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Army Aviation Modernization

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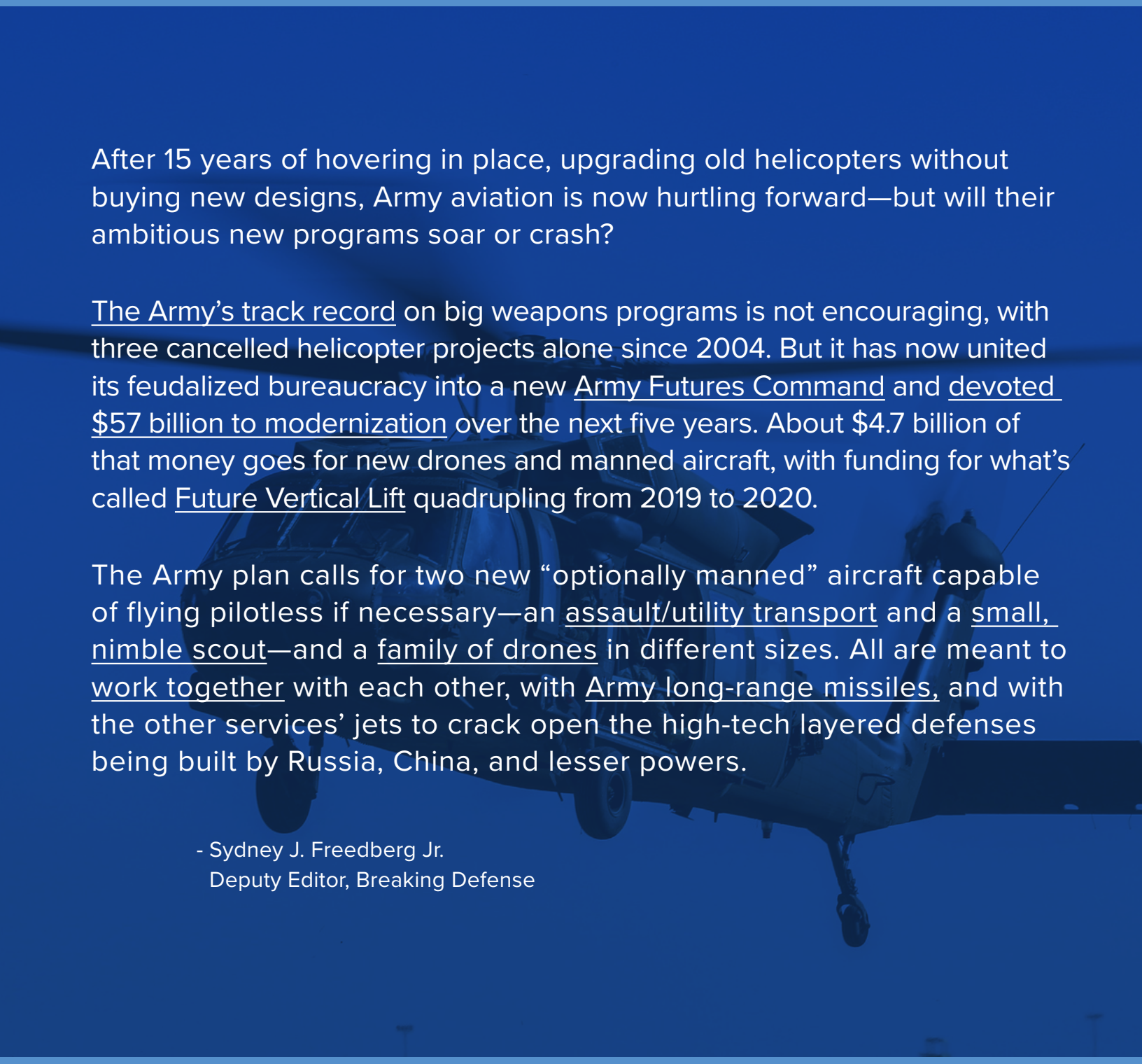
THE SITREP:
ARMY AVIATION MODERNIZATION



After 15 years of hovering in place, upgrading old helicopters without buying new designs, Army aviation is now hurtling forward—but will their ambitious new programs soar or crash?

The Army's track record on big weapons programs is not encouraging, with three cancelled helicopter projects alone since 2004. But it has now united its feudalized bureaucracy into a new Army Futures Command and devoted $57 billion to modernization over the next five years. About $4.7 billion of that money goes for new drones and manned aircraft, with funding for what's called Future Vertical Lift quadrupling from 2019 to 2020.

The Army plan calls for two new "optionally manned" aircraft capable of flying pilotless if necessary—an assault/utility transport and a small, nimble scout—and a family of drones in different sizes. All are meant to work together with each other, with Army long-range missiles, and with the other services' jets to crack open the high-tech layered defenses being built by Russia, China, and lesser powers.

- Sydney J. Freedberg Jr.
  Deputy Editor, Breaking Defense

ARMY AVIATION ACCELERATES: CAN NEW PROGRAMS DELIVER?

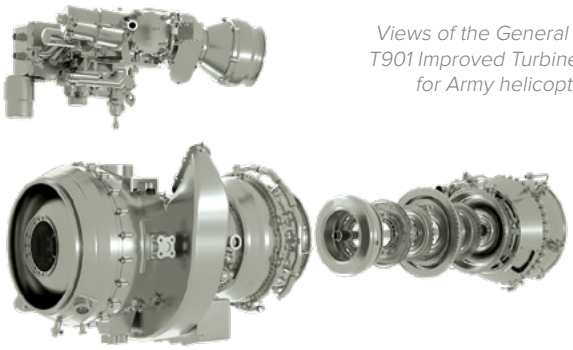
By Sydney J. Freedberg Jr. | April, 2019

WASHINGTON: How fast is Army aviation flying? Just since January, three new aircraft programs have collectively hit almost half a dozen milestones, with a fourth competition officially launching any day now. Meanwhile the Army's cancelled long-planned upgrades to a Vietnam-era aircraft to free up funds for all-new designs.

HERE'S THE TIMELINE:

Bell V-280 Valor in flight

January 24 - FLRAA Flight: Bell announces its prototype V-280 Valor tiltrotor just hit the 280 knot speed it was named for. That's 322 mph, more than twice as fast as the UH-60 Black Hawk helicopter the Valor is vying to replace under the **Future Long-Range Assault Aircraft** program. (Its rival hit a milestone of its own just two months later; see below). As the name implies, FLRAA will have not only greater speed than current helicopters but much longer range. The combination is meant to let FLRAA launch from bases too far away for most Russian or Chinese missiles to hit, then dash through air defenses to land raiding forces deep behind enemy lines.



Views of the General Electric T901 Improved Turbine Engine for Army helicopters

February 1 - ITEP Award: GE's T901 engine wins the Army's **Improved Turbine Engine Program** contract. ITEP is a bridge between upgrading the old and building the new. It was originally envisioned as replacing the engines on the venerable Black Hawk and Apache — which have gained weight and lost performance over decades of upgrades — with something that provides 50 percent more horsepower while burning 25 percent less fuel. But the Army's increasingly interested in using ITEP on its future aircraft as well. Combining proven components with cutting edge tech, rather than inventing everything from scratch as on the canceled Future Combat Systems program, is how the Army hopes to get its new weapons quickly and at a tolerable cost.

CH-47F Chinook

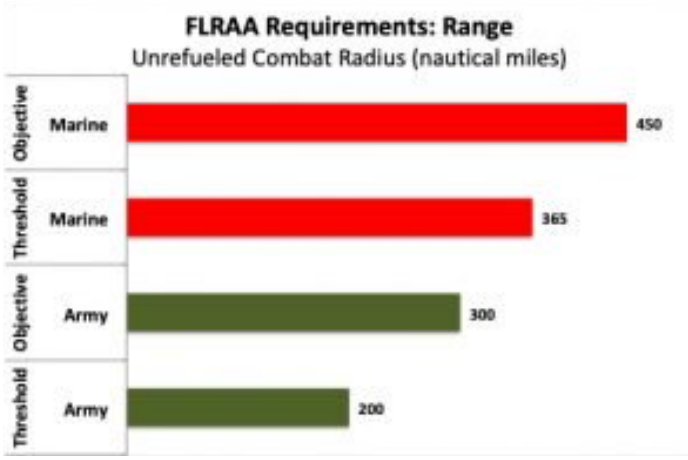
March 12 - Chinook Cut: The Army rolls out its budget plan for 2020-2024. As expected, it cuts or cancels over 180 programs to free up funding for its Big Six modernization priorities, of which new aircraft — collectively, Future Vertical Lift — are No. 3 after long-range artillery and armored vehicles. One of the sacrifices on the altar of modernization: a major upgrade program for Boeing's **CH-47F Chinook,** the latest model of a heavy-lift workhorse that first saw service in Vietnam. (Upgrades to the less numerous Special Operations variant, the MH-47G, continue). The Army once planned on keeping Chinooks in service for up to a century — 1965-2065 — and there's still no replacement heavy-lifter even on the drawing boards, but the service made the tough decision to stop updating the aging aircraft and move the money to all-new designs.

SB>1 Defiant on its first flight

March 21 - FLRAA Flight, Reprise: Over a year behind Bell's V-280, Sikorsky and Boeing got their SB>1 Defiant prototype into the air for the first time. While V-280 is a tiltrotor, like the Marine Corps' V-22 Osprey, SB>1 looks like a traditional helicopter at first glance — but at high speeds its ultra-rigid main rotors effectively act as wings while a pusher propeller provides tremendous thrust. Sikorsky (now part of Lockheed) invented the technology and is pitching it as inherently more compact and agile than wide-winged tiltrotors. If true, that may be crucial, because Army pilots don't want the Future Long-Range Assault Aircraft's increased speed and range to come at the price of the low-level maneuverability they've come to know and love in conventional helicopters.

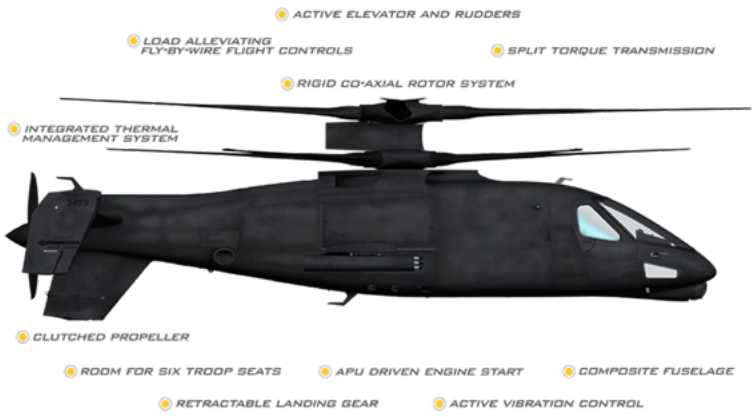
Martin engineers show of their V-Bat vertical take-off and landing drone

March 28 - FTUAS Award: Defense industry mainstay Textron and relatively tiny newcomer Martin UAV win $99.5 million each to build competing prototypes for the Future Tactical Unmanned Aerial System. FTUAS is a new mid-ranged reconnaissance drone to replace the current RQ-7 Shadow with something that's smaller, sneakier, and able to take off and land without a runway. FTUAS is also just one of three new drones meant to extend the Army's reach, alongside a larger Advanced Unmanned Aerial System (AUAS) to replace the Grey Eagle (the Army version of the Predator) and much smaller mini-drones — aka Air-Launched Effects (ALE) — that can be fired from a larger aircraft like rockets.



April 4 - FLRAA RFI: The Army posted a formal Request For Information (RFI) asking industry for potential options for the Future Long-Range Assault Aircraft. Joining the effort are Special Operations Command, which wants its variant of the aircraft to fold up small enough to fit into a C-17 jet transport, and the Marine Corps, which adds a whole host of demands. The Marines want even more speed and range than the Army, plus adaptations to operate from Navy ships, plus in-flight refueling capability, plus built-in weapons — oh, and that's not counting their desire for a

gunship version. The Army wants to award a contract in 2021, start test flights in 2024, and have the first combat unit fully equipped by 2030. Target cost per aircraft (on average — the first ones will cost more, later ones less, as the production line gets up to speed): $43 million.



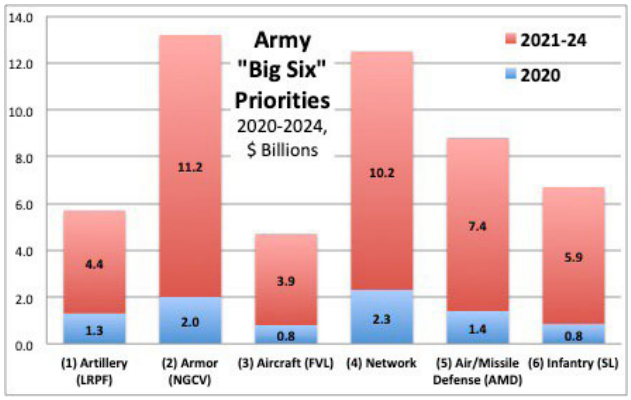
Sikorsky (Lockheed) S-97 Raider design, a leading candidate for the Army's Future Attack Reconnaissance Aircraft (FARA)

April TBD: The competition for the Army's new aerial scout, the Future Attack Reconnaissance Aircraft, is expected to kick off in April with the official release of the final Request For Proposals. FARA would replace the OH-58D Kiowa helicopter, another much-upgraded veteran of Vietnam that last flew in 2017. In the interim, the Army's using the larger, better-armed, but less agile AH-64 Apache gunship in the recon role. Three previous efforts to build a new scout aircraft all failed: Comanche was cancelled in 2004, Arapaho was cancelled in 2008, and Armed Aerial Scout was stillborn in 2013 before a competition even began. Each time, the Army redirected the funding to continued upgrades of aging aircraft. Will the fourth time, FARA, be the charm?

FARA's objective is to scale down the advanced technology used on the larger Future Long-Range Assault Aircraft to make similarly dramatic gains in speed and range. Both FARA and FLRAA may also end up being powered by GE's Improved Turbine Engine.

In fact, the Army's seeking to standardize all sorts of systems across its future aircraft fleet. That's why the service is developing a Modular Open Systems Architecture (MOSA) to provide a single framework used by multiple aircraft that can easily plug-and-play new electronics, whether to customize an aircraft for a particular mission or to upgrade existing systems with something new. (This is an approach industry groups have long urged because it allows more companies, especially smaller companies, to compete for specific components, rather than have a few big incumbents use proprietary technologies to achieve "vendor lock.")

The ideal is a single common cockpit where controls, display screens, helmet-mounted displays, and more are all the same no matter which aircraft you're in. That could decrease training costs and make it much easier for a pilot used to say, the FARA scout. to adapt to the FLRAA transport or vice-versa.



LRPF: Long-Range Precision Fires. NGCV: Next-Generation Combat Vehicle. FVL: Future Vertical Lift. AMD: Air & Missile Defense. SL: Soldier Lethality. SOURCE: US Army. (Click to expand)

If you count Modular Open Systems Architecture and the Improved Turbine Engine Program as major efforts in their own right — ones that build components for multiple aircraft — then Army aviation has seven balls in the air right now. (In brief: MOSA, ITEP, FLRAA, FARA, FTUAS, AUAS, and ALE).

That's a tremendous task for both industry and the Army acquisition bureaucracy, which historically has struggled to get even one new aviation program going. And there are even more moving pieces if you look across the entire modernization effort, from super-cannon that can shoot 1,000 miles to AI-assisted targeting goggles that help infantry pinpoint targets. Official Army documents list some 31 high-priority programs, although the exact number depends on what initiatives you count separately and which ones you bundle together. By our count, there are 12 major modernization milestones packed in 2019 alone.

Army leaders believe this high-speed, high-tech effort is essential to modernize the service for future multi-domain warfare against Russia, China, and other high-tech foes. Will it work? That's up to the Army — and to the companies that win the contracts to actually build the new technology.

VIEWPOINT FROM ELBIT SYSTEMS OF AMERICA

ELBIT'S VIEW ON HELICOPTER MODERNIZATION

Harry Hewson is Senior Director of the Vertical Lift segment at Elbit Systems of America where he oversees all programs in the rotary wing and tilt-rotor portfolio. Before joining ESA in 2014, Harry was an attack helicopter pilot in the United States Marine Corps, and he has over 3000 tactical flight hours in UH-1N Huey and AH-1W Cobra helicopters. Harry held the rank of colonel in the Marine Corps and was Program Manager of the USMC Light/Attack Helicopter program, PMA-276, at Naval Air Systems Command. Under his leadership, PMA-276 developed and fielded the UH-1Y and AH-1Z helicopters while supporting and upgrading the combat-proven UH-1N and AH-1W.

1 After decades of canceling new helicopters — Comanche, Arapaho, AAS — and focusing on upgrades to legacy platforms, the Army is now urgently accelerating new manned and unmanned aircraft: FVL FLARA & FARA; FTUAS, Advanced UAS, Air Launched Effects. How is the industry in general, and Elbit in particular, adapting to keep up with the new pace — without dropping the ball on the legacy programs whose sustainment will be big business for decades to come?

ElbitAmerica's core technologies have an important and expanding presence on nearly every legacy DoD rotorcraft: helmet mounted displays, mission computers, and cockpit displays. This gives us the ability to improve the capabilities of those systems with an eye toward the requirements of FVL platforms, so today's aviators get innovative new capabilities that can be baseline requirements for FVL mission equipment. The challenge in FVL lies in the tension between optimizing a system for a specific mission set and generalizing requirements for commonality and portability. For this reason, we are heavily involved in things like FACE and the Vertical Lift Consortium, to help build a future family of systems that can be easily customizable, with very high security, at a reasonable cost. ElbitAmerica has also made significant investments in our ability to co-develop Army Aviation solutions and to better define state of the art technology prior to program initiation. These include the purchase of a light twin-engine helicopter for conversion into a Vertical Lift Test Bed, and the construction of an advanced ground-based flight simulator for experimentation purposes. These efforts enable us to bring mature, flight-tested technology to the Army at program inception.

2 How is industry, and Elbit in particular, using innovative mechanisms such as OTAs, Section 804, CRADAs, consortia, etc. to accelerate Army programs? What is still best done under the FAR?

Alternative acquisition strategies can be very useful in speeding up the development, acquisition, and insertion of new technologies. They are particularly useful when requirements are evolving or uncertain. We actively participate in and are members of numerous consortiums, and leverage those relationships and activities to shape our acquisition strategies and positioning to meet the government's intent of high velocity tech insertion. We also team on many projects through CRADAs and other creative demonstrative efforts to help our customers shape their requirements and be as efficient as possible in their acquisitions.

ELBIT'S VIEW ON HELICOPTER MODERNIZATION

3 As you look at opportunities in Army aviation, how much potential and opportunity to add value do you see in the airframe and mechanical components — engines, rotors, etc. — as opposed to electronics, software, and mission systems generally, especially given the Army's desire for commonality and interoperability across programs?

Air vehicle and dynamic component improvements are really the provenance of the major primes and engine manufacturers. In the world of rotorcraft, ElbitAmerica is fundamentally a human-machine interface company. We provide the sensors, processors, displays, and software that give pilots the best possible situational awareness so that they can execute missions more effectively. The primes make the machines; we make the machines more effective. The net benefit is that with mission avionics, we can upgrade and improve capabilities through software or limited hardware changes very rapidly, in comparison to what it takes to improve the dynamic capabilities of an air vehicle.

4 What challenges does ElbitAmerica face as the arm of an overseas corporation, particularly in terms of relationships, building a US manufacturing base, and sharing sensitive or classified information between the US and Israeli branches? What advantages do your Israeli roots bring?

ElbitAmerica has more than 1600 employees in the United States, operating in strict compliance with U.S. technology transfer and security regulations. Our Special Security Agreement with the Department of Defense allows us to perform classified contracts, using both organically developed technology and core technology from our Israeli affiliates. When pursuing new business and developing new technology – and within the safeguards of our SSA – we collaborate with our Israeli parent company and sister divisions to bring a rapid-acquisition mindset and wide-ranging approach to innovation that transcends the typical conservatism of other companies. It's an important complement to our technical engineering teams and leadership team. We have used this approach for decades, and it works very well – and frontline platforms like the Apache and Osprey are more capable because of it.

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