Assessing the Industrial Base Implications of the Army’s Future Vertical Lift Plans

AUTHORS
RHYS MCCORMICK
ANDREW HUNTER

A Report of the CSIS DEFENSE-INDUSTRIAL INITIATIVES GROUP
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Abstract

As the Future Vertical Lift programs down selects to a smaller pool of competitors, understanding the industrial base implications of the Army’s FVL plans is crucial. This report presents a detailed analysis of the industrial base implications of the Army’s approach to vertical lift modernization. It examines the Army’s addressable market for vertical lift, looks at opportunities and challenges in restructuring and optimizing the industrial base, what Middle Tier Acquisition and Modular Open Systems Architecture approaches might mean for key industry dynamics, and how incentive structures can be aligned for success.
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Introduction

**Future Vertical Lift (FVL),** the Army’s effort to develop a new family of vertical lift aircraft, is one of the service’s top modernization priorities as it orients itself towards near-peer competition\(^1\) and Multi-Domain Operations.\(^2\) Although the current fleet is relatively modern from an average age perspective, the Army vertical lift inventory sits at an inflection point as the current platforms begin reaching their technological limitations. Given FVL’s importance, the Army has elected to move forward with a pioneering acquisition strategy to develop, procure, and field Future Attack Reconnaissance Aircraft (FARA) and Future Long-Range Assault Aircraft (FLRAA) on accelerated timelines. Previous CSIS research has found that modernization programs for both FARA and FLRAA can be accommodated at historical levels of modernization funding, but that the Army will need to engage in robust efforts to manage cost risk across every stage of the program’s lifecycle.\(^3\) Over the long term, managing Operating and Support (O&S) costs will be a critical component of ensuring that FVL remains affordable.

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As the FARA and FLRAA programs down select to a smaller pool of competitors, understanding the industrial base implications of the Army’s FVL plans is crucial. While the rotorcraft industrial base may need restructuring and optimization amongst its four current suppliers, it is in the nation’s best interests the Army maintain a robust defense rotorcraft industrial base. At the macro level, maintaining a robust defense rotorcraft industrial base helps drive improved FVL performance through competition and increased innovation. Competition across and within the industrial base is the best driver of best behavior and results from industry. Furthermore, many innovations arise from the bottom-up within industry. At a more micro level, it is important to maintain a robust supply chain at the lower levels of the industrial base to avoid single points of failure as much as possible. While there is plenty of manufacturing capacity worldwide, it is important to carve out some of that capacity for the defense market so that an external shock doesn’t cripple a supply chain due to a single point of failure.

This paper presents a detailed analysis of the industrial base implications of the Army’s approach to vertical lift modernization. It begins by examining the Army’s addressable market for the vertical lift aircraft industry. Second, it looks at the opportunities and challenges presented by restructuring and optimizing the rotorcraft industrial base. Next, it looks at what the Army’s use of new approaches for FVL—such as modular open systems architecture (MOSA) and Middle Tier of Acquisition (MTA)—might mean for key industry dynamics. It concludes by looking at how FVL incentive structures can be aligned for success and highlights the importance of taking a collaborative approach with Congress.
Addressable Markets

The current U.S. Army operational vertical lift fleet is comprised primarily of UH-60 Black Hawk utility helicopters, AH-64 Apache attack helicopters, CH-47 Chinook heavy-lift helicopters, and UH-72 Lakota light utility helicopters. Except for the UH-72 Lakota, each of these aircraft is still in production today. The UH-60 Black Hawk program is currently producing new M-models, as well converting older A-models into the newest L- and V-models. The Army is also building a mix of both new AH-64 Block IIIA models and remanufactured AH-64 Block III models.

When FARA and FLRAA enter full-rate production later this decade, FLRAA will eventually replace the UH-60 Black Hawk, while FARA will fulfill the scouting missions currently performed by the AH-64, which were undertaken until recently by the now-retired OH-58 Kiowa. As shown in Figures 1 and 2 below, the transition to these two next-generation rotorcrafts will cause shifts in the rotorcraft industrial base. Although Figure 1 shows that there will be a drop-off in the procurement of legacy aircraft in the mid-2020s as full-rate production of FARA and FLRAA starts to spin-up, Figure 2 shows that there is still a roughly $10 billion yearly addressable Army rotorcraft market over the next decade.

O&S costs will remain the largest source of Army vertical lift spending over the next decade.
The data show that operating and support (O&S) costs will remain the largest source of Army vertical lift spending over the next decade. While O&S includes military personnel costs that won’t translate into revenue for industry (likely to be between 20–40 percent of the O&S total), it also includes the spending for spare parts and complex maintenance that are core revenue opportunities for industry, especially in the supply chain. Between FY 2020 and FY 2025, spending on research and development (R&D) and upgrades will outpace acquisition costs, but this will start to wind down afterwards as FARA and FLRAA get closer to full-rate production. After FY 2025, annual acquisition spending is projected to grow steadily before leveling off around FY 2029–FY 2030 when FARA and FLRAA both reach full-rate production, which this projection forecasts at 30 aircraft a year. For industry, this projects to a total addressable market of approximately $8–10 billion annually, with a varying mix of design, production, and sustainment work for the foreseeable future.
As the FARA and FLRAA programs down select a smaller pool of competitors, understanding the industrial base implications of the Army’s FVL plans is crucial. While the rotorcraft industrial base may need restructuring and optimization amongst its current suppliers, it is in the nation’s best interests the Army maintain a robust defense rotorcraft industrial base. At the macro level, maintaining a robust defense rotorcraft industrial base helps drive improved FVL performance through competition and increased innovation. Competition across and within the industrial base is the best driver of best behavior and results from industry. Furthermore, many innovations arise from the bottom-up within industry. At a more micro level, it is important to maintain a robust supply chain at the lower levels of the industrial base to avoid single points of failure as much as possible. While there is currently plenty of manufacturing capacity worldwide, it is important to carve out some of that capacity for the defense market so that an external shock doesn’t cripple a supply chain due to a single point of failure. While the addressable market analysis indicates that the Army’s plans for FVL should provide a solid foundation for the industrial base, it assumes that both FARA and FLRAA happen on the Army’s current timeline. If one or both programs were to falter, or be delayed by multiple years, the potential for significant dislocations in the industrial base, particularly in the supply chain, would be substantially higher.

4. The Army has rotorcraft production sites located at Stratford, Connecticut; Amarillo, Texas; Ridley Park, Pennsylvania; Mesa, Arizona; and Columbus, Mississippi.
Optimizing and Restructuring the FVL Industrial Base

One of the primary challenges facing the rotorcraft industrial base in recent years has been budgeting and planning across two Future Years Defense Programs (FYDP) to maintain the current fleet before the new platforms come online. Given their operational limitations in high-threat environments, the current fleets are approaching their technological limits and are increasingly approaching the ends of their production lines. As these production lines wind down, the rotorcraft industry is increasingly seeing larger single points of failure at the lower tiers of the industrial base. While foreign military sales will possibly keep these lines open for another few years, the fate of those lower tier “mom and pop” parts suppliers is a significant concern. These problems were further exacerbated by the defense budget reductions stemming from the 2011 Budget Control Act, with approximately 185,000 jobs being lost in the defense aerospace subsector between 2010 and 2016. Taken together, these facts suggest that the rotorcraft industrial base of today may not be sustainable in the long-term and that it needs to be optimized and restructured to deliver FVL. This restructuring could take many forms, but a successful transition should be defined by a robust industrial base with few single points of failure, along

with new technologies rapidly deployed to operational systems at affordable price points and with long-term O&S cost constraints in place.

Nearly every expert CSIS spoke to agreed that they are more concerned about what happens to those lower-tier suppliers during the FVL transition than they are with the large tier 1 original equipment manufacturers (OEM). While the OEMs have their own concerns, they also have a much greater risk appetite and are able to make the business case that investments in one- or two-off developmental orders are worth the risk. Comparatively, it is generally harder for lower-tier suppliers to justify their investments in FVL development. Their reasons vary on a case-by-case basis. Potential reasons include, but are not limited to: a general lower risk appetite for the uncertainty in the generational transition, insufficient demand to justify floor space, and already being at near-maximum (if not maximum) capacity on the commercial side of the business.

For the OEMs, these dynamics are forcing them to rethink their manufacturing processes. Over the last 20 to 30 years, OEMs had increasingly become assemblers, outsourcing the manufacturing of individual components to other suppliers and combining the different components into the final product. However, the dynamics at play in the lower tiers of the industrial base have forced companies to re-evaluate their make/buy decisions on certain components. Several companies CSIS spoke with revealed that they were increasingly manufacturing certain critical components in-house, such as rotors, drive trains, yokes, and (in some cases) wings. They were planning to continue outsourcing components where they were not industry leaders but were looking for other areas where they could bring other components back in-house.

**Leveraging Emerging Technologies**

Restructuring and optimizing the rotorcraft industrial base for FVL presents several challenges, but it also provides a significant opportunity to leverage emerging technologies. In advanced manufacturing, this includes additive manufacturing, robotics, artificial intelligence, digital twins, and data analytics. Across the board, these technologies offer the promise of reduced production and sustainment costs as well as increased operational flexibility. For example, in a 2013 survey of companies employing smart manufacturing technologies, 82 percent reported increases in efficiency and 49 percent reported fewer product defects. Digital twins—virtual replicas of real-world platforms—allow for more rapid and rigorous evaluation of platforms’ performance and maintenance requirements, as well as

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those of critical components like rotor blades, in a wide range of circumstances. According to some estimates, digital twins can reduce design and maintenance costs by up to 50 to 100 percent and lead to a 10 percent effectiveness improvement.\textsuperscript{9} Finally, data analytics offers the promise of increased readiness rates through predictive maintenance: instead of conducting maintenance on defined schedules, predictive maintenance and data analytics can analyze a specific aircraft’s performance data to determine when that rotor blade needs to be replaced.\textsuperscript{10} The commercial sector is already leveraging data analytics and predictive maintenance to deliver readiness rates through the roof, compared to military rates on similar aircraft, despite smaller fleets.

While these emerging technologies offer great promise on the whole, perhaps their greatest promise lies in those sectors of the manufacturing industrial base that have not been tapped into before, most notably flight safety critical aircraft parts (FSCAP).\textsuperscript{11} Due to their critical nature, FSCAPs require that manufacturers meet stringent qualification requirements before they can incorporate these FSCAPs onto the aircraft. While these qualification requirements are essential for safety, they have historically driven up costs, along with restricting the usage of additive manufacturing and other advanced manufacturing techniques due to the technology’s immaturity. However, as these technologies have matured, there are increasingly more opportunities to leverage advanced manufacturing in this wholly untouched area.

**Human Capital**

The biggest challenge facing the entire rotorcraft industry is the competition for science, technology, engineering, and math (STEM) talent with non-traditional defense firms like Amazon and Google, which can offer substantially more money. Right now, many of the major rotorcraft primes are undertaking large efforts to


\textsuperscript{10} An example of this defined scheduled maintenance is replacing an aircraft’s rotor blade after a specific number of hours corresponding to that part’s mean time before failures regardless of the actual condition of that part.

\textsuperscript{11} “Flight Safety Critical Aircraft Part (FSCAP) means any aircraft part, assembly, or installation containing a critical characteristic whose failure, malfunction, or absence could cause a catastrophic failure resulting in loss or serious damage to the aircraft or an uncommanded engine shutdown resulting in an unsafe condition.” Source: 41 CFR § 102-33.20
hire engineering talent to work on clean sheet designs of new products and lines. However, they are also concerned that without programmatic stability, they will lose this talent to non-defense and non-traditional defense firms. While it is hard for the defense industry to compete on monetary compensation differences, people are excited to work on clean sheet designs, although they may be less excited to spend their entire careers working on sustaining and maintaining existing designs. These challenges are not limited to systems engineering but apply at all levels, including component engineering. Given that a core component of the FVL efforts is leveraging MOSA for more rapid component development, maintaining a quality component engineering workforce is critical to ensuring that FVL can be rapidly upgraded to meet the changing battlefield demands.

Beyond the work on clean sheet designs of new platforms and their components, recruiting and retaining STEM talent for critical positions, like flight control specialist, is a large challenge facing industry today. Flight control specialists are one of the hardest positions for industry to recruit, as the relevant skills are not necessarily taught at engineering schools across the United States. Instead, these flight control specialists are mostly trained in-house or through experience at companies themselves. However, once trained, these firms are then competing with Silicon Valley and Detroit for this talent, which can take years to rebuild.
Increased usage of a Modular Open System Architecture, like the Army is using in FVL and currently demonstrating through the Joint Multi-Role Technology Demonstrator (JMR TD) mission systems effort, offers great promise by enabling the Army and the Department of Defense (DoD) to “replace problematic elements in the design over time and escape from vendor lock on these elements, potentially increasing the ability to manage O&S costs through competition over the full program lifecycle.” While modular open system designs offer great promise, there is greater uncertainty about what that ultimately means for certain key industry dynamics. Before MOSAs became prevalent, the large primes had a reasonable expectation that if they won the initial production award, they would be the frontrunners for any additional follow-on work. However, with MOSAs, there is always the risk that another company could compete its component upgrades, taking over key subsystems on the airframe from the prime and vice-versa. Additionally, MOSAs might present engineering challenges for primes in managing, changing, and maintaining multiple configurations of a single platform.

While MOSAs offer great promise, CSIS found that there remains significant uncertainty as to what it might ultimately mean for certain dynamics in industry and the Army, given the current development state of FVL’s MOSA. From an industry perspective, there is uncertainty about whether the government’s top priority for MOSA is the rapid integration of new capabilities or the reduction of long-term development and sustainment costs. From the Army’s perspective, the challenge comes in creating a standard that meets certain minimum requirements, provides a
digital backbone, establishes government-defined interfaces and specifications, and integrates avionics with multi-core processing. MOSA is also intended to speed up the integration of new components, allow re-use of common components, increase commonality between FARA and FLRAA, and avoid future vendor lock. Although industry uncertainty about the implications of MOSA remains, there has been an acknowledgement that MOSA is going to be the hardest part of FVL and that both sides are making progress thanks to ongoing science and technology (S&T) programs and Army-industry working groups.

Moving forward, MOSA discussions need to be a two-way conversation between government and industry about what the government’s desired outcomes are and what is in the realm of the doable to ensure a greater chance at success. Industry needs to be willing to share its capabilities and challenges, while the government should avoid being too prescriptive in its preliminary requirements and should listen to what industry has to offer. Previous discussion between government and industry may have been hampered by both sides coming in and proscribing solutions without sufficient dialogue. Furthermore, both sides should acknowledge that a “perfect solution” does not exist and that reaching a threshold that’s “good enough” is better for everyone than delivering nothing. Finally, access to information is critical to understanding the investment business case, planning investments, and delivering and utilizing MOSA.

Similarly, the use of middle tier acquisition (MTA) authorities to develop and procure FARA and FLRAA creates uncertainties for the key underlying industry dynamics. As highlighted in CSIS’s previous work, MTA rapid prototyping efforts provide important insights into a program—such as the effectiveness of certain critical technologies or areas to reduce long-term costs—but also creates uncertainty for industry. Absent a guarantee that a prototype moves to production, and given MTA’s short timelines, this creates a dynamic where industry might have a more limited incentive to make up-front investments that result in cost savings down the road. However, MTA’s prospect of future competition creates a counterincentive for industry to invest to meet program objectives. Given the novelty of MTA authorities, and given that FVL is one of the first major programs to be executed using this approach, there is uncertainty about how those competing dynamics might play out.

Moving forward, MOSA discussions need to be a two-way conversation between government and industry.

Aligning FVL Incentive Structures for Success

**Future Vertical Lift** is best positioned to succeed if the program’s incentive structure is properly aligned such that industry understands what the Army wants them to deliver and is encouraged to deliver it.

**Requirements Consistency**

A key incentive for industry is the Army ensuring that the FARA and FLRAA program requirements are consistent and certain. Industry is unable to deliver what the Army wants when requirements are constantly changing, leaving them uncertain as to what the Army’s most important needs are. Although this has been a problem for other Army priorities like the Optionally Manned Fighting Vehicle (OMFV), the basic outline of the FARA and FLRAA requirements have remained generally consistent and transparent to industry. The FVL effort has changed somewhat since the Army made it a top priority, but what the Army said in recent years is still largely true today. While some uncertainty about FARA’s top level inventory requirement makes industry stakeholders nervous, they are also aware that it is more a feature of the trade space available in the program’s requirements than it is uncertainty about the program itself. Moreover, the Army should be willing to make tradeoffs in expectations for initial operational capability based on its overarching priorities. For example, if “schedule is king” for FVL as the Army has repeatedly stated, then the Army should be willing to accept that certain deliverables might not be ready on initial operational models and would have to be incorporated later, something that MOSA is designed to enable.

Moving forward, the Army should continue to be consistent and certain about FARA and FLRAA requirements, but also be clear about the importance of these two programs to its total modernization strategy. This is particularly salient if the defense budget experiences significant cuts or is put on a different trajectory in the coming years. Comparing previous Army modernization efforts with those of other services shows that one of the largest problems with Army modernization has been inconsistent and rapidly shifting priorities. Consistent service leadership support has been critical to the fielding of complex acquisition programs such as the F-35 and V-22 Osprey, despite those programs’ problems. Consistent support from Army leadership will not guarantee that these programs survive potential budget cuts, but they are more likely to gather and build the needed constituencies in the Department of Defense and Congress as the defense budget is debated.

**Companies have different incentives**

The opportunity of two new aircraft development programs offered by FARA and FLRAA is itself a consistent and compelling incentive for all FVL industry competitors. Beyond that, each of the different companies competing is likely to have a distinct portfolio of incentives unique to its nature and circumstances. Rather than developing a one-size-fits-all award for FARA and FLRAA, the Army should work to understand what incentivizes the different competitors, then create an award structure aligned with their priorities that incentivizes industry to meet the Army’s needs. This burden does not fall solely on the Army, as industry also needs to be open with the Army about what incentivizes them. For example, one company might favor an award structure that offers significant certainty in production quantities but a marginal award fee, while another might favor an award structure that offers almost no certainty but gives a significant incentive to accelerate delivery and drive down costs. One of the biggest benefits of using the Other Transaction Authority (OTA) is the ability of the Army to create an award structure and timeline that works best for the parties involved. Furthermore, the Army and industry should mutually recognize that award structure preferences might ebb and flow throughout the program and should be ready to adjust accordingly—so long as it is in the taxpayer’s best interests. This might lead to one incentive structure during the competitive phases of the FVL program, followed by more tailored and individualized incentive structures after competition is completed and a prime contractor is established.

**Credit for Up-Front Investment Evaluation**

The emerging technologies discussed above—such as advanced manufacturing, robotics, artificial intelligence, digital twins, and data analytics—offer great promise, but also require substantial up-front investment from industry that can be difficult to justify without a robust business case. Justifying these up-front costs is even harder in the defense sector, where DoD historically has not given much credit for these types of

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investments in the evaluation and selection process for awarding contracts. From an industry perspective, the question could arise as to why even bother making these investments for production and sustainment if it’s not going to move the needle much in the competition. Army FVL leadership has acknowledged that this has been a problem, and it is working with Army and DoD cost evaluators to improve how these investments are credited in cost estimation. While this is an important step, incorporating these considerations into the final cost estimates during the down-select might be too late, as industry needs to start making these types of investments now, well in advance. The Army should ensure appropriate incentives for upfront investment by setting up evaluation criteria that gives credit for desired investment independent from their treatment in cost estimates.

**Army Up-Front Costs AND Investments**

Within the Army, the service needs to work with Congress to determine whether it is willing to invest to develop an FVL supply chain in order to save money down the road on life-cycle costs during sustainment. Although development and production get most of the attention, 68 percent of rotary wing costs occur during sustainment. For example, would the Army be willing to pay money up-front to develop a rotary blade that needs to be replaced every 600 hours instead of every 200 hours? Although this might require more direct Army investment, it would also mean that the platform would not need to be parked as often for maintenance, reducing O&S costs. If FVL is truly intended to be a disruptive approach to Army aviation, understanding and developing the internal incentives for up-front investments within the Army is a critical enabler.

"The Army should ensure appropriate incentives for upfront investment by setting up evaluation criteria that gives credit for desired investment independent from their treatment in cost estimates."
What Does a Successful Collaborative Approach Between the Army, Congress, and Industry Look Like?

As the Army and industry move towards transitioning from current production lines to FARA and FLRAA, Congress can either be a successful collaborator or an unmoving barrier, depending on the approaches taken. History shows that when transitioning between legacy programs and new programs, it is common that Congress will add a few years of production to the end of a program’s production line; how many years depends on whether the service has laid the groundwork with Congress on transitioning production beforehand. If Congress finds the Army’s transition plan credible, it will likely add only modestly to the production schedule of the current fleet.

Historical examples from the Air Force and Navy can be illustrative. In the Air Force, the proposed retirement of the A-10s and C-130s offers two different examples of how a lack of credible transition plan can lead to rejection in Congress. In the case of the A-10, the Air Force proposed retiring the aircraft without offering up a direct replacement. Congress strongly rejected the Air Force’s proposal, extending the A-10’s lifespan and spending extra money on sustaining the aircraft. A few years later, the Air Force tried a different tactic and proposed retiring older C-130s and buying newer C-130J models to replace them. However, the Air Force surprised Congress when it included the proposal in its budget submission without having briefed Congress on their plans beforehand, leading to another rejection.

If the Army wants to gain traction for its FVL transition plans with Congress, it needs to start laying the groundwork now to start building its credibility. The core of any case for making such a transition is the need for the new capability to succeed in future operations. Additionally, the Army should avoid surprising Congress with sudden changes or reversals, and in particular avoid introducing proposals directly in a budget submission. Some level of change to the FVL programs in the upcoming
years is likely, but rather than waiting for budget submissions, the Army should be working to inform Congress as the need for changes appears. Finally, the Army should work to understand and inform the constituencies at play on the Hill. It is essential for the Army to understand all of the constituencies in play across development, production, fielding, and sustainment, and to know how they are affected. Furthermore, the Army must let affected members know in advance about what is coming down the ramp, what the beginning and end points are for these efforts.

These approaches are not a guarantor of future success, but Congress is more likely to react favorably if treated as a collaborative partner rather than an obstacle to be overcome. Recent Congressional actions suggest that the Army’s FVL plans have a solid foundation, but there is still progress to be made. Congress included an additional $75 million in FVL funding in FY 2020 towards accelerating FLRAA, but there is also a sense in Congress, as detailed in the FY 2020 National Defense Authorization Act (NDAA), that the Army needs to “continue to invest in RDT&E programmes for FVL, including programmes to improve pilot situational awareness, increase flight operations safety, and reduce operations and maintenance (O&M) costs.”

Conclusion

The Army’s effort to develop and field the next generation of vertical lift aircraft, FARA and FLRAA, will have significant implications for the industrial base. Projections show that although there will be a drop-off in the procurement of legacy aircraft in the mid-2020s as FARA and FLRAA full-rate production starts to ramp up, there is still a roughly $8–10 billion annual addressable Army vertical lift market over the next decade. O&S costs will remain predominant throughout the decade, but you can expect to see more notable shifts in other accounts. Over the next five years, R&D and upgrade spending will outpace FVL production costs as FARA and FLRAA continue through development. However, as FARA and FLRAA programs start approaching full-rate production in the middle of the decade, annual production spending will steadily ramp up, before leveling off when both programs reach full-rate production of 30 aircraft a year near the end of the decade.

Beyond the addressable market, the transition to FVL presents both challenges and opportunities for the industrial base as it optimizes and restructures. One of the most promising opportunities FVL presents is leveraging emerging technologies—such as advanced manufacturing, to include additive manufacturing, robotics, artificial intelligence, digital twins, and data analytics—to deliver cost-savings and increased performance. By leveraging these emerging technologies, industry and the Army can change how they design, manufacture, and maintain aircraft; this is particularly true in areas like FSCAPs, which have been untapped due to stringent qualification requirements. However, these technologies require substantial up-front investment, despite there being significant uncertainty as to whether the proper incentives to do so are currently in place. Additionally, one of the biggest challenges facing the industrial base is the global competition for STEM talent, both for new designs but also for critical positions like flight control specialists. While
FVL transition provides a needed draw for new talent, programmatic stability is required to retain it.

If FVL is to succeed, the most important thing is ensuring that the program's incentive structure is properly aligned such that industry understands what the Army wants and is encouraged to deliver it. A key incentive the Army can provide to industry is ensuring that the FARA and FLRAA program requirements remain consistent and certain. The Army has largely done a good job at maintaining consistent requirements throughout the program so far and should continue to do so as the program continues moving forward. Second, it is important to create incentives to make up-front investments now that can have significant cost savings down the road. Historically, DoD has not given much credit to these types of investments in its cost evaluations and competitions. While the Army is working with cost estimators to improve how these investments are credited, it should also consider setting up explicit criteria that gives credit for these investments in proposal evaluation. It is not only important that industry is incentivized to make these up-front investments; the Army also needs to consider making investments that can reduce long-term sustainment costs, given that sustainment accounts for 68 percent of rotary wing costs today.

There is still significant uncertainty about how MOSA and MTA might change key industry dynamics, given their relative novelty in aircraft development. FVL is one of the first major development programs to be executed under the new MTA approach, and there is going to be a learning process from both industry and DoD on what this new approach means. MOSA is critical to FVL's success but is also going to be one of the hardest things to manage successfully. MOSA discussions need to be a two-way street; the government can't be too prescriptive, while industry needs to describe what it has already done. Ultimately, access to information on both sides is going to be critical to understanding the investment business case, planning investments, and delivering and utilizing MOSA.

These findings and the findings from CSIS’s earlier analysis of the affordability of the Army’s Future Vertical Lift Portfolio demonstrate that the Army’s pioneering acquisition strategy to develop, procure, and field FARA and FLRAA in accelerated timelines shows promise, but there are important steps the Army still needs to undertake to ensure the program’s success. CSIS research showed that managing long-term costs is the most critical component of ensuring that the program remains affordable in the long-term. While emerging technologies offer great promise for controlling long-term costs, proper incentives are required for industry and the Army to make those crucial up-front investments. The Army must understand and consider the incentives it provides as it establishes requirements, designs evaluation criteria, and shapes its budget for FVL.
About the Authors

Rhys McCormick is a fellow with the Defense-Industrial Initiatives Group (DIIG) at CSIS. His work focuses on unmanned systems, global defense industrial base issues, and U.S. federal and defense contracting trends. Prior to working at DIIG, he interned at the Abshire-Inamori Leadership Academy at CSIS and the Peacekeeping and Stability Operations Institute at the U.S. Army War College. He holds an MA in security studies from Georgetown University and a BS in security and risk analysis from the Pennsylvania State University.

Andrew Hunter is a senior fellow in the International Security Program and director of the Defense-Industrial Initiatives Group at CSIS. He focuses on issues affecting the industrial base, including emerging technologies, sequestration, acquisition policy, and industrial policy. From 2011 to November 2014, Mr. Hunter served as a senior executive in the Department of Defense (DOD). Appointed as director of the Joint Rapid Acquisition Cell in 2013, his duties included fielding solutions to urgent operational needs and leading the work of the Warfighter Senior Integration Group to ensure timely action on critical issues of warfighter support. From 2011 to 2012, he served as chief of staff to Ashton B. Carter and Frank Kendall, while each was serving as undersecretary of defense for acquisition, technology, and logistics. Additional duties while at DOD include providing support to the Deputy’s Management Action Group and leading a team examining ways to reshape acquisition statutes.

From 2005 to 2011, Mr. Hunter served as a professional staff member of the House Armed Services Committee, leading the committee’s policy staff and managing a portfolio focused on acquisition policy, the defense industrial base, technology transfers, and export controls. From 1994 to 2005, he served in a variety of staff positions in the House of Representatives, including as appropriations associate for Representative Norman D. Dicks, as military legislative assistant and legislative director for Representative John M. Spratt Jr., and as a staff member for the Select Committee on U.S. National Security and Military/Commercial Concerns with the People’s Republic of China. Mr. Hunter holds an MA degree in applied economics from the Johns Hopkins University and a BA degree in social studies from Harvard University.