnets. Finally, it is challenging for American officials to argue for increased international sales of U.S. defense systems when pushing for increased Buy America thresholds.[52]

International Cooperation, OUSD (A&S), April 5, 2023.

47. Webster, *How to reform America's military sales process*, October 6, 2022, https://thehill.com/opinion/congress-blog/3675933-how-to-reform-americas-military-sales-process/ (accessed May 16, 2023).

48. *Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States*, Report to President Donald J. Trump by the Interagency Task Force in Fulfillment of Executive Order 13806, September 2018, https://media.defense.gov/2018/oct/05/2002048904/-1/-1/1/assessing-and-strengthening-the-manufacturing-and%20defense-industrial-base-and-supply-chain-resiliency.pdf (accessed March 31, 2023).

49. *Securing Defense-Critical Supply Chains—An action plan developed in response to President Biden's Executive Order 14017*, February 2022, https://media.defense.gov/2022/feb/24/2002944158/-1/-1/1/dod-eo-14017-report-securing-defense-critical-supply-chains.pdf (accessed March 31, 2023).

50. Jerry McGinn, "Reshoring does not mean Buy America only," *Defense News*, September 15, 2020, https://www.defensenews.com/opinion/commentary/2020/09/15/reshoring-does-not-mean-buy-america-only/ (accessed April 1, 2023).

51. Made in America, https://www.madeinamerica.gov (accessed April 1, 2023).

52. For a more detailed treatment of this issue, see McGinn, "Buy America Only," and Daniel Fata and Jerry McGinn, "Why a 'Build Allied' approach matters," *Defense News,* May 19, 2022, https://www.defensenews.com/opinion/commentary/2022/05/19/why-a-buy-allied-approach-matters/ (accessed on April 1, 2023).

Case Studies

WE EXAMINED SEVERAL past and current programs that have "Build Allied" components to understand what worked well and what did not. Specifically, we examined

Two very large programs

1. F-35 Lightning II
2. Mine-Resistant Ambush-Protected (MRAP) Vehicle

Four focused efforts

3. Next Generation Jammer (NGJ)
4. Advanced Medium-Range Air-to-Air Missile (AMRAAM) Alternate Engine
5. Three-Dimensional Expeditionary Long-Range Radar (3DELRR)
6. Tactical High-speed Offensive Ramjet for Extended Range (THOR-ER)

Three NATO programs

7. NATO Air Ground Surveillance (AGS)
8. NATO Sea Sparrow Consortium
9. NATO Multinational Multi Role Tanker and Transport Fleet

For each case study, we examined the purpose of the program, its development and deployment, and made findings relevant for future "Build Allied" efforts.

Case 1. F-35 Lightning II

PURPOSE

The F-35 Lightning II program is simply the biggest DoD acquisition program in history. The United States alone will spend $400 billion procuring nearly 2,500 aircraft and then spend another $1.27 trillion sustaining the fleet over 66 years.[53] In the early days of the program, DoD officials and the international community—both governments and industrial bases—recognized the significant benefits of partnering in every aspect of the program.

> "The F-35 program is DOD's largest international cooperative program. DOD has actively pursued allied participation as a way to defray some of the cost of developing and producing the aircraft, and to 'prime the pump' for export sales of the aircraft. Allies in turn view participation in the F-35 program as an affordable way to acquire a fifth-generation strike fighter, technical knowledge in areas such as stealth, and industrial opportunities for domestic firms."[54]

DEVELOPMENT AND PRODUCTION

The United Kingdom was the only international partner involved in the early days of concept development and demonstration. In 1995, by agreeing to contribute $200 million, the British earned a seat at DoD's table for requirements definition and aircraft design. Four years later, the British committed to spending another $2 billion for system development and demonstration, making them the largest non-U.S. contributor to the developmental effort, which would have a significant effect on industrial base rewards as the program progressed.[55] The bilateral

53. "F-35 Sustainment," Government Accountability Office, April 22, 2021, https://www.gao.gov/assets/gao-21-505t.pdf (accessed February 15, 2023).

54. "F-35 Joint Strike Fighter (JSF) Program," Congressional Research Service, May 2, 2022, https://crsreports.congress.gov/product/pdf/RL/RL30563/85 (accessed February 15, 2023).

55. Ibid., 31.

partnership for the development effort quickly grew. Denmark, Netherlands and Norway were the next countries to join the effort, followed by Canada and then Italy.[56] Collaborating and financially contributing to the development effort then led to production agreements.

Turkey and Australia joined the seven original countries in signing an MOU for JSF Production, Sustainment, and Follow-on Development (PSFD), committing each nation to shared nonrecurring costs and non-financial contributions, which also provided some assurances for their industrial bases, stating "…industries that are in the nations of Participants procuring JSF Air Systems under this MOU and that were awarded SDD subcontracts will normally also be awarded subcontracts for low rate initial production and full rate production work, as well as for related sustainment and follow-on development work."[57]

This benefitted industrial bases around the world. In the United Kingdom, BAE provides the aft fuselage, empennage, and electronic warfare suite; Rolls-Royce is a partner on the engine and is a subcontractor for the lift system; and other firms serve as suppliers.[58] Alenia Aeronautica is the largest aeronautical company in Italy and so it naturally had a significant part to play with the F-35, a role which started with aircraft wing construction. Italy and Japan would earn final assembly production line work, which also translated into sustainment efforts. As described next, Italy's production path came through the F-35 International Cooperative Program, whereas Japan's production path came through Foreign Military Sales.

Cooperative Production through the Cooperative Program

U.S. law provides authority to enter into cooperative projects with friendly foreign countries for concurrent production in the United States and in another member country of a defense article jointly developed.[59] The authority for international agreements relating to cooperative research, development, test, evaluation, production, follow-on support, information exchange, and related personnel exchange and standardization agreements is delegated to the Director, International Cooperation in USD(A&S).[60] This cooperative project path provided the legal framework for Italy to contribute to the development of the program and then produce aircraft. Italy's production and sustainment opportunity was realized when the Italian Parliament approved $775 million for the construction of the Final Assembly and Check Out (FACO) line in Cameri.[61] Italy's F-35

56. Frank Kenlon, "The International Acquisition & Exportability Aspects of JSF—Concept Demonstration Phase," June 26, 2021, https://www.dau.edu/training/career-development/intl-acq-mgmt/blog/The-International-Acquisition-and-Exportability-(IAandE)-Aspects-of-JSF-%E2%80%93-Concept-Demonstration-Phase- (accessed February 15, 2023).

57. Memorandum of Understanding among Australia, Canada, Denmark, Italy, The Netherlands, Norway, Turkey, UK, and US concerning the Production, Sustainment, and Follow-On Development of the Joint Strike Fighter, signature dates on November 14, 2006, December 11, 2006, December 12, 2006, January 25, 2007, January 31, 2007, February 7, 2007, and February 27, 2007, https://www.state.gov/wp-content/uploads/2019/02/06-1231-Multilateral-Defense-JSF.pdf (accessed February 15, 2023).

58. "F-35 Joint Strike Fighter (JSF) Program," 32.

59. 22 U.S. Code § 2767—Authority of President to enter into cooperative projects with friendly foreign countries, https://www.govinfo.gov/app/details/USCODE-2011-title22/USCODE-2011-title22-chap39-subchapII-sec2767/context (accessed February 15, 2023).

60. DoD Instruction 5530.03—International Agreements, December 4, 2019, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/553003p.PDF (accessed February 15, 2023).

61. Michele Nones, Giovanni Gasparini, and Alessandro Marrone, "Europe and the F-35 Joint Strike Fighter (JSF) Pro-

FACO is owned by the Italian Ministry of Defense and is operated by Alenia Aermacchi, in conjunction with Lockheed Martin. Its success has been highlighted not only by aircraft rolling off the assembly line but also its selection by DoD as the F-35 Heavy Airframe Maintenance Repair, Overhaul and Upgrade facility for the European region as well.[62] Investments in the Cameri facility led to new production opportunities, too. In 2019, the first Dutch F-35 rolled off the Cameri line.[63]

Co-Production through Foreign Military Sales (FMS)

Japan's production path came through FMS. U.S. law provides authority for coproduction or licensed production outside the US of defense articles of US origin when such production best serves the foreign policy, national security, and economy of the U.S.[64] Authority for co-production using FMS procedures is conducted under the oversight of the Defense Security Cooperation Agency.[65] The F-35 prime, Lockheed Martin, partnered with Japan's Mitsubishi Heavy Industries (MHI) to stand up the Komaki South FACO facility in Nagoya, Japan.[66] And similar to Italy's Cameri FACO, the Japanese FACO provided valuable high-tech work in the country and the DoD selected it as the North Asia-Pacific regional heavy airframe Maintenance Repair Overhaul & Upgrade facility.[67] Two additional Japanese companies contribute to the program, further expanding the industrial base. Mitsubishi Electric Company produces mission systems radar and electro-optical components while IHI Corporation produces F135 engine components and supports the FACO.[68]

FINDINGS

- **Negotiating commitments early sets the stage for production.** The bilateral development agreement between the U.S. and the UK led to multilateral development agreements that added Denmark, Netherlands, Canada, and Italy, that in turn led to multilateral production agreements that added Turkey and Australia. All these agreements paved the way for FMS to Israel, Japan, Korea, Belgium, Poland, Singapore, Finland, Switzerland, and Germany.[69] While the U.S. will buy the lion's share of F-35s, the international community will buy another 800 of the aircraft.[70]
- **Large international production programs are very hard but very sticky.** Negotiating agreements like the F-35's PSFD MoU is exceedingly difficult and keeping the program together can

gram," Quaderni IAI, July 2009, https://www.iai.it/sites/default/files/quaderni_e_16.pdf (accessed February 15, 2023).

62. "The first Italian F-35 rolls out of the hangar," March 16, 2015, https://www.leonardo.com/en/news-and-stories-detail/-/detail/the-first-italian-f-35-rolls-out-of-the-hangar (accessed February 15, 2023).

63. F-35 for the Netherlands. Available at https://www.f35.com/f35/global-enterprise/netherlands.html (accessed April 3, 2023).

64. 22 U.S. Code § 2791—Foreign relations and Intercourse, https://www.govinfo.gov/app/details/USCODE-2008-title22/USCODE-2008-title22-chap39-subchapIV-sec2791/summary (accessed February 15, 2023).

65. Security Assistance Management Manual, March 31, 2023, https://samm.dsca.mil/ (accessed April 3, 2023).

66. Japan Air Self-Defense Force's 5th Generation Fighter, https://www.f35.com/f35/global-enterprise/japan.html (accessed February 15, 2023).

67. First Japanese-Built F-35A Officially Unveiled At Nagoya Facility, June 5, 2017, https://news.lockheedmartin.com/2017-06-05-First-Japanese-Built-F-35A-Officially-Unveiled-at-Nagoya-Facility (accessed February 15, 2023).

68 Japan 5th Generation Fighter.

69. F-35 Lightning II Program Status and Fast Facts, March 1, 2023, https://www.f35.com/content/dam/lockheed-martin/aero/f35/documents/March%202023%20F-35%20Fast%20Facts.pdf (accessed April 3, 2023).

70. "F-35 Sustainment."

likewise be very challenging. In 2015, for example, Canadian Prime Minister candidate Justin Trudeau campaigned on ending the country's participation in the program.[71] After Trudeau's election, withdrawal seemed like a real possibility; however, Canada ultimately remained in the program.[72] The Turkish scenario was quite different. Following its plan to acquire the S-400 Russian-made air defense system, Turkey was removed from the F-35 program.[73] Fortunately, plans were in place to address the possibility as the F-35 Production, Sustainment, and Follow-On Development MOU, which spans 45 years, specifically addresses amendment, withdrawal, and termination.[74] In addition, the sheer size of the program and the respective national commitments through the PSFD MOU enabled it to survive and even thrive despite regular turbulence.

- **Cooperative production is beneficial for increased global resilience and capacity.** The international FACOs developed for the F-35 program created additional capacity and resilience. Having them created inherent surge capacity for the program as well as more of an "in-theater" base for repair and sustainment work. This is especially critical given the cost of sustainment work, which for the U.S. will cost more than three times the amount to acquire the system. This is typical for fixed wing aircraft, in which the U.S. averages spending 64% of life cycle costs for operations and support.[75]
- **International industrial collaboration can significantly increase the world-wide industrial base.** The F-35 program has suppliers in nearly every U.S. state, with an economic impact in the U.S. of $72 billion.[76] The value of F-35 work in the U.S. alone would place the program in the Gross Domestic Product top 70 list.[77] The world-wide effort includes over 1,700 companies at various tiers of work worldwide. These companies, moreover, are doing more than providing widgets. The collaboration specifically targets sustainment, upgrades, and collaborative initiatives among fleets and supporting industries.[78]

71. Marina Malenic, "Canada liberal party would end F-35 participation," *IHS Jane's Defence Weekly*, Volume 52, Issue 45, September 23, 2015.

72. Any Blatchford, "Canada circles back to Lockheed for F-35s," Politico, March 28, 2022, https://www.politico.com/news/2022/03/28/canada-lockheed-air-force-upgrade-00020974 (accessed April 2, 2023).

73. "Turkey officially kicked out of F-35 program, costing US half a billion dollars," *Defense News,* July 17, 2019, https://www.defensenews.com/air/2019/07/17/turkey-officially-kicked-out-of-f-35-program/ (accessed February 27, 2023).

74. Memorandum of Understanding among Australia, Canada, Denmark, Italy, The Netherlands, Norway, Turkey, UK, and US concerning the Production, Sustainment, and Follow-On Development of the Joint Strike Fighter, with signature dates of November 14, 2006, December 11, 2006, December 12, 2006, January 25, 2007, January 31, 2007, February 7, 2007, and February 27, 2007, https://www.state.gov/wp-content/uploads/2019/02/06-1231-Multilateral-Defense-JSF.pdf (access February 27, 2023).

75. Operating and Support Cost-Estimating Guide, Office of the Secretary of Defense Cost Assessment and Program Evaluation, September 2020, https://www.cape.osd.mil/files/OS_Guide_Sept_2020.pdf (accessed April 3, 3023).

76. Evaluating the Economic Impact of the F-35, https://aerodynamicadvisory.com/wp-content/uploads/2022/09/Aerodynamic-Advisory-White-Paper_v8.pdf (accessed April 3, 2023).

77. GDP by Country, https://www.worldometers.info/gdp/gdp-by-country/ (accessed April 3, 2023).

78. Memorandum of Understanding among Australia, Canada, Denmark, Italy, The Netherlands, Norway, Turkey, UK, and US concerning the Production, Sustainment, and Follow-On Development of the Joint Strike Fighter.

Case 2. Mine-Resistant, Ambush-Protected (MRAP) Vehicle

PURPOSE

MRAPs were developed in the mid- to late-2000s to address the dramatic increase in casualties in Iraq and Afghanistan resulting from improvised explosive devices (IEDs).[79] Then Secretary of Defense Bill Gates personally led the effort to rapidly increase the production and deployment of MRAPs, based principally off existing foreign designs, during this period.[80] The late Ashton Carter highlighted the success of the MRAP program, explaining that forces in MRAP vehicles were 14 times more likely to survive roadside explosions in Afghanistan and Iraq than forces riding in Humvees.[81] The Army and Marine Corps had a limited number of MRAP vehicles for specialized missions, but in 2006 "US combatant commanders identified the urgent operational need for an increased number of MRAP vehicles in theater to provide better protection against underbody mines, improvised explosive devices, rocket-propelled grenades and small arms fire."[82]

DEVELOPMENT AND PRODUCTION

MRAP's Engineering Origins

The MRAP solution dates back decades. During the Rhodesian Civil War of the 1970s, mining of roads brought casualties and in South Africa, gue-

79. Clay Wilson, "Improvised Explosive Devices (IEDs) in Iraq and Afghanistan: Effects and Countermeasures," Congressional Research Service, November 21, 2007, https://apps.dtic.mil/sti/pdfs/ADA475029.pdf (accessed March 31, 2023).

80. James Hasik, *Securing The MRAP—Lessons Learned in Marketing and Military Procurement* (Texas A&M University Press: 2021), 136.

81. Tom Vanden Brook, "Officials say MRAPs made the difference in wars," *USA TODAY*, September 30, 2012, https://www.usatoday.com/story/news/world/2012/09/30/mraps-saved-lives/1600693/ (accessed March 30, 2023).

82. Mathuel Browne, "MRAP Program Celebrates 10 Years of Protecting Those Who Protect US," U.S. Marine Corps Systems Command, September 1, 2016, https://www.marcorsyscom.marines.mil/News/News-Article-Display/Article/932752/mrap-program-celebrates-10-years-of-protecting-those-who-protect-us/ (accessed March 16, 2023).

rilla groups began to mine roads as well. The engineering solution was for a high ground clearance, V-shaped hull, and wide wheelbase which would direct the blast's energy away from occupants of the vehicle; the design quickly demonstrated success. Rhodesian forces suffered only one fatality from the first 99 blasts against this new design and the South Africans adapted quickly, producing 19,000 vehicles with V-shaped hull. The story of IED lethality also unfortunately spread, so much so that in the 1980s in Sri Lanka, Indian troops—who did not have the newly designed vehicles—preferred to walk.[83]

While the high ground clearance, V-shaped hull, and wide wheelbase design had been in place for decades, no one company owned an exclusive design. After the South African conflicts, the industry for this new design was concentrated in the Olifant Manufacturing Company, which was then acquired by Reunert, which was later acquired by Vickers, who sold a 20 year license to General Dynamics Land Systems (GDLS), and on a parallel path, Vickers merged with Alvis, which BAE Systems then acquired.[84]

SECDEF Leadership, Simplified Requirements, and Rapid Industry Engagement

It cannot be overstated how critical that Secretary Gates's direction and engagement throughout the MRAP was to its success. He drove a radically different acquisition approach focused on an extremely limited set of requirements centered on improving soldier survivability.

Building upon the proven technology, the MRAP program office was able to deliver at tremendous speed to concurrently produce, test, and field the vehicles.[85] On November 9, 2006, the MRAP program office's Request for Proposal solicited bids in 3 categories. Urban areas were the focus for Category I, the smallest version, which would be capable of carrying four troops. Category II's mission sets were convoys, medical evacuations, and explosive ordnance disposal (EOD) and would carry up to 13 troops. Category III, the largest size with the most hazardous mission, targeted IED clearing operations and EOD.[86]

Manufacturers responded with bids and the MRAP program office awarded multiple initial contracts. Designs which passed tests for maintainability, mobility, and survivability were rewarded with more contracts.[87] The government was able to accelerate deployment of the vehicles as it elevated the program's priority, which paved the way for industry to invest of their own capital to purchase critical components before delivery options were exercised, as well as retained integration responsibilities for mission equipment packages.[88] This approach was not business as usual. As James Hasik notes in his recent book on the MRAP, "Not since the beginnings of the nuclear submarine production in the late 1950s and early 1960s had the US military run so many parallel designs for the same purpose."[89]

Multiple Designs from a Variety of Manufacturers

The Buffalo Mine-Protected Clearance Vehicle was manufactured by Force Protection, which was later acquired by General Dynamics. This design was inspired by the Casspir, a South African landmine-protected armored personnel carrier (APC).[90] The Caiman vehicle came from Armor Holdings,

83. Hasik, 45–7.

84. Ibid., 47.

85. "Rapid Acquisition of MRAP Vehicles," Government Accountability Office, October 8, 2009, https://www.gao.gov/assets/gao-10-155t.pdf (accessed March 31, 2023).

86. Hasik, 131–132.

87. Ibid., 135.

88. "Rapid Acquisition of MRAP Vehicles."

89. Hasik, 8.

90. Buffalo Mine-Protected Clearance Vehicle, April 26, 2021, https://www.army-technology.com/projects/buffalo/ (accessed March 16, 2023).

which was later acquired by BAE Systems.[91] Cougars, which included Command and Control, EOD, Patrol, Convoy Support, Forward Observation, Reconnaissance, and Medical Evacuation configurations, came from Force Protection, which was later acquired by General Dynamics.[92] The MaxxPro MRAP came from Navistar.[93] The RG-31, which served as an Armored Personnel Carrier, Command Vehicle, Ambulance, Armored Utility Vehicle, Surveillance Vehicle, EOD and Combat Engineer, was manufactured by GDLS through the Vickers license,[94] and BAE Systems manufactured the RG-33, which was not covered by the Vickers license to GDLS.[95]

In less than 3 years from the government's proposal request, 16,204 vehicles were produced and 13,848 were fielded.[96] These MRAPs saved thousands of lives and had a tremendous impact on the survivability of military servicemen and women during their use.[97]

FINDINGS

- **Importance of senior leader sponsorship.** The Secretary drove the Department's MRAP effort and he regularly and personally intervened to ensure that the program stayed on track to deliver life-saving capabilities with speed to deployed warfighters.
- **Use of existing foreign designs.** A foreign design developed decades ago, with minor modifications, served coalition forces extremely well in Afghanistan and Iraq during post 9/11 operations. The US acquisition system embraced that design approach and then successfully turned to industry for multiple solutions—which led to great success.
- **Rapid development and fielding.** The MRAP decision to use only proven technologies, emphasized in the government's invitation for industry to offer non-developmental solutions, proved to be key in taking the foreign design of a high ground clearance, V-shaped hull, and wide wheelbase to U.S. production in a very short time frame, even earning a "very good overall" assessment for schedule and performance results by the Government Accountability Office (GAO).[98] MRAP's schedule success runs contrary to a typical DoD program in which schedule delays are the norm. The GAO has found that more than half of major programs report schedule delays and not one of the programs reviewed had reported accelerating any deliveries.[99] For the MRAP, the government's decision to start with a non-U.S.

91. Hasik, 138.

92. Cougar 6x6, https://www.gdls.com/cougar-6x6/ (accessed March 16, 2023); and Hasik, 135.

93. MaxxPro MRAP, https://www.navistardefense.com/navistardefense/vehicles/maxxpromrap/maxxpro_mrap (accessed March 16, 2023).

94. RG-31, https://international.gdls.com/english/products/MRAP/RG-31_MK5.pdf (accessed March 16, 2023).

95. Hasik, 132.

96. "Rapid Acquisition of MRAP Vehicles."

97. Vanden Brook, "MRAPs."

98. "Rapid Acquisition of MRAP Vehicles."

99. "Weapons System Annual Assessment," Government Accountability Office, June 2022, https://www.gao.gov/assets/gao-22-105230.pdf (accessed March 31, 2023).

design not only did not slow things down, but it also actually accelerated fielding, which was most critical in times of war.

- **Multi-sourcing.** With the MRAP, the government recognized that no single firm had the capacity to meet the demand in a timely manner and so the source selection strategy discounted the traditional one-winner approach. The government awarded contracts to nine commercial sources, thereby expanding production capacity to the maximum extent.[100] This multi-sourcing approach allowed firms to focus on their best value solutions for the three requirement categories. Bids were requested for Category I (small vehicles primarily intended for operations in urban combat environments), Category II (medium sized vehicles for convoys, transporting troops, and ambulatory purposes), and Category III (large vehicles for IED clearing operations and Explosive Ordnance Disposal).[101] This provided firms the flexibility to match their proven solution to a specific need, without having to develop a comprehensive solution for all MRAP needs in a winner-take-all environment.

100. "Rapid Acquisition of MRAP Vehicles."

101. Hasik, 132.

Case 3. Next Generation Jammer (NGJ)

PURPOSE

The Next Generation Jammer is an evolutionary acquisition program providing Airborne Electronic Attack capability in three increments for each of the low, middle, and high frequency bands. NGJ Mid Band and NGJ Low Band Programs are joint cooperative programs between the U.S. Navy and the Australian Department of Defence.[102]

DEVELOPMENT AND PRODUCTION

NGJ Mid-Band program focuses on providing Airborne Electronic Attack capability the middle frequency bands of the electromagnetic spectrum. Recognizing the benefits of working together to address a common requirement, the U.S. and Australia signed a cooperative development agreement in October 2017 and based on the program's success signed a PSFD MOU in May, 2020.[103] The program has continued to make progress, earning a Milestone C decision in 2021, which enabled the award of initial production contracts.[104] Production pods are scheduled to be delivered in September 2023.[105]

The NGJ Low Band program addresses advanced and emerging threats in the lower frequency bands. It is also a joint cooperative program between the U.S. and Australia and currently in the Engineering and Manufacturing Development acquisition phase.[106]

102. Next Generation Jammer, https://www.navair.navy.mil/product/Next-Generation-Jammer (accessed February 20, 2023).

103. Next Generation Jammer Mid-Band Selected Acquisition Report (SAR), December 2021, https://www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/Selected_Acquisition_Reports/FY_2021_SARS/22-F-0762_NGJ_MB_SAR_2021.pdf (accessed February 20, 2023).

104. Ibid.

105. DOT&E FY2021 Annual Report—Next Generation Jammer Mid-Band, https://www.dote.osd.mil/Portals/97/pub/reports/FY2021/navy/2021ngj.pdf?ver=ahlNpCgYYKKs_UtJ2JO1lA%3d%3d#:~:text=No%20operational%20testing%20has%20been%20conducted%20on%20the,IOT%26E%20and%20likely%20extend%20the%20planned%20IOT%26E%-20schedule (accessed February 20, 2023).

106. Next Generation Jammer.

The cooperation benefits are significant. For the NGJ, the Navy has specifically identified them as sharing of best technologies in the world, strengthening technology capabilities, increasing military effectiveness at home and abroad, reducing duplication of effort across nations, and overall reducing costs.[107]

These NGJ programs support Australia's overall Advanced Growler Airborne Electronic Attack Capability (AEAC) Project, which introduces enhancements to airborne electronic attack by investing up to $6 billion between 2016 and 2035.[108] This large investment has benefitted both the U.S. and Australian industrial bases. Raytheon Australia works with the U.S.-based prime contractor Raytheon on advanced technologies which enable interoperability for the allies, and for the NGJ there is a special focus on the companies providing real-world training scenarios and services.[109] Test ranges are also an important element of delivering a capability and the cooperative programs have realized benefits in this aspect, too. Supporting the NGJ program, the AEAC Project awarded Australia's CEA Technologies a contract to provide advanced capabilities for electronic warfare ranges, which is supporting training exercises that also include U.S. forces.[110]

FINDINGS

- **Focused bilateral partnership efforts set up future success.** The Next Generator Jammer program emphasizes the cooperative benefits of sharing the best technologies, increasing military effectiveness, reducing duplication of effort, and reducing costs. It also highlights the connections between partner industrial bases due to the global nature of multinational corporations, transnational enterprises, and joint ventures. Additionally, NGJ highlights ancillary benefits in terms of training scenarios and test ranges.
- **Success breeds success.** The NGJ program was built on the success of previous U.S.-Australian cooperation programs. The NGJ PSFD MOU was modeled on those used earlier for the P-8A Maritime Patrol and the MQ-4C Triton programs and they are similarly using this PSFD model as a potential approach for a Precision Strike Program partnership.

107. U.S. and Australia expand Next Gen Jammer cooperative partnership, July 14, 2020, https://www.navair.navy.mil/news/US-and-Australia-expand-Next-Gen-Jammer-cooperative-partnership/Tue-07142020-0812 (accessed February 20, 2023).

108. Advanced Growler Airborne Electronic Attack Capability, December 2020, https://www.defence.gov.au/project/advanced-growler-airborne-electronic-attack-capability (accessed February 20, 2023).

109. Thousands of Missions Build Success—Raytheon Australia trains the nation's defenders for electronic warfare, March 01, 2017, https://www.raytheonaustralia.com.au/news/2017/03/01/ewtsmission (accessed February 20, 2023).

110. CEA Technologies to upgrade Growler training ranges, February 6, 2023, https://www.australiandefence.com.au/news/cea-technologies-to-upgrade-growler-training-ranges (accessed February 20, 2023).

Case 4. Advanced Medium-Range Air-to-Air Missile (AMRAAM) Alternate Engine

PURPOSE

The AIM-120 AMRAAM is an all-weather, beyond-visual-range missile used on U.S. Air Force F-15, F-16, F-22 and F-35A aircraft and U.S. Navy and Marine Corps' F/A-18, F-35B/C, EA-18G and AV-8B aircraft.[111] In 2011, AMRAAM's rocket motor experienced technical problems, which led to the program office and prime contractor Raytheon to seek and ultimately certify an alternative rocket motor supplier.[112] This alternate engine came from Nammo, a Norwegian provider of rocket motors for both military and civilian customers.[113] AMRAAM, which has been procured by 40 countries, can be fired from nine different U.S. and allied aircraft and one ground based system.[114]

DEVELOPMENT AND PRODUCTION

AMRAAM rocket motor problems began in 2011, when acceptance testing experienced unpredictable performance at low temps due to propellant hot spots and burn-through failures.[115] Problems escalated, the prime contractor (Raytheon) and the rocket motor supplier (ATK) took legal action against each other, and no AMRAAMs were delivered for two years.[116]

111. AMRAAM, https://www.navair.navy.mil/product/AMRAAM (accessed February 8, 2023).

112. Director of Operational Test and Evaluation report on AMRAAM, https://www.dote.osd.mil/Portals/97/pub/reports/FY2013/af/2013amraam.pdf?ver=2019-08-22-111345-300 (accessed February 8, 2023).

113. Nammo.

114. Modern, versatile and proven, https://www.raytheonmissilesanddefense.com/what-we-do/air-warfare/air-to-air-missiles/amraam-missile (accessed February 8, 2023).

115. Director of Operational Test and Evaluation report on AMRAAM.

116. Jen Judson, "Tactical Rocket Motor Business Takes Fight to Congress," *Defense News*, May 13, 2016, https://www.defensenews.com/air/2016/05/13/tactical-rocket-motor-business-takes-fight-to-congress/ (accessed February 8, 2023).

Nammo saw an opportunity and after an investment of $12 million of internal and Norwegian government funds developed and delivered an alternative engine to Raytheon in Tuscon, Arizona.[117] Raytheon and Nammo then quickly worked through the process to qualify the engine.[118] Their work was soon rewarded with a successful Live-Fire Test.[119] Within the first year after the test, Nammo had produced and delivered 1,000 motors to get the program back on schedule.[120] This alternate engine has been a significant contributor to AMRAAM's upgrades, testing and production; capabilities fully demonstrated in 4,900 shots and 13 air-to-air combat victories; and its selection as the baseline weapon for the National Advanced Surface-to-Air Missile System, NASAMS.[121]

NASAMS itself represents another international success. This air defense system consists of Raytheon's Sentinel A3 radar and a suite of effectors, including AMRAAM, AMRAAM-ER, and AIM-9X plus the Norwegian Kongsberg Defence & Aerospace's fire distribution center and launcher, providing safety for the U.S. National Capital Region as well as 12 other countries (Norway, Finland, Spain, The Netherlands, Oman, Lithuania, Indonesia, Australia, Qatar, Hungary, Ukraine and one undisclosed).[122] Of special note is the recent military aid package to the Ukraine which included two NASAMS from the U.S.[123]

FINDINGS

- **Developing a second source can unlock new capabilities and capacity.** The AMRAAM case provides an excellent example of tapping into the best technological capabilities, regardless of borders. Nammo, with substantial host government support, developed an alternative engine and thereby gained access the U.S. market. The Norwegian company's alternate rocket motor not only brought the U.S. program back from a two-year schedule slip, but it advanced the platform beyond the program to integrate with another system-of-systems. Most importantly, the alternate engine helped establish additional capacity that has been critical as the demand for AMRAAM has skyrocketed. The program office's willingness to consider international solutions is an enabler for the Build Allied approach.

117. Judson, "Rocket Motor Fight."

118. Raytheon Partners with NAMMO for Second Source of AMRAAM Motors—Additional source assures AMRAAM supply for U.S. and allies," June 20, 2011, https://www.prnewswire.com/news-releases/raytheon-partners-with-nammo-for-second-source-of-amraam-motors-124181804.html (accessed February 8, 2023).

119. Pat Host, "Air Force Successfully Tests AMRAAM With Nammo Rocket Motor," *Defense Daily*, January 13, 2013, https://www.defensedaily.com/air-force-successfully-tests-amraamwith-nammorocket-motor/air-force/ (accessed February 8, 2023).

120. Director of Operational Test and Evaluation report on AMRAAM.

121. Modern, versatile and proven.

122. NASAMS: National Advanced Surface-to-Air Missile System, https://www.raytheonmissilesanddefense.com/what-we-do/missile-defense/air-and-missile-defense-systems/nasams (accessed February 8, 2023).

123. Tony Bertuca, "New U.S. Weapons Package for Ukraine Includes Norwegian surface-to-air missile systems," *Inside Defense*, July 1, 2022, https://insidedefense.com/insider/new-us-weapons-package-ukraine-includes-norwegian-surface-air-missile-systems (accessed February 8, 2023).

Case 5. Three-Dimensional Expeditionary Long Range Radar (3DELRR)

PURPOSE

The Three-Dimensional Expeditionary Long Range Radar program will provide the U.S. Air Force their principal "long-range, ground-based sensor for detecting, identifying, tracking and reporting aerial tracks for the Joint Force Air Component Commander through the Theater Air Control System."[124] 3DELRR participates in the DEF program described earlier to increase exportability with the intent of increasing production quantities and lowering life cycle costs.[125] This approach has already resulted in one sale to a foreign customer and there is additional interest by other potential customers.

DEVELOPMENT AND PRODUCTION

When the Air Force began the process of replacing the outdated AN/TPS-75 radar system, its request for proposals included the need for bidders to address exportability as the service would evaluate this aspect as a source selection factor.[126] Raytheon, Lockheed Martin, and Northrop Grumman submitted proposals and they all included exportability features in their designs.[127] Unfortunately, progress on the program was halted for several years while legal action took place in the courts.[128] However, the

124. Air Force Budget Exhibit R-2 of Program Element 0207455F for President's Budget for Fiscal Year 2020, February 2019, https://www.dacis.com/budget/budget_pdf/FY20/RDTE/F/0207455F_52.pdf (accessed March 1, 2023).

125. Air Force Budget Exhibit R-2 of Program Element 0207455F for President's Budget for Fiscal Year 2020.

126. Government Accountability Office Decision, File B-410719.10; B-410719.11, November 15, 2016, https://www.gao.gov/assets/b-410719.10%2Cb-410719.11.pdf (accessed March 1, 2023).

127. Courtney Albon, "Air Force: International Market Drove Desire for 3DELRR Exportability," Inside the Pentagon; Arlington, Volume 30, Issue 41 (October 9, 2014).

128. Report on Weapons System Annual Assessment, Government Accountability Office, April 2018, https://www.gao.gov/assets/gao-18-360sp.pdf (accessed March 1, 2023).

ground work for embracing the exportability concept in the program had been laid. The Air Force's subsequent request for bids called for implementing anti-tamper design and applying differential capabilities aligned with the DoD Anti-Tamper guidelines as well as identifying the bidder's costs with and without foreign purchases.[129] Lockheed Martin won the ensuing competition with its TPY-4 long-range radar.[130] Eight months later, the Norwegian Armed Forces selected the same TPY-4 because, first, Norwegian industry has been a crucial partner in the radar's development as Lockheed Martin leveraged an extensive Norwegian supplier-base, and second, it lowered the foreign partner's risk by integrating into the prime's production line for the Air Force.[131]

A subsystem of the TPY-4 provides an excellent example of the importance of the relationship between U.S. primes and the international supplier base. The Platform Electronics SubSystem, built by KONGSBERG Defense & Aerospace, is critical for TPY-4's long-range surveillance.[132] Lockheed Martin is in talks with multiple additional international customers to purchase TPY-4 and anticipates generating $1.3B in future sales over the next 10 years.[133]

FINDINGS

- **DEF was a key enabler for the 3DELRR program.** 3DELRR officials acknowledged increased competition for the program which resulted from participating in the DEF program.[134] DEF encourages government program managers to design and develop technology protection features in systems early in their acquisition life cycle to facilitate international industrial collaboration.[135]
- **Focused bilateral partnership efforts set up future success.** The early involvement of the Norwegian government and industry in the development of 3DELRR through DEF helped secure the prompt engagement of an international partner and created a framework for future nations as well. This will advance interoperability over time.

129. Request for Proposal FA8730-13-R-0001, Attachment 13, July 26, 2016, https://www.defensedaily.com/wp-content/uploads/post_attachment/139139.pdf (accessed March 1, 2023).

130. 3DELRR to Move Forward with Lockheed Martin's Long-Range Radar System, March 9, 2022, https://www.hanscom.af.mil/News/Article-Display/Article/2955550/3delrr-to-move-forward-with-lockheed-martins-long-range-radar-system/ (accessed March 1, 2023).

131. Royal Norwegian Air Force Selects the Lockheed Martin TPY-4 Radar to Enhance Homeland Defense, November 17, 2022, https://news.lockheedmartin.com/2022-11-17-Royal-Norwegian-Air-Force-Selects-the-Lockheed-Martin-TPY-4-Radar-to-Enhance-Homeland-Defense (accessed March 1, 2023).

132. Ibid.

133. Justin Katz, "Fresh off Air Force 3DELRR win, Lockheed eyes Norway, other international buyers," *Breaking Defense*, April 28, 2022, https://breakingdefense.com/2022/04/fresh-off-air-force-3delrr-win-lockheed-eyes-norway-other-international-buyers/ (accessed March 1, 2023); First AN/TPY-4 Air defense Radar Completed Production, May 11, 2022, https://www.key.aero/article/first-antpy-4-air-defence-radar-completes-production (accessed March 1, 2023); Lockheed Martin to Hire 300 in Salina, Swelling Workforce to Biggest in 10 Years, February 17, 2023, https://www.aviationpros.com/aircraft/defense/news/21296138/lockheed-martin-to-hire-300-in-salina-swelling-workforce-to-biggest-in-10-years (accessed March 1, 2023).

134. GAO Report on Defense Acquisitions: Assessments of Selected Weapon Programs, March 2017, https://www.gao.gov/assets/files.gao.gov/assets/gao-17-333sp.pdf (accessed March 1, 2023).

135. Defense Exportability Features, https://www.acq.osd.mil/ic/def.html (accessed March 1, 2023)

Case 6. Tactical High-speed Offensive Ramjet for Extended Range (THOR-ER)

PURPOSE

Tactical High-speed Offensive Ramjet for Extended Range (THOR-ER) is an effort to develop advanced solid fuel ramjet technologies applicable to long range high-speed and hypersonic weapons. This partnership program between the U.S. and Norway provides cooperative opportunities in co-development and co-production for the governments and industrial bases of both nations.[136]

DEVELOPMENT AND PRODUCTION

THOR-ER gained initial support through the DoD's Allied Prototyping Initiative, launched in 2020 to identify and develop high impact prototyping projects in which U.S. and partner nations share technologies and resources for their industries to co-develop leap-ahead capabilities.[137] The ramjet technical program relied upon collaborative research efforts involving multiple U.S. and Norwegian organizations including the Office of the Undersecretary of Defense for Research and Engineering (R&E), the R&E's Joint Hypersonics Transition Office, Naval Air Warfare Center Weapons Division, the Norwegian Defence Research Establishment, and the Norwegian company Nammo.[138]

136. "DOD Announces New Allied Prototyping Initiative Effort with Norway to Continue Partnership in Advancing Solid Fuel Ramjet Technologies," Defense Department, April 20, 2020, https://www.defense.gov/News/Releases/Release/Article/2156251/dod-announces-new-allied-prototyping-initiative-effort-with-norway-to-continue/ (accessed March 30, 2023).

137. Allied Prototyping Initiative (API) briefing, Office of The Under Secretary of Defense (Research & Engineering), June 16, 2020. https://ac.cto.mil/wp-content/uploads/2020/08/api_overview_06_16_2020_cleared.pdf (accessed March 30, 2023).

138. "Tactical High-speed Offensive Ramjet for Extended Range (THOR-ER) Team Completes Ramjet Vehicle Test," Defense Department, October 5, 2022, https://www.defense.gov/News/Releases/Release/Article/3180755/tactical-high-speed-

THOR-ER's test program reached a notable milestone in 2022 with a successful in-flight demonstration of ramjet propulsion technology with "new high energy fuels, advanced air injection, and throttling methodologies."[139] The technical success in accelerating to above Mach 2 was noted by Under Secretary of Defense for Research and Engineering Heidi Shyu and Norwegian Armaments Director Morten Tiller, who praised the collaboration and demonstration of the power of bilateral cooperation.[140] THOR-ER's development is also distinguished by each partner providing equitable contributions and both will consider the potential for co-production.[141]

The senior leadership engagement and funding sponsorship through the Allied Prototyping Initiative was a critical enabler for THOR-ER. This OSD (R&E) program laid the foundation for decision-making with sharing philosophies in terms of funding, technologies, subject matter expertise, and industrial base strengths while pursuing the endgame of maximizing modernization through better ideas together; increasing interoperability by starting with a common specification, and reducing vulnerabilities by collectively addressing challenges and enabling flexibility in the supply chain.[142] As an Undersecretary effort, the initiative was not constrained to just one technical area and so can address any of OSD (R&E)'s critical technology areas.[143] An additional effort, the Southern Cross Integrated Flight Research Experiment (SCIFiRE), also advanced technology, but in partnership with Australia.[144]

FINDINGS

- **Importance of senior leader sponsorship.** Initiatives endorsed by the Directorate for Advanced Capabilities within the Office of the Under Secretary of Defense for Research and Engineering provided the top-level support critical to coordinating and earning signatures on the government-to-government International Agreements necessary for international collaboration. The same is true on the industry side. Industry executives saw the value in how one effort can create prospects for another, as evidenced in Nammo partnering with Boeing to jointly develop and produce the next generation of extended-range artillery projectiles, based on Nammo's ramjet technology.[145]
- **Focused bilateral partnership efforts set up future success.** In 1905, the U.S. established

offensive-ramjet-for-extended-range-thor-er-team-completes/ (accessed March 30, 2023).

139. "Tactical High-speed Offensive Ramjet for Extended Range (THOR-ER) Team Completes Ramjet Vehicle Test."

140. Ibid.

141. "DoD and Norway Working On Ramjets For Hypersonic Missiles," *Defense Daily*, April 20, 2020, https://www.defensedaily.com/dod-norway-working-ramjets-hypersonic-missiles/advanced-transformational-technology/ (accessed March 30, 2023).

142. API Briefing.

143. "Critical Technology Areas," Under Secretary of Defense for Research and Engineering, https://www.cto.mil/usdre-strat-vision-critical-tech-areas/ (accessed March 30, 2023). The specific areas are Biotechnology, Quantum Science, Future Generation Wireless Technology, Advanced Materials, Trusted AI and Autonomy, Integrated Network Systems-of-Systems, Microelectronics, Space Technology, Renewable Energy Generation and Storage, Advanced Computing and Software, Human-Machine Interfaces, Directed Energy, Hypersonics, Integrated Sensing and Cyber.

144. "Department of Defense Announces New Allied Prototyping Initiative Effort With Australia to Continue Partnership in Developing Air Breathing Hypersonic Vehicles," Defense Department, November 30, 2020, https://www.defense.gov/news/releases/release/article/2429061/department-of-defense-announces-new-allied-prototyping-initiative-effort-with-a/ (accessed March 31, 2023).

145. "DoD, Norway Partner on Ramjets for Navy Hypersonic Missiles," *Breaking Defense*, April 20, 2020, https://breakingdefense.com/2020/04/dod-norway-partner-on-ramjets-for-navy-hypersonic-missiles/ (accessed April 9, 2023).

diplomatic relations with Norway and the two nations have enjoyed a long tradition of friendly relations for many years.[146] For the THOR-ER program, the U.S.-Norway partnership has proven very successful.

- **Understanding the importance of the production potential.** U.S. and allied defense companies understand that winning development contracts is important, but they also recognize that successful transition to ultimately leads to production and long-term revenues. Pentagon acquisition chief Bill LaPlante has also emphasized the importance of co-production and licensed production.[147] LaPlante has further stressed this criticality: "All that matters is getting into production."[148]

146. "U.S. Relations with Norway," State Department, February 28, 2023. Available at https://www.state.gov/u-s-relations-with-norway/#:~:text=The%20United%20States%20and%20Norway,operations%20with%20Allies%20and%20Partners (accessed March 31, 2023).

147. Jerry McGinn, "America needs to grow its capacity to produce weapons. Here's four steps to do it," *Breaking Defense*, March 17, 2023, https://breakingdefense.com/2023/03/america-needs-to-grow-its-capacity-to-produces-weapons-heres-four-steps-to-do-it/ (accessed March 17, 2023).

148. "Strategy & Policy: Production Matters," *Air & Space Forces Magazine*, December 2, 2022, https://www.airandspaceforces.com/article/strategy-policy-production-matters/ (accessed March 31, 2023).

Case 7. NATO Alliance Ground Surveillance (AGS)

PURPOSE

NATO Defense Ministers identified the need for an Alliance-owned and -operated integrated ground surveillance capability for unrestricted and unfiltered access to ground surveillance data in near real-time. Consisting of air, ground, and core mission support segments, the Alliance Ground Surveillance provides that integrated ISR capability.[149] 15 participating nations—Bulgaria, Czech Republic, Denmark, Estonia, Germany, Italy, Latvia, Lithuania, Luxembourg, Norway, Poland, Romania, Slovak Republic, Slovenia, and the U.S.—all contribute to AGS.[150]

DEVELOPMENT AND PRODUCTION

During the Cold War, the NATO Integrated Air Defence System (NATINADS) provided a one directional look for the well-defined threat of manned aircraft. As challenges changed to a less predictable environment, this system evolved into the NATO Integrated Air and Missile Defence System (NATINAMDS) to address the full range of air and missile threats.[151]

In 1995, NATO Defence Ministers agreed to a new acquisition effort; however, over the next several years, multiple approaches based on existing assets or a development program based on an American or European radar failed to obtain sufficient support. In 2007, consensus was gained for an air segment based on Global Hawk Block 40 Unmanned Air Vehicle and a ground segment to largely be developed and built by European and Canadian industry. In 2009, the NATO AGS Memorandum of

149. Alliance Ground Surveillance (AGS), July 20, 2022, https://www.nato.int/cps/en/natohq/topics_48892.htm (accessed February 27, 2023).

150. NATO Alliance Ground Surveillance Management Agency, https://www.nagsma.nato.int/about/nagsma/pages/default.aspx (accessed February 27, 2023).

151. NATO Integrated Air and Missile Defence, November 28, 2022, https://www.nato.int/cps/en/natohq/topics_8206.htm#:~:text=NATO%20IAMD%20incorporates%20all%20necessary,emanating%20from%20all%20strategic%20directions (accessed February 27, 2023).

Understanding was signed, establishing the NATO Alliance Ground Surveillance Management Agency (NAGSMA) to manage the procurement and sustainment of AGS.[152] NAGSMA has played a pivotal role in the AGS program's fielding and sustaining its operational efficiency while maintaining good working relations with all key stakeholders.[153]

Organizing and funding the effort were obviously keys to success. Each of the 15 participating members had a seat at the table, financially contributed to the program, and supported through their industrial bases. Overall coordination was conducted through the NATO Alliance Ground Surveillance Management Organisation, which included a Board of Directors.[154] All members financially contributed to establishing the AGS Main Operating Base, communications, and life-cycle support of the AGS fleet; however, some replaced part of their financial contribution through contributions-in-kind.[155]

All NATO members, not just the 15 participating AGS members, now contribute to the on-going capability, and the overall program management and life cycle support responsibility is now in the hands of the NATO Support and Procurement Agency as NATO common funds for infrastructure, communications, operation and support follows the Alliance's normal funding authorization procedures.[156]

The industrial bases of all acquiring countries were also engaged. The team included Northrop Grumman, Germany's Airbus Defence and Space, Italy's Leonardo, Norway's Kongsberg, and other defense companies from each of the members.[157] Northrop Grumman was the prime contractor, also manufacturing the Global Hawk air vehicle, supporting systems, and payloads, including an advanced ground surveillance radar sensor radar.[158] Airbus built the Mobile General Ground Stations.[159] Leonardo provided the Sigonella Mission Operations Support system, Transportable General Ground Stations, application software for those functionalities, and Wide Band Data Link; the Italian company was also responsible for industry contributions for Bulgaria and Romania.[160] Kongsberg provided the System Master Archival/Retrieval Facility (SMARF) for storing, managing and disseminating Joint ISR data.[161] A host of other international industry team members included Cassidian, Selex Galileo, ICZ, A.S., ComTrade d.o.o, BIANOR, Technologica, Zavod Za Telefonna Aparatura Ad, SELEX ELSAG, Elettra Communications, UTI Systems, and SES.[162]

FINDINGS

- **Multilateral cooperative development programs are really challenging to pull off.** AGS

152. AGS.

153. NAGSMA.

154. NATO Alliance Ground Surveillance Management Organisation, https://www.nagsma.nato.int/About/NAGSMO/Pages/default.aspx (accessed February 27, 2023).

155 NATO AGS Factsheet, September, 2014, https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2014_09/20140901_140901-Factsheet-AGS_en.pdf (accessed February 27, 2023).

156. AGS.

157. Ibid.

158. NATO at Chicago Summit Signs Contract with Northrop Grumman, May 20, 2012, https://news.northropgrumman.com/news/releases/photo-release-nato-at-chicago-summit-signs-contract-with-northrop-grumman-to-lead-transatlantic-team-delivering-new-isr-capability-to-alliance-forces (accessed February 27, 2023).

159. Airbus Defence and Space presents its Mobile General Ground Station at the 2016 Warsaw NATO Summit, July 11, 2016, https://www.airbus.com/en/newsroom/news/2016-07-airbus-defence-and-space-presents-its-mobile-general-ground-station-at-the (accessed February 27, 2023).

160. Leonardo NATO AGS Program, https://unmanned.leonardo.com/en/products/nato-ags (accessed February 27, 2023).

161. NATO AGS SMARF, https://www.kongsberg.com/kda/what-we-do/defence-and-security/c4isr/nato-alliance-ground-surveillance-ags/ (accessed February 27, 2023).

162. NATO at Chicago Summit.

took an inordinate amount of time to come to fruition. It took almost 15 years from a NATO Ministerial decision in 1995 until the PMOU was signed by 15 nations in 2009. It then took another 12 years, until early 2021, before NATO AGS declared initial operating capability.[163] That 27 years (!) demonstrates the challenges with negotiating workshare, changing national priorities, maintaining consensus, and numerous other factors in a multilateral effort. The F-35 case demonstrated some of these same challenges, but it is an order of magnitude harder to reach mutual agreement among nations in an MOU to establish and implement a group development effort like AGS compared to a U.S.-led program like F-35.

- **Gaining consensus on a governance model is critical.** The 2009 MOU, along with the AGS Charter, sets the legal, organizational, and budgetary framework needed for ultimate success.[164] This laid the framework to address problems as they surfaced and created a life cycle management philosophy. In AGS's case, the consensus led to the NATO Support and Procurement Agency being designated as the life cycle manager, with responsibilities to include sustainment, system upgrades, and ensuring system safe for flight compliance.[165] This life cycle approach is a best practice in the Defense Acquisition System and helped to make a large complex multinational program like AGS sticky.[166]

163. AGS.

164. NATO's Allied Ground Surveillance programme signature finalized, September 25, 2009, https://www.nato.int/cps/en/natolive/news_57711.htm?mode=pressrelease (accessed February 27, 2023).

165. NSPA's AGS website, https://www.nspa.nato.int/about/life-cycle-management/ags.

166. DoD Directive 5000.01, The Defense Acquisition System, change 1 effective July 28, 2022, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodd/500001p.pdf (accessed April 1, 2023).

Case 8. NATO Sea Sparrow Consortium

PURPOSE

The NATO Sea Sparrow Surface Missile System Project started more than 50 years ago as a four-country international technology development effort for anti-ship missile defense capabilities. It has grown to become "the largest and longest running cooperative smart defense initiative in NATO history" with 12 participating nations—Australia, Belgium, Canada, Denmark, Germany, Greece, Netherlands, Norway, Portugal, Spain, Turkey, and U.S.—benefitting from the progression over the years of the RIM-7 Sea Sparrow to today's RIM-162 Evolved Sea Sparrow Missile.[167]

DEVELOPMENT AND PRODUCTION

In the early 1960s, the U.S. Navy began work with the Applied Physics Laboratory at Johns Hopkins University on a Basic Point-Defense Missile System to defend against Soviet advances in anti-ship missiles.[168] This work spurred multiple proposals in NATO, which led to Denmark, Italy, Norway, and U.S. signing an International Development MOU in June 1968, which established the NATO Sea Sparrow Surface Missile System project.[169] Raytheon was the prime contractor for a three-year development effort which led to successful operational testing by the Americans and Norwegians, clearing the way to production.[170] This set the stage for decades of use and upgrades, culminating with today's Evolved Sea Sparrow Missile (ESSM).

ESSM planning and consensus building for the

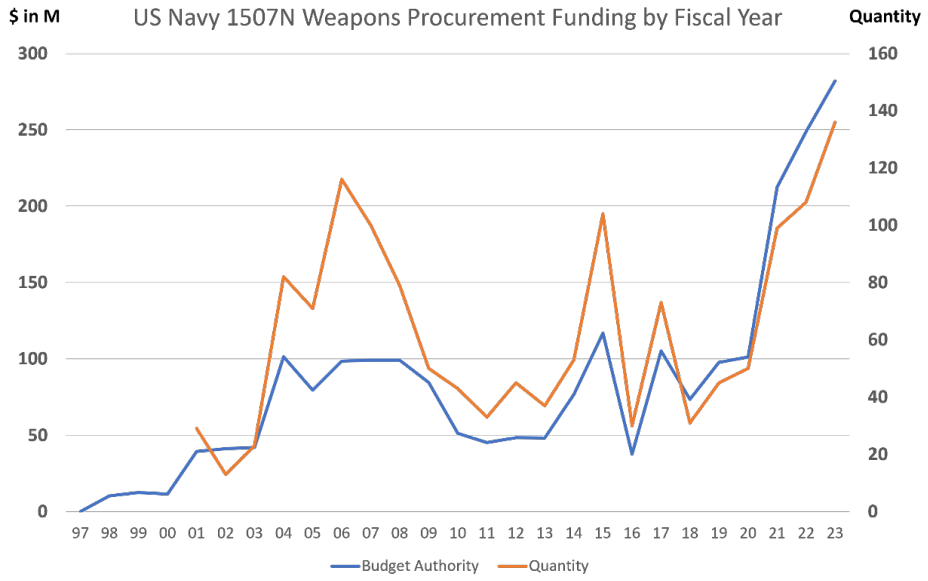
167. NATO Sea Sparrow Surface Missile System Project, https://www.natoseasparrow.org/ (accessed March 6, 2023).

168. Thomas Wildenberg, "The Seasparrow Surface-to-Air Missile System," Naval History Magazine, December 2018, https://www.usni.org/magazines/naval-history-magazine/2018/december/seasparrow-surface-air-missile-system (accessed March 6, 2023).

169. NATO SeaSparrow Surface Missile System Project.

170. Charles Roe, "The NATO SeaSparrow Surface Missile System," *Johns Hopkins APL Technical Digest*, November 4, 1991, https://secwww.jhuapl.edu/techdigest/Content/techdigest/pdf/V12-N04/12-04-Roe_NATO.pdf (accessed March 6, 2023).

Figure 2: U.S. Navy Procurement Funding: $2.2B in FY97-23 for 1,450 missiles



development effort has led to benefits across industrial bases into production efforts, too. The 1999 agreement for cooperative engineering and manufacturing development included workshares and cost shares by country. For example, Australia earned thrust vector control work while Canada's was in the control section.[171] That development partnership became the baseline for the production effort, which is governed by the Production MoU that also outlines another workshare arrangement by participating nations.[172] The ESSM Consortium crosses multiple industrial bases, including Australia's BAE Systems, Canada's Honeywell, Denmarks' Terma, Germany's RAMSYS, Diehl BGT Defence, and MBDA-LFK, Greece's ELFON, INTRACOM, and HAI, Netherlands' Thales, Norway's Nammo Raufoss, Spain's Indra, Turkey's Roketsan, and the U.S.'s Raytheon, Alliant Techsystems, BAE Systems Land and Armament, and Lockheed Martin.[173]

The production effort is significant. Figure 2 shows that the U.S. Navy has been buying the missile for decades.[174]

Additionally, Raytheon expects to produce and deliver another 1,500 rounds based on customer requirements, which will make the missile a staple for many years yet to come.[175] The ESSM is a model answer for Under Secretary for Acquisition and

171. DoD IG Report—Acquisition of the Evolved SEASPARROW Missile, July 5, 2002, https://media.defense.gov/2002/Jul/05/2001715839/-1/-1/1/02-126.pdf (accessed March 6, 2023).

172. Evolved Sea Sparrow Missile (ESSM), July 3, 2020, https://www.naval-technology.com/projects/evolved-sea-sparrow-missile-essm/ (accessed March 6, 2023).

173. Dabrowka Smolny, NATO SeaSparrow Program: Cooperation Based on Trust, https://www.pfp-consortium.org/articles/nato-seasparrow-program-cooperation-based-trust (accessed March 6, 2023).

174. Based on P-1 documents in each Fiscal Year for 1507N Weapons Procurement for ESSM, https://comptroller.defense.gov/Budget-Materials/ (accessed March 6, 2023).

175. ESSM Missile, https://www.raytheonmissilesanddefense.com/what-we-do/naval-warfare/ship-self-defense-weapons/essm-missile (accessed March 6, 2023).

Sustainment Dr. Bill LaPlante's call for an increase in co-production, licensed production, and cooperative programs.[176]

FINDINGS

- **Starting small can pay off big in the long run.** The initial partnership of the 1960s focused on the threat of Soviet anti-ship missiles. The general missile threat lasted for decades, and will continue into the foreseeable future, which has led to long-term success and NATO's largest and longest running cooperative smart defense initiative. While technology changed over time, Sea Sparrow demonstrated that the collective approach over time works. Sea Sparrow's development agreements also led to production agreements, which have now spanned decades.
- **Workshare agreements can be enablers.** While the U.S. generally seeks a best value procurement without guarantees of specific workshares, sometimes the workshare approach is needed to encourage international participation, which will, in the end, provide the greatest overall benefits.

176. McGinn, "Four Steps."

Case 9. NATO Multinational Multi Role Tanker and Transport Fleet

PURPOSE

NATO's Multinational Multi Role Tanker Transport (MRTT) fleet provides Belgium, the Czech Republic, Germany, Luxembourg, The Netherlands, and Norway strategic transport, air-to-air refueling, and medical evacuation capabilities. In this partnership, the six participating nations benefit from economies of scale by pooling the MRTT aircraft and sharing costs.[177]

PROCUREMENT

In 2012, the European Defence Agency initiated the project and four years later the acquisition phase began with the signing of a procurement contract with Airbus for two A330 aircraft plus the first two years of support. The number of participating nations as well as the fleet size has grown over the years. The Netherlands and Luxembourg were the original partners in 2016, Germany and Norway joined a year later, followed by Belgium and the Czech Republic, each in subsequent years. The fleet size currently stands at seven aircraft, with two more expected in 2024 and a tenth in 2026.[178]

Two important agreements laid the foundation for the program's success. The program Memorandum of Understanding documents the participating nations' promise to pool the aircraft and share costs. The MRTT Fleet Support Partnership agreement documents NATO Support and Procurement Agency's commitment to acquire and own on behalf of NATO the aircraft and related support equipment, provide in-service support, manage follow-on sup-

177. Multinational Multi Role Tanker Transport (MRTT) Fleet (MMF), https://www.nspa.nato.int/about/life-cycle-management/MMF (accessed April 5, 2023).

178. Multi-Role Tanker Transport Fleet (MMF) expands significantly, September 25, 2017, https://eda.europa.eu/news-and-events/news/2017/09/25/multi-role-tanker-transport-fleet-(mmf)-expands-significantly# (accessed April 5, 2023).

port, administer finances, and manage host nation support arrangements.[179]

FINDINGS

- **Cooperative procurement is a lot easier than cooperative development.** The MRTT Fleet case provides an excellent example of cooperating to benefit from economies of scale by pooling aircraft and sharing costs to *purchase* existing aircraft rather than *developing* bespoke cooperative programs like NATO AGS. Initial capabilities were delivered in four years as opposed to AGS's 27 and NATO support of the fleet provided stability. While the fleet of seven obviously has limitations, it provides significant capabilities for participating NATO members.

179. Multinational Multi Role Tanker Transport (MRTT) Fleet Support Partnership, https://www.nspa.nato.int/about/life-cycle-management/MMF/multinational-multi-role-tanker-transport-fleet-support-partnership (accessed April 5, 2023).

Conclusions and Recommendations

THE CASE STUDIES and preceding analysis illustrate clearly that many of the building blocks are in place for a robust "Build Allied" approach. There have been and are in development a number of co-development, co-production, second sourcing, licensed production, and sustainment efforts involving our allies and partners. The case study findings show that these successful efforts have largely been driven by strong leadership, focused cooperative efforts, and effective enablers.

The environment today for international industrial collaboration is incredibly strong, with robust Administration leadership, bipartisan Congressional support, and increased allied defense investment to address defense industrial capacity shortfalls. The key to a vigorous "Build Allied" approach is to apply the success principles from the cases; accelerate enablers such as AUKUS, NTIB, and DEF; and overcome obstacles such as export controls and aspects of the defense acquisition system. Moreover, the speed and scale of such efforts should model the MRAP case given today's threat scenarios and the current industrial base capacity.

RECOMMENDATIONS

Make International Industrial Collaboration a Central Component of the Defense Acquisition System

While the case studies show that success is achievable, these cases and recent experiences in Ukraine demonstrate our defense acquisition system is not optimized for speed or scale when it comes to collaborative programs. To address this,

- The Deputy Secretary of Defense should issue a memo to Service Secretaries and DoD components outlining the importance of partnering with allies and partners in acquisition to achieve NDS objectives and specifically highlighting principal enablers such as AUKUS, NTIB, RDP MOUs, and DEF;
- The Under Secretary of Defense for Acquisition and Sustainment should prioritize and promote international collaboration with an update to DoD Directive 5000.01 to better emphasize opportunities such as co-development, co-production, second-sourcing, licensed production, and sustainment;

- The Defense Security Cooperation Agency, working with the military departments, should establish a rapid contracting process to reduce the 18-month backlog in getting approved FMS cases on contract;
- The Military Departments should examine the requirements development processes to facilitate the early involvement of allied and partner companies in DoD programs. This would include avoiding citations of classified, U.S.-only documents in either informal or formal requests for information or solicitations where possible; and
- The Military Departments should add international collaboration evaluation factors to annual performance appraisals for PEOs and PMs to foster greater prioritization of international acquisition activities.

Overcome Technology Transfer and Other Obstacles to Make NTIB, AUKUS, and Other Cooperative Initiatives True Vehicles for International Industrial Collaboration

The only way to make real progress toward a "Build Allied" approach is to move beyond policy pronouncements and make substantive changes in export controls, foreign disclosure and technology security, contracting policies and practices, and other efforts. Acting on today's incredibly supportive environment,

- Congress should grant Australia and the United Kingdom ITAR waivers under the FY24 NDAA for AUKUS classified and unclassified programs;
- Congress should direct the Department of State in the FY24 State Department Authorization to review and update the Canada ITAR waiver to make it more applicable for today's national security threat environment as well as expand that revised waiver to include Australia and the United Kingdom;
- OUSD (Policy) and OUSD (A&S) should reinvigorate the Arms Transfer Technology Release Senior Steering Group to measure and report on the effectiveness of TSFD efforts in support of AUKUS initiatives;
- Congress should increase eligibility from Canada to all NTIB countries for Defense Production Act (DPA) Title III industrial base capability projects. The recent Administration legislative proposal proposing Australia and the UK as domestic sources under the DPA is a great step in this effort;[180]
- The Office of Defense Pricing and Contracting should establish DFARS clauses focused on facilitating NTIB participation in solicitations for acquisition programs:
  - Once finalized, DoD should use DAU and other venues to educate the acquisition workforce on the use of NTIB clauses for use in programs across DoD;
  - Additionally, NTIB country trade associations should advertise NTIB clauses to NTIB-based companies to facilitate additional collaborative initiatives; and
- The military departments should build on specific and focused AUKUS Pillar II activities in hypersonics and unmanned systems to accelerate collaboration and demonstrate capabilities as soon as feasible in FY24 to maintain investment momentum and stakeholder engagement.

180. Bryant Harris, "Bident seeks legislation to invest in Australia, UK defense industries," *Federal Times,* May 25, 2023, https://www.federaltimes.com/federal-oversight/2023/05/25/biden-seeks-legislation-to-invest-in-australia-uk-defense-industries/ (accessed May 29, 2023).

Make the Tangible Benefits of International Industrial Collaboration More Widely Known Across the Government Contracting Community

While the amounts of arms transferred to Ukraine and international defense sales more broadly are regularly announced, the impact of these transactions has a significant impact across the U.S. industrial base that is not recognized or understood. To address this,

- Congress should request a study in the FY24 NDAA of the impact of RDP MOU countries' contributions to the U.S. defense industrial base through participation in DoD programs and the purchase of U.S. defense systems through foreign military or direct commercial sales to increase Congressional awareness of the benefits of RDP MOUs and quantify the counterproductive nature of additional Buy America legislation; and
- Using DAU and other venues, DoD should educate acquisition professionals across the Department about the Buy America exemption for RDP MOU countries to help spur additional international collaboration opportunities.

Increase the Efficacy and Scale of DEF and SOSAs

While DEF has shown modest promise and SOSAs have grown in popularity, they both have significant potential to spur international industrial collaboration if they grow in scale and effectiveness. To accomplish this,

- Building off 2022 Ukraine supplemental reprogramming, OUSD (A&S) should increase DEF base funding to $50 million in FY25 budget submission to focus on capabilities being developed for the pacing China challenge;
- The Assistant Secretary of Defense for Acquisition should work with DAU and the military departments to increase the awareness and effectiveness of DEF in acquisition program "building in defense exportability" development and initial production phase efforts; and
- The Office of the Assistant Secretary of Defense (Industrial Base Policy) should work with SoSA signatories to modify the respective arrangements to address specific capability areas (e.g. materials, microelectronics, magnets, unmanned systems) where bilateral industrial cooperation can strengthen industrial resilience.

The report outlines a series of practical and actionable recommendations to help enhance the enablers of and remove the obstacles to achieve a true "Build Allied" approach. This goes well beyond reforming foreign military sales or expanding the scope of international acquisition programs. To realize NDS objectives, we must accelerate international industrial collaboration to build the industrial base capacity and resilience we need to face the national security challenges of tomorrow. This requires system level efforts—encouraged and supported by senior acquisition organizations and prime contractors—that promote and foster a broad mosaic of programs across the entire spectrum of U.S. and allied defense acquisition needs. While many of the building blocks are in place, acting on these recommendations is essential to gain the speed and scale necessary for a successful "Build Allied" approach, which will ultimately be a win-win proposition for the United States as well as its allies and partners.

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