



The Bell Invictus deploys Air Launched Effects or missiles from its Modular Effects Launchers. (Bell)

# Glimpses of FVL

Surrogate platforms and proof-of-concept demonstrators enabled Project Convergence 21 to experiment with pieces of the Future Vertical Lift ecosystem.

By Frank Colucci

**W**ith proposals for a Future Long Range Assault Aircraft (FLRAA) before source selection evaluation boards, and prototypes for the Future Attack Reconnaissance Aircraft (FARA) heading for a flight competition, the shape of Future Vertical Lift (FVL) is still to be determined. Joint Multi-Role Technology Demonstrator (JMR TD) flight test data from the Bell V-280 Valor tiltrotor and the Sikorsky-Boeing SB>1 Defiant compound helicopter will help the US Army pick a FLRAA in 2022. FARA competitive prototypes of the Bell 360 Invictus and Sikorsky S-103 Raider X helicopters are about 70% complete, and one will win a development contract in fiscal 2024.

Lacking FVL platforms, Project Convergence 21 (PC21) at Yuma Proving Ground, Arizona, in October and November gave soldiers glimpses of the FVL ecosystem. PC21 scenarios saw Air Launched Effects (ALE) fly and a new gun system fire

from a FARA surrogate, and soldiers were resupplied by an autonomous helicopter standing in for FLRAA.

Some level of autonomy remains expected in both the FARA armed scout and FLRAA squad carrier. By the end of 2021, the Bell V-280 Valor tiltrotor JMR TD had finished flight tests, including an autonomous flight demonstration in December 2020. After 214 flight hours, the Valor was disassembled and showed rotor and drive systems in excellent condition, according to Bell V-280 program director Ryan Ehlinger. The Sikorsky-Boeing SB>1 Defiant keeps flying through 2022 to validate speed, maneuverability and load factors for FLRAA design optimization under a Phase II Competitive Demonstration and Risk Reduction (CD&RR) contract. Sikorsky has demonstrated autonomous flight with its Matrix technology on S-76B and UH-60A helicopters.

PC21 included a semiautonomous resupply mission scenario that used the Defense Advanced Research Projects Agency (DARPA) aircrew in-cockpit automation system (ALIAS) in a UH-60M Black Hawk. Air assault soldiers of the 82nd Airborne Division received supplies and tasked the helicopter to return to base. The semi-autonomous Black Hawk was flown via a ground control station with crew aboard, but the mission remained under the command of the division headquarters.

At PC21, the ALIAS helicopter set down at an unimproved landing zone.

### Let Fly and Fire

Significantly, DARPA's ALIAS Black Hawk also launched two ALE small unmanned aircraft systems (UAS) during the resupply mission. Small and large ALEs are expected to spot and suppress air defenses for FLRAA and FARA crews in contested airspace. The Altius 600 surrogate vehicles used at PC21 flew from a modular effects launcher (MEL) on the Black Hawk external stores support system (ESSS). The MEL fabricated by the US Army Combat Capabilities Development Command (DEVCOM) is government-furnished equipment (GFE) on the FARA and likely used by FLRAA. The Army continues to pursue one-over-many architectures where a single operator controls multiple UAS. In another PC21 scenario, five ALEs were launched during the same mission under division tactical control.

FARA is also meant to be armed with a GFE 20 mm gun system. The XM915 cannon fired from a Black Hawk at PC21 was sponsored by the FVL Cross-Functional Team and developed as a science and technology project of the DEVCOM Armaments Center at Picatinny Arsenal, New Jersey. The 115-lb (52-kg) three-barreled rotary cannon fires electrically-primed 20x102 mm rounds fed via a linkless carrier drive system.

General Dynamics Ordnance and Tactical Systems is the Army's industry partner for the XM915. The Black Hawk playing FARA in PC21 carried the gun fixed-forward on an ESSS station with its control unit and ammunition magazine in the helicopter cabin. The rapid-fire gun was triggered from the pilot's cyclic control stick and aimed by yawing the aircraft. The XM915 at Yuma fired about 2,000 rounds in flight in an operational context to collect noise, blast overpressure, recoil and impulse data. The FARA gun will progress to live-fire tests from a software-controlled turret on a ground stand in 2022, and data and the airworthiness certification from PC21 may advance or reduce testing in the FARA program of record.



Black Hawks played FARA and FLRAA at Project Convergence at Yuma last October and November. (US Army)



The XM915 gun for the Future Attack Reconnaissance Aircraft was air-fired at Project Convergence 21 on a UH-60M Black Hawk. (US Army)



The Sikorsky Defiant X shows the government-furnished 20 mm cannon and modular effects launcher of FARA. (Sikorsky)