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Army Future Vertical Lift (FVL) Program

The major combat rotorcraft platforms in U.S. inventory—the Chinook, Black Hawk, Apache, and Kiowa Warrior—are based on designs from the 1960s and 1970s. While several are still in production or remanufacture, the Army is leading DOD’s effort to move to a new generation of rotorcraft technology.

The Future Vertical Lift (FVL) program is a research and development effort dedicated to discovering, investigating, and refining the technologies that is to provide the next generation of vertical lift aircraft for the United States Armed Forces. According to the Army, the goal of the program is to develop technologies that improve “maneuverability, range, speed, payload, survivability, reliability, and reduced logistical footprint” compared with current rotorcraft.

The Army lists FVL as one of its top six modernization priorities. The Marine Corps and Navy also plan to use FVL-derived technology in their next-generation rotorcraft. Although the FVL effort is intended to benefit all services, and elements of the work are joint, the Army is the lead service, and most funding for the program is included in the Army’s R&D budget.

FVL is in a fairly early stage, and aircraft likely to result from this program’s work are not expected to be operational until the early 2030s. However, in April 2018, then-Army Secretary Mark Esper directed the FVL team to determine whether promising technologies could be incorporated into a new aircraft within 10 years.

History

FVL officially began in 2009, and the strategic plan for the project was issued in October 2011. The pace of work has varied over time due to shifting Army budget priorities.

The Army is also resolving an internal debate as to its priorities. While the FVL development focus had been on the medium-lift Black Hawk helicopter replacement, Army officials have more recently noted a larger capability gap in the attack/reconnaissance fleet, and are considering whether to shift focus to that smaller platform.

FVL is currently looking at five basic categories (or “capability sets”) of aircraft varying in size, but the initial foci are a medium transport platform capable of succeeding the Army UH-60 Black Hawk and Marine H-1 “Huey” utility helicopters—the Future Long-Range Assault Aircraft (FLRAA)—and a scout platform roughly in the role of the current Apache, now called the Future Attack and Reconnaissance Aircraft (FARA). Heavy-lift variants may follow.

FLRAA

Bell and Sikorsky (with Boeing) have produced demonstrators for FLRAA. The two companies are taking different technology approaches to their efforts. The Bell V-280 (**Figure 2**) is a tiltrotor aircraft like the V-22 Osprey, with engines and rotors at the end of its wings that swivel. The Sikorsky/Boeing SB-1 (**Figure 3**) is a compound helicopter, using twin coaxial rotors to provide lift and a pusher propeller to enhance speed.

Figure 1. FLRAA Schedule

Events	Start		End	
	Quarter	Year	Quarter	Year
Material Development Decision	1	2017	1	2017
Analysis of Alternatives	3	2017	4	2019
Weapons System Specification Development	2	2019	1	2021
Program Documentation and Contracts Requirements Package	2	2019	3	2021
Architecture Definition and Risk Reduction	3	2019	4	2024
Competitive Demonstration and Risk Reduction	2	2020	2	2022
Request for Proposal Release	3	2021	3	2021
Proposal Preparation	3	2021	4	2021
Source Selection Evaluation Board	4	2021	2	2022
Contract Award	2	2022	2	2022
Preliminary Design	2	2022	4	2023
Detailed Design	4	2023	1	2025
First Prototype Delivery	2	2025	2	2025
Flight Testing	2	2025	4	2029

Source: FY2021 budget submission for Research, Development, Test & Evaluation, Army.

In the FY2020 Defense Appropriation Act, Congress added \$75.6 million for competitive demonstration and risk reduction (CD&RR) in FVL, focused on FLRAA. The main step from technology demonstrators to competitive aircraft, CD&RR will be a two-year effort designed to prepare the competing systems for projected contract award in the second quarter of FY2022. On March 18, 2020, the Army granted Bell and Sikorsky CD&RR project agreements.

Figure 2. Bell V-280 Valor



Source: Bell.

Figure 3. Sikorsky-Boeing SB-I Defiant



Source: Sikorsky.

FARA

Five competitors have been selected to develop technologies for FARA. Those awards went to

- AVX/L-3;
- Bell;
- Boeing;
- Karem Aircraft/Raytheon/Northrop Grumman; and
- Sikorsky.

The Army makes clear that these aircraft are technology demonstrators, not finished prototypes. Rather than being developed against a particular set of performance criteria, they are intended to increase the understanding of different approaches to FVL that will inform future program decisions. The next major decision is a 2020 downselect to two vendors for the final design, build, and test phase, which is expected to provide the required data for a FARA contract award in FY2024.

Sikorsky is already flying a prototype FARA, the S-97 Raider. Bell has revealed its FARA concept, the 360 Invictus.

Figure 4. Sikorsky S-97 Raider



Source: Sikorsky.

Figure 5. Bell 360 Invictus Concept



Source: Bell.

Figure 6. FARA Schedule

Events	Start		End	
	Quarter	Year	Quarter	Year
FVL CFT 2371b Competitive Prototype (CP) Design	3	2019	2	2020
FVL CFT 2371b CP - Down Select to 2 Performers	2	2020	2	2020
FVL CFT 2371b CP Build	3	2020	4	2022
FVL CFT 2371b CP Test	1	2023	4	2023
Milestone B Documentation Dev. and Coord.	1	2021	2	2024
Contract Requirement Package Development	1	2021	2	2022
EMD Request for Proposal Release	2	2022	2	2022
EMD Proposal Submission/Evaluation	4	2022	1	2024
Milestone B	2	2024	2	2024
EMD Contract Award	2	2024	2	2024
EMD Phase	2	2024	4	2028
Weapons System CDR	4	2024	4	2024

Source: FY2021 budget submission for Research, Development, Test & Evaluation, Army.

Funding

FVL funding is carried in the Research and Development, Army budget in PE 0603801A, Aviation Advanced Development. That budget was funded at \$107.6 million in FY2020; the FY2021 request is for \$134.4 million, going to \$653.7 million by FY2025. Separately, the FY2021 request for FARA (under the same PE) is \$513.5 million.

Since its inception, FVL has relied on investment by industry to advance its technologies. Although the companies have not released exact figures, they have consistently pushed for the Army to increase its commitment to the R&D phase and to define a deployment schedule and plan that could inform corporate investment decisions.

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