# THE FUTURE IS NOW:
# VERTICAL LIFT & MULTI-DOMAIN OPERATIONS


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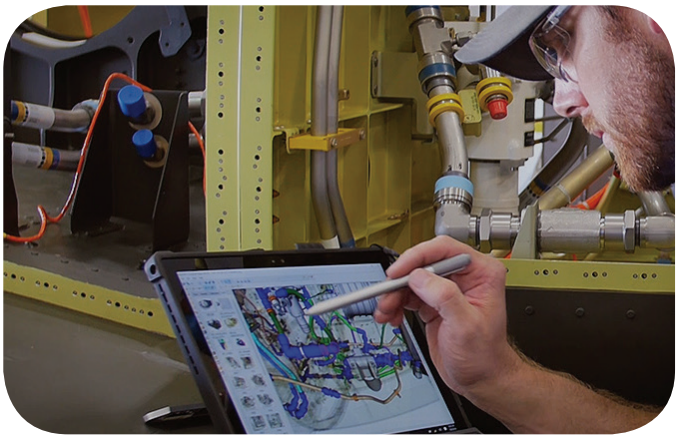
The U.S. Army is at an inflection point. Just as the service moved from counterinsurgency doctrine in the 1960s and 1970s to Air-Land-Battle doctrine in the 1980s to counter the Soviets, the Army now finds itself preparing for peer adversaries, such as Russia and China, after nearly two decades battling violent extremists in the Middle East and Afghanistan. Under the Army's Multi-Domain Operations concept (MDO) that stemmed from the 2018 National Security Strategy, the Army, as part of the joint force, is preparing to defeat such adversaries across the full spectrum of conflict—air, land, maritime, space and cyberspace. Such potential adversaries have not frozen their technology efforts over the last decade but have studied U.S. warfighting capabilities and made adjustments. So as potential enemies adapt to erode U.S. military dominance, hypersonics, artificial intelligence, and robotics are changing the character of war.

To enable MDO, the Army has identified six key modernization areas—the "Big Six" —to revolutionize Army capabilities: Long-Range Precision Fires; the Next Generation Combat Vehicle; Future Vertical Lift (FVL); Network Command and Control, Communications and Intelligence; Short-Range Air Defense; and Soldier Lethality.

Army Aviation requires revolutionary advances in maneuverability, agility, lethality, reach, survivability, and sustainment to operate on the highly contested battlefield of the future. FVL's two main programs right now, Future Attack Reconnaissance Aircraft (FARA) and the Future Long-Range Assault Aircraft (FLRAA) are set up to achieve these core requirements by providing significantly enhanced attack, reconnaissance and assault capabilities. Area denial tactics require a multi-domain approach; aviation enables ground maneuver providing reaction time and maneuver space based on the fact you can cross long distances at a rapid rate free from the tyranny of terrain. FVL is a vital part of Army modernization and the service's efforts to satisfy the requirements of MDO.

FVL empowers many facets of MDO, but timely and sustainable procurement are necessary. In recognition, the Army and Congress are considering an acceleration of FVL to deliver it to warfighters in 2030. This aviation modernization effort is about more than new aircraft. Most importantly, it provides ground maneuver forces the capability to gain positional advantage rapidly, extend operational reach, and provide logistics support from relatively secure areas.



Core to MDO are the element of surprise and simultaneous and sequential operations through the integration of capabilities across all domains to present multiple dilemmas to an adversary and gain control of the operational environment.

The Army and other services are planning a series of MDO war games and exercises this year.

While the Army wants to compete in all domains short of armed conflict to deter potential enemies, if deterrence fails, MDO calls for the Army to "penetrate" enemy anti-access and area denial systems to enable the strategic and operational maneuver of forces; "dis-integrate" the enemy's defensive systems to permit operational and tactical maneuver; "exploit" the resulting freedom of maneuver to gain objectives by defeating the enemy in all domains; and quickly return to a competitive state, "re-compete."

The first aviator to serve as Army Chief of Staff, Gen. James McConville has said that the service "cannot be an Industrial Age Army in the Information Age. We must transform all linear industrial age processes to be more effective, protect our resources, and make better decisions. We must be the Army of tomorrow, today."

The Army FVL Cross Functional Team efforts and the Joint Multi-Role Technology Demonstrator (JMR TD) program provide a blueprint for how services can move quickly from strategy to requirement to procurement, through close collaboration with industry, to fulfill the Army vision for MDO.

The government/industry partnership on JMR TD moved from a concept to a high-performance aircraft—the Bell V-280 Valor tiltrotor—in less than five years.

The V-280 has flown more than 122 flight hours and in May marked the completion of all its Key Performance Parameters performed as part of the JMR TD. The V-280 demonstrated the raw control power in pitch, roll, and yaw maneuvers to meet the Army's Level 1 Handling Qualities requirements, the highest performance standard for agility.

For the JMR TD follow-on FLRAA program—a component of the FVL program and a planned replacement for the UH-60 Black Hawk—the Army wants significantly greater speed, range, and payload than traditional rotorcraft have to fulfill the demands of MDO. FLRAA is to conduct assaults deep in enemy territory to facilitate the "exploit" phase of MDO.

For FLRAA— the mid-sized assault and utility aircraft, the service wants an aircraft with a 300 nautical mile unrefueled combat radius; 280 knots maximum continuous cruise speed at max power; a capacity of 12 passengers; a minimum of 365 pounds cabin floor capacity per square foot with tie-downs capable of holding 5,000 pounds each; maintainability of 200 flight hours in 60 days between scheduled field maintenance; and 92 percent operational readiness.

The success of JMR TD has led the Army to follow a similar


program to procure the "knife fighting" FARA platform to replace the Army's retired Bell OH-58D Kiowa Warrior reconnaissance helicopters. Another key piece of FVL and MDO, FARA supports capabilities such as Long-Range Precision Fires and the Next Generation Combat Vehicle for example by delivering superior targeting and close combat fire support respectively.

The Bell FARA design takes advantage of proven technologies from V-280, Bell 525 and other Bell programs. Bell relies on its knowledge of the mission as the Kiowa Warrior was known to be a capable aircraft with the highest operational tempo and uptime over the last decade-plus of war before it was retired. The new design builds on Bell's expertise in fly-by-wire flight controls, rotors and drives, as well as design to build technology that enhances aircraft sustainability.

The service has laid out a strategy to use innovative acquisition methods leveraging the science and technology investments in JMR TD to accelerate FLRAA as a program of record. Through the success of the Army-led JMR TD partnership, industry proved its ability to deliver high-performance aircraft on budget and schedule. The Army has released an RFP for a FLRAA competition, as well as progress with a similar construct to select two competitors to continue work on the FARA aircraft in early 2020, and Bell is responding.

The Army acknowledges this is no small undertaking, but it is not the first time the service has moved with purpose to fulfill aviation needs. The recent JMR TD success demonstrates industry's ability to leverage advances in design and manufacturing technology, and recent experience, to deliver exceptional aircraft to suit the Army's requirements on time and on budget.

However, designing, building, and fielding aircraft are only part of the equation for a successful program of record. Sustainment plays a vital role as well. Bell's Integrated Product Support team "is trying to stay a step ahead" on V-280 maintenance, said Terry Horner, director of government relations at Bell and a 30-year Army officer with experience operating several aircraft during multiple combat tours. The company's Maintenance Steering Group-3 (MSG-3) "is focused on sustaining and maintaining the aircraft so it's available to the warfighter."

"There's an old saying that 50 percent of your maintenance is caused by 50 percent of your maintenance—consistently pulling components to inspect them," he said. "If there's nothing wrong with those parts, why don't we extend the time between inspections? We're pulling a lot of information and running ground tests, which informs our maintenance efforts and ultimately make the V-280 more affordable."

As Bell ramps up such efforts, the V-280 is ready to become the Army's Future Long-range Assault Aircraft.

"The V-280 is purpose-built for the long-range assault mission," said Carl Coffman, director of Advanced Vertical Lift Systems sales and strategy at Bell and a retired Army aviator with thirty years of experience in multiple combat theaters. "Incorporating lessons learned from the V-22, our commercial products and combined with a tradition of vertical lift excellence, Bell developed a reliable aircraft with maintenance concepts that support availability and reduced life-cycle cost. Side doors, no rotating engines, and no tail rotor all increase operational options and safety, while decreasing cost and system complexity."

This year and next are crucial for the FLRAA program. The Army is on a path with an acquisition strategy that maintains the momentum of the JMR TD, allows informed decisions and gets the warfighters a capability they need.

"We think the Army is going to go with the best athlete. That's the V-280," Coffman said. "The V-280 has the needed range, speed and survivability characteristics to enable MDO."

As a crucial part of the six Army modernization priorities, the Future Vertical Lift aircraft are designed to outmaneuver and defeat adversaries in an anti-access, area-denial environment.

"At the end of the day, Army modernization is a critical component of national security to restore our eroded military overmatch," Horner said. "2019 is the year to move to the next acquisition stage for FLRAA, and the V-280 Valor will deliver revolutionary capability at an affordable cost." ■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